

INTERNATIONAL CENTRE FOR SETTLEMENT OF INVESTMENT DISPUTES

In the arbitration proceeding between

TETHYAN COPPER COMPANY PTY LIMITED

Claimant

and

ISLAMIC REPUBLIC OF PAKISTAN

Respondent

ICSID Case No. ARB/12/1

AWARD

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Rt. Hon. Lord Leonard Hoffmann
Dr. Stanimir A. Alexandrov
Professor Dr. Klaus Sachs, President

Secretary of the Tribunal

Ms. Mercedes Cordido-Freytes de Kurowski

Assistant to the Tribunal

Ms. Susanne Schwalb

Date of dispatch to the Parties: 12 July 2019

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Table of Selected Abbreviations and Defined Terms

2000 Addendum	2000 Addendum to the CHEJVA dated 4 March 2000
2002 BM Rules	Mineral Rules enacted by Balochistan in 2002 to implement the National Mineral Policy, dated September 1995
2006 Novation Agreement	Agreement pursuant to which Claimant became a party to the CHEJVA (replacing BHP) dated 1 April 2006
2012 Provisional Measures Request	Claimant's Request for Provisional Measures dated 23 July 2012
2018 Provisional Measures Request	Claimant's Request for Provisional Measures dated 15 February 2018
Anderson	Expert Report of Dr. Corby G. Anderson, dated 16 April 2018
Antofagasta	Antofagasta plc
Application	Mining lease application submitted by TCCP to the Licensing Authority on 15 February 2011
Application for a Ruling <i>in Limine</i>	Respondent's Application for a Ruling <i>in Limine</i> and for Spoliations Sanctions dated 7 February 2018
Arbitration Rules	ICSID Rules of Procedure for Arbitration Proceedings 2006
Ault	Potential Impacts to Pakistan's Marine Fisheries & Ecosystem from Reko Diq, prepared by Dr. Jerald S. Ault, dated 27 March 2018
Australia-Pakistan BIT	<i>Agreement between Australia and the Islamic Republic of Pakistan on the Promotion and Protection of Investments</i> , signed on 7 February 1998 and entered into force on 14 October 1998
Balochistan	Province of Balochistan
Barrick	Barrick Gold Corporation

BHP	BHP Minerals International Exploration, Inc.
BIT	<i>Agreement between Australia and the Islamic Republic of Pakistan on the Promotion and Protection of Investments</i> , signed on 7 February 1998 and entered into force on 14 October 1998
Boggs I	Witness Statement of Ms. Catherine (“Cassie”) Boggs, dated 1 February 2013
Boggs V	Fifth Witness Statement of Ms. Catherine (“Cassie”) Boggs, dated 21 March 2017
Brailovsky/Wells I	Expert Report of Mr. Vladimir Brailovsky and Professor Louis T. Wells, dated 20 September 2017
Brailovsky/Wells II	Second Expert Report of Mr. Vladimir Brailovsky and Professor Louis T. Wells, dated 27 March 2018
Burrows I	Expert Report of Dr. James C. Burrows, dated 19 September 2017
Burrows II	Rejoinder Report of Dr. James C. Burrows, dated 29 March 2018
CA-[#]	Claimant’s Legal Authority
CHEJVA	Chagai Hills Exploration Joint Venture Agreement dated 29 July 1993
CE-[#]	Claimant’s Exhibit
Cessford	Expert Report of Ms. Fiona Cessford-Le Roux, dated 13 December 2017
Claimant’s Memorial on Liability	Claimant’s Memorial dated 1 February 2013
Claimant’s Quantum Memorial	Claimant’s Memorial on Damages dated 22 March 2017
Claimant’s Quantum Post-Hearing Brief	Claimant’s Quantum Post-Hearing Brief dated 31 August 2018
Claimant’s Quantum Reply	Reply Memorial on Quantum of Damages dated 13 December 2017
Claimant’s Submission on Costs	Claimant’s Submission on Costs dated 28 September 2018

Claimant's Supplemental Quantum Reply	Claimant's Supplemental Quantum Reply Memorial dated 9 April 2018
Connor	Expert Opinion of Dr. Kerry M. Connor on Potential for TCC to Acquire and Maintain a Social License to Operate, dated 23 March 2018
Dagdelen/Owen I	Expert Report of Professor Kadri Dagdelen and Mr. Terry Owen, dated 19 September 2017
Dagdelen/Owen II	Rejoinder Report of Professor Kadri Dagdelen and Mr. Terry Owen, dated 29 March 2018
Davies I	The Security Risk Context for the Reko Diq Project, prepared by Mr. Julian Davies, dated 19 September 2017
Davies II	Reko Diq S-RM Expert Report (2nd), prepared by Mr. Julian Davies, dated 24 March 2018
Davis I	Quantum of Damages Analysis prepared by Professor Graham A. Davis, dated 22 March 2017
Davis II	Quantum of Damages Reply Report prepared by Professor Graham A. Davis, dated 13 December 2017
Decision on Jurisdiction and Liability	Tribunal's Decision on Jurisdiction and Liability dated 10 November 2017
Decision on Respondent's Application to Dismiss the Claims (with reasons)	Tribunal's Decision on Respondent's Application to Dismiss the Claims (with reasons) dated 10 November 2017
Decision on Respondent's Reconsideration Request	Tribunal's Decision on Respondent's Request for Reconsideration of the Tribunal's Decision on Jurisdiction and Liability dated 28 February 2018
Disqualification Proposal	Respondent's Request for Disqualification of the Tribunal dated 25 November 2017
Disqualification Request	Respondent's Request for Disqualification of Dr. Stanimir Alexandrov dated 7 July 2017
Drury	Expert Report of Dr. Leonard Drury, dated 13 December 2017

EL-5	Exploration License designated EL-5, issued 18 May 2002, with retroactive effect as of 21 February 2002, for a period of three years
EPZ	Export Processing Zone
ER	Expert Report
ESIA	Environmental and Social Impact Assessment for the Reko Diq Project dated November 2010
Expansion Pre-Feasibility Study	Expansion Pre-Feasibility Study completed by Claimant in July 2010
Feasibility Study	Initial Mine Development Feasibility Study submitted by TCCA to the Government of Balochistan on 26 August 2010
Filas I	Independent Review of the Environmental and Social Documentation for the Reko Diq Copper-Gold Project Chagai District, Balochistan, Pakistan, prepared by Ms. Barbara A. Filas, dated 19 September 2017
Filas II	Second Expert Report of Filas Engineering and Environmental Services LLC, prepared by Mr. Barbara A. Filas, dated 29 March 2018
FET	Fair and Equitable Treatment
GOB	The Government of Balochistan
GOP	The Government of Pakistan
H-14 / H-15	Principal copper-gold orebodies at the Western Porphyries, Reko Diq
H-4	Tanjeel copper orebody, Reko Diq
Haq I	Expert Report of Dr. Ikramul Haq, dated 18 September 2017
Haq II	Second Expert Report of Dr. Ikramul Haq, dated 25 March 201[8]
Hearing on Jurisdiction and Liability	Hearing on Jurisdiction, Liability and the Counter-Claims held from 6 to 17 October 2014 in Paris, France

Hearing on Quantum	Hearing on Quantum held from 14 to 24 May 2018 in London, United Kingdom
Henry/Howden I	Expert Report of Mr. David Henry and Mr. Leonidas Howden, dated 18 September 2017
Henry/Howden II	Expert Report of Mr. David Henry and Mr. Leonidas Howden rebutting Claimant's reply, dated 26 March 2018
ICSID Convention	Convention on the Settlement of Investment Disputes Between States and Nationals of Other States dated March 18, 1965
ICSID	International Centre for Settlement of Investment Disputes
ILC Articles	International Law Commission, Articles on State Responsibility of States for Internationally Wrongful Acts, 2001
Joint Venture	Unincorporated contractual joint venture between the BDA [Balochistan] and TCCA, governed by the CHEJVA
Jones	Expert Report of Mr. Michael Jones, dated 13 December 2017
Khokhar II	Second Witness Statement of Mr. Irshad Ali Khokhar, dated 25 August 2014
Khokhar III	Third Witness Statement of Mr. Irshad Ali Khokhar, dated 19 September 2017
Khokhar IV	Fourth Witness Statement of Mr. Irshad Ali Khokhar, dated 29 March 2018
Licensing Authority	Director General of the Mines & Mineral Development Department of Balochistan, decided on the Mining Lease Application
Livesey IV	Fourth Witness Statement of Mr. Timothy Livesey, dated 1 February 2013
Livesey V	Fifth Witness Statement of Mr. Timothy Livesey, dated 23 April 2013
Livesey IX	Ninth Witness Statement of Mr. Timothy Livesey, dated 13 December 2017

Luksic I	Witness Statement of Mr. Jean-Paul Luksic, dated 23 April 2014
Luksic II	Second Witness Statement of Mr. Jean-Paul Luksic, dated 22 March 2017
Mayer I	Expert Report of Mr. Anton Mayer, dated 13 December 2017
Mayer II	Second Expert Report of Mr. Anton Mayer, dated 16 April 2018
MCC	China Metallurgical Group Corporation
Mincor	Mincor Resources NL
Mineral Agreement	Agreement between mining venture and Federal and Provincial Governments, contemplated by 2002 BM Rules and 1995 NMP
Mining Lease Application	Mining lease application submitted by TCCP to the Licensing Authority on 15 February 2011
Mubarakmand I	Witness Statement of Dr. Samar Mubarakmand, dated 21 September 2012
NAFTA	North American Free Trade Agreement entered into between Canada, Mexico and the United States, entered into force on 1 January 1994
Nanni	Second Expert Report of Dr. Marcella Nanni, dated 29 March 2018
Neville	Expert Report of Mr. Christopher J. Neville, dated 28 March 2018
NPI	Net profit interest
NOC	No-Objection Certificate
Notice of Intent to Reject	Licensing Authority's notice of its intent to reject the Mining Lease Application dated 21 September 2011
Pakistan	The Islamic Republic of Pakistan
Pingle	Expert Report of Mr. Rex E. Pingle, dated 13 December 2017
PO	Procedural Order

Rahman I	Expert Report of Mr. Zaki Rahman, dated 19 September 2017
Rahman II	Second Expert Report of Mr. Zaki Rahman, dated 29 March 2018
Rais	Expert Report of Professor Rasul Bakhsh Rais, dated 18 September 2017
RE-[#]	Respondent's Exhibit
Request	Request for Arbitration dated 28 November 2011
Respondent's Application to Dismiss the Claims	Respondent's Application to Dismiss the Claims dated 2 September 2015
Respondent's Counter-Memorial on Quantum	Respondent's Counter-Memorial on Quantum dated 20 September 2017
Respondent's Post-Hearing Brief on Quantum	Respondent's Post Hearing Brief dated 31 August 2018
Respondent's Reconsideration Request	Request for Reconsideration of the Draft Decision on Jurisdiction and Liability dated 6 November 2017
Respondent's Rejoinder on Quantum	Respondent's Rejoinder on Quantum dated 29 March 2018
Respondent's Submission on Costs	Respondent's Submission on Costs dated 28 September 2018
Ridley	Expert Report of Mr. Tony Ridley, dated 13 December 2017
Ripinsky I	Expert opinion of Dr. Sergey Ripinsky, dated 18 September 2017
Ripinsky II	Supplementary expert opinion of Dr. Sergey Ripinsky, dated 2 March 2018
RLA-[#]	Respondent's Legal Authority
Rossi	Expert Report of Mr. Mario E. Rossi, dated 13 December 2017
Secretariat	ICSID Secretariat
Secretary-General	Secretary-General of ICSID

Sepúlveda	Witness Statement of Mr. Carlos Sepúlveda, dated 21 March 2017
Site Visit Report	Site Visit Report by Professor Kadri Dagdelen dated 26 February 2018
Spiller I	Report on Results of Comparative Metallurgical Flotation Testing, prepared by Professor D. Erik Spiller, dated 20 March 2018
Spiller II	Report on Adequacy of Sampling for Process Metallurgy in Feasibility Study, prepared by Professor D. Erik Spiller, dated 29 March 2018
Spiller III	Follow-up Report to Expert Report of Dr. Corby G. Anderson (16 April 2018), prepared by Professor D. Erik Spiller, dated 30 April 2018
Steering Committee	Steering Committee for the Development of Reko Diq Copper–Gold Project [Pakistan-Balochistan] established by the Pakistani Prime Minister on 3 September 2007
TCC	Reference to TCCA and TCCP collectively
TCCA	Tethyan Copper Company Pty Limited, Claimant in this arbitration
TCCP	Tethyan Copper Company Pakistan (Private) Limited
Transcript Hearing on Jurisdiction and Liability (Day [#]), p. [#] line [#]	Transcript of the Hearing on Jurisdiction and Liability
Transcript Hearing on Quantum (Day [#]), p. [#] line [#]	Transcript of the Hearing on Quantum
Treaty	<i>Agreement between Australia and the Islamic Republic of Pakistan on the Promotion and Protection of Investments</i> , signed on 7 February 1998 and entered into force on 14 October 1998
Tribunal	Arbitral Tribunal re-constituted on 10 September 2012
ul Haque	Witness Statement of Mr. Noor ul Haque, dated 18 September 2017
WRA	Water Resource Associates

Award

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WRA Report	Review of Hydrogeological, Water Governance and Transboundary Risks, Associated with the Proposed Water Supply Source, prepared by Mr. Paul A. C. Holmes and Dr. Marcella Nanni, dated September 2017
WS	Witness Statement

I. INTRODUCTION AND PARTIES

1. This arbitration concerns a legal dispute between TCCA and Pakistan arising out of TCCA's investments in Pakistan submitted to the International Centre for Settlement of Investment Disputes ("ICSID" or the "Centre") on the basis of the *Agreement between Australia and the Islamic Republic of Pakistan on the Promotion and Protection of Investments*, which was signed on 7 February 1998 and entered into force on 14 October 1998 (the "**Australia-Pakistan BIT**", the "**Treaty**" or the "**BIT**")¹ and the Convention on the Settlement of Investment Disputes between States and Nationals of Other States, dated October 14, 1966 (the "**ICSID Convention**").
2. In its Decision on Jurisdiction and Liability dated 10 November 2017 (the "**Decision on Jurisdiction and Liability**"), the Tribunal found that, for the reasons set out therein: (i) it has jurisdiction to hear Claimant's claims and that the claims are admissible;² and (ii) by its denial of a mining lease to Claimant's wholly-owned subsidiary, Tethyan Copper Company Pakistan (Private) Limited ("**TCCP**"), in order to allow the Government of Balochistan ("**GOB**") to implement its own project instead, Respondent has breached its obligation to accord Claimant fair and equitable treatment under Article 3(2) of the Treaty, carried out a measure having effect equivalent to expropriation that did not comply with the requirements for a lawful expropriation under Article 7(1) of the Treaty, and impaired the use of Claimant's investment in violation of Article 3(3) of the Treaty.³
3. This Award addresses the question whether as a result of Respondent's breaches, Claimant has suffered damage for which it must be compensated by Respondent and, if so, determines the amount of such compensation.
4. The Decision on Jurisdiction and Liability as well as the Tribunal's Decision on Respondent's Application to Dismiss the Claims (with reasons) also dated 10 November 2017 are hereby incorporated by reference into this Award.

A. Claimant

5. **Tethyan Copper Company Pty Limited**, a company constituted and registered under the laws of Australia and owned (through Atacama Copper Pty Limited) in equal shares by Antofagasta plc, a company incorporated in the United Kingdom with its headquarters in Chile, and Barrick Gold Corporation, a company incorporated in Canada, hereinafter referred to as "**Claimant**" or "**TCCA**".

¹ Exhibit C-4.

² Decision on Jurisdiction and Liability, ¶ 688.

³ Decision on Jurisdiction and Liability, ¶ 1373.

B. Respondent

6. Islamic Republic of Pakistan, hereinafter referred to as “**Respondent**” or “**Pakistan**”.
7. Claimant and Respondent are hereinafter referred to individually as a “**Party**” and collectively as the “**Parties**”.

II. THE ARBITRAL TRIBUNAL

8. The Arbitral Tribunal (“**Tribunal**”) has been constituted as follows:

- (i) Dr. Stanimir A. Alexandrov
(appointed by Claimant)
c/o Stanimir A. Alexandrov PLLC
1501 K Street, N.W.
Suite C-072
Washington, D.C. 20005
U.S.A.
- (ii) Rt. Hon. Lord Leonard Hoffmann
(appointed by Respondent)
Brick Court Chambers
7-8 Essex Street
London WC2R 3LD
United Kingdom
- (iii) Professor Dr. Klaus Sachs
(appointed by the Parties)
CMS Hasche Sigle
Nymphenburger Strasse 12
80335 München
Germany

III. SUMMARY OF THE PROCEDURAL HISTORY

A. Registration of the Request for Arbitration

9. On 28 November 2011, Claimant filed a Request for Arbitration with the Secretary-General of ICSID (the “**Secretary-General**”) pursuant to Article 36 of the ICSID Convention⁴ (the “**Request**”). Article 36 of the ICSID Convention provides:

“(1) Any Contracting State or any national of a Contracting State wishing to institute arbitration proceedings shall address a request to that effect in writing to the Secretary-General who shall send a copy of the request to the other party.

“(2) The request shall contain information concerning the issues in dispute, the identity of the parties and their consent to arbitration in accordance with the rules of procedure for the institution of conciliation and arbitration proceedings.

“(3) The Secretary-General shall register the request unless he finds, on the basis of the information contained in the request, that the dispute is manifestly outside the jurisdiction of the Centre. He shall forthwith notify the parties of registration or refusal to register.”

10. On 12 January 2012, the Secretary-General registered the Request in accordance with Article 36(3) of the ICSID Convention and notified the Parties of the registration. In the Notice of Registration, the Secretary-General invited the Parties to proceed to constitute an arbitral tribunal as soon as possible in accordance with Rule 7(d) of ICSID’s Rules of Procedure for the Institution of Conciliation and Arbitration Proceedings.

B. Constitution of the Tribunal

11. On 12 July 2012, the Tribunal was constituted in accordance with Article 37(2)(b) of the ICSID Convention. The Tribunal was composed of Professor Dr. Klaus Sachs, a national of Germany, President, appointed by agreement of the parties; Mr. John Beechey, a national of Great Britain, appointed by the Claimant; and Rt. Hon. Lord Leonard Hoffmann, a British national, appointed by the Respondent. Mrs. Mercedes Cordido-Freytes de Kurowski, ICSID Legal Counsel, was designated to serve as Secretary to the Tribunal.
12. Following the resignation of Mr. John Beechey, Claimant appointed Dr. Stanimir Alexandrov, a national of Bulgaria and the Tribunal was reconstituted on 10 September 2012.

C. Procedural Background Previous to the Quantum Phase

13. As reflected in Section 14 of Procedural Order No. 1 dated 3 December 2012, it was agreed between the Parties and the Tribunal that the Parties would in a first phase file submissions on jurisdiction and liability and that the need for a second phase of the

⁴ Convention on the Settlement of Investment Disputes between States and Nationals of Other States dated 18 March 1965.

proceeding, on the quantum of damages, would be determined based on the Tribunal's decision in the first phase or the intervening course of events in Pakistan.

14. On 27 October 2015, in the context of discussions on a time schedule to address certain new issues raised in Respondent's Application to Dismiss the Claims dated 2 September 2015, the Tribunal, *inter alia*, informed the Parties of the following:

“The Tribunal would like to inform the Parties that it has almost concluded its deliberations on the case and that the draft of its Decision on Jurisdiction and Liability is in a very advanced stage. In light of the circumstances, the Tribunal will finalize, and provide the Parties with, a draft of the Decision that it would have rendered but for the issues raised in Respondent's Application. The Tribunal notes that, while this approach is not provided for by ICSID, it is common practice in the WTO and also provided for in Article 10.20(9) lit. a of the CAFTA. By analogy to the latter provision, the Parties may submit their comments on the draft Decision on Jurisdiction and Liability within 60 days of its transmission by the Tribunal. Any such comments will be duly considered by the Tribunal in its ultimate Decision on Jurisdiction and Liability.”

15. On 3 February 2016 and having given advance notice to the Parties of its intention to do so on 27 October 2015, the Tribunal provided the Parties with its Draft Decision on Jurisdiction and Liability and invited them to provide comments on errors of fact, misprints, etc. within 60 days of the decision's transmission to the Parties.
16. On 4 April 2016, the Parties submitted their respective comments on the Tribunal's Draft Decision on Jurisdiction and Liability.
17. On 20 March 2017, the Tribunal issued its Decision on Respondent's Application to Dismiss the Claims (with reasons to follow).
18. On 6 November 2017, Respondent submitted a Request for Reconsideration of the Draft Decision on Jurisdiction and Liability (“**Respondent's Reconsideration Request**”).
19. On 10 November 2017, the Tribunal issued its Decision on Jurisdiction and Liability, which is hereby incorporated by reference into this Award. The submissions on jurisdiction and the merits were summarized in that Decision. For a summary of the procedural history leading up to the Decision on Jurisdiction and Liability, *see* paragraphs 5 to 215 of that Decision.
20. In its Decision on Jurisdiction and Liability, the Tribunal for the reasons set out therein (*see* paragraphs 564 to 1374 with respect to Claimant's claims; and paragraphs 1407 to 1446 with respect to Respondent's counterclaims) decided as follows:

I. The Tribunal has jurisdiction to hear the claims submitted to it by Claimant.

II. Claimant's claims are admissible.

- III. *By denying TCCP's Mining Lease Application, Respondent has breached Articles 3(2), 7(1) and 3(3) of the Treaty.*
 - IV. *Claimant is entitled to be compensated for all damages and losses resulting from Respondent's breaches of the Treaty, in an amount to be determined in a later phase of this proceeding.*
 - V. *The Tribunal has jurisdiction to hear Respondent's counterclaim based on the alleged violation of Article 1(1)(a) of the Treaty. The Tribunal does not have jurisdiction to hear Respondent's further counterclaims.*
 - VI. *Respondent's counterclaim based on the alleged violation of Article 1(1)(a) of the Treaty is dismissed.*
 - VII. *The Tribunal's decision on the costs of this phase of the proceeding is reserved for the Award.*
21. Also, on 10 November 2017, the Tribunal issued its Decision on Respondent's Application to Dismiss the Claims (with reasons) ("**Decision on Respondent's Application to Dismiss the Claims (with reasons)**"), which is hereby incorporated by reference into this Award, concerning an Application to Dismiss the Claims filed by Respondent on 2 September 2015. For a summary of the procedural history leading up to the Decision on Respondent's Application to Dismiss the Claims (with reasons), *see* paragraphs 6 to 182 of that Decision.
22. After carefully reviewing all of the arguments and evidence presented by the Parties in the course of that phase of the proceedings concerning Respondent's allegations of corruption as well as, to the extent relevant in that context, the arguments and evidence adduced in the previous phase on jurisdiction and liability, the Tribunal for the reasons set out in paragraphs 209 to 1496 of its Decision on Respondent's Application to Dismiss the Claims (with reasons), decided as follows:
- I. *The evidence submitted by Respondent as well as the counter-evidence submitted by Claimant in the present phase of the proceeding are admitted into the record.*
 - II. *Respondent's Application to Dismiss the Claims dated 2 September 2015 is dismissed in its entirety.*
 - III. *Respondent has not established any of its individual allegations of corruption that would be attributable to Claimant and that could have become relevant as potential contributory fault in the quantum phase that is now to follow.*

IV. The Tribunal's decision on the costs of this phase of the proceeding is reserved for the Award.

D. PROCEDURAL BACKGROUND - QUANTUM PHASE

23. On 22 March 2017, Claimant filed a Memorial on Damages, together with: (i) Exhibits CE-890 to CE-1197; (ii) Legal Authorities CA-356 to CA-385; (iii) updated indices of exhibits and authorities; (iv) four witness statements (“**WS**”): WS of Carlos Sepúlveda, Second WS of Jean-Paul Luksic, Fifth WS of Cassie Boggs and Eighth WS of Timothy Livesey; and (v) the Expert Report (“**ER**”) of Prof. Graham Davis (“**Claimant’s Quantum Memorial**”).
24. Prof. Davis advised in paragraph 9 of his Report that he was retained as a testifying witness in another matter by a team at Sidley Austin LLP that included Dr. Stanimir Alexandrov, and that such engagement was concluded at the time of the Report.
25. On 7 July 2017, Respondent filed a Request for Disqualification of Dr. Stanimir Alexandrov (the “**Disqualification Request**”). By letter of 8 July 2017, the Secretariat confirmed receipt of the Disqualification Request on behalf of the Secretary-General and informed the Parties that, pursuant to Rule 9(6) of the ICSID Arbitration Rules, the proceeding was suspended until a decision on the Disqualification Request had been taken.
26. On 17 July 2017, Claimant filed its Opposition to Respondent’s Request for Disqualification of Dr. Stanimir Alexandrov.
27. On 18 July 2017, pursuant to Rule 9(3) of the ICSID Arbitration Rules, Dr. Alexandrov furnished explanations in response to the Disqualification Request, which were transmitted to the Parties on the same day.
28. On 26 July 2017, the Secretariat circulated the Parties’ simultaneous further observations on the Disqualification Request that were received from Claimant on 21 July 2017 and from Respondent on 25 July 2017.
29. On 5 September 2017, the Unchallenged Members of the Tribunal rendered a Decision on Respondent’s Request for Disqualification of Dr. Stanimir Alexandrov in which they rejected Respondent’s Disqualification Request. For a summary of the procedural history leading up to the Decision on Respondent’s Disqualification Request, *see* paragraphs 5 to 70 of that Decision.
30. On 20 September 2017, Respondent filed a Counter-Memorial on Quantum, together with the following documentation: (i) Exhibits RE-554 to RE-612; (ii) Legal Authorities RLA-375 to RLA-383; (iii) two witness statements: WS Noor ul Haque and WS Ishad Ali Khokhar; (iv) eleven expert reports: ER of Vladimir Brailovsky and Prof. Louis T. Wells, together with Exhibits 1-62; ER of Dr. James C. Burrows, together with Exhibits 1-26, ER of Prof. Kadri Dagdelen and Terry Owen, together with Exhibits 1-41; ER of Barbara

Filas, together with Exhibits 1-18; ER of Dr. Ikramul Haq, together with Exhibits 1-2; ER of David Henry and Leonidas Howden, together with Exhibits 1-7; ER of Prof. Rasul Bakhsh Rais, together with Exhibits 1-91; ER of Dr. Sergey Ripinsky; ER of Julian Davies (S-RM), together with Exhibits 1-66; ER of Zaki Rahman, together with Exhibits 1-5; and ER of Paul A. Holmes and Dr. Marcella Nanni (Water Resource Associates or “WRA”), together with Exhibits 1-36 (“**Respondent’s Counter-Memorial on Quantum**”)

31. On 25 November 2017, Respondent filed a proposal for disqualification of the entire Tribunal (the “**Disqualification Proposal**”). On the same date, the ICSID Secretariat (the “**Secretariat**”) informed the Parties that, pursuant to Rule 9(6) of the Rules of Procedure for Arbitration Proceedings (“**ICSID Arbitration Rules**”), the proceeding was suspended until a decision on the Disqualification Proposal had been taken.
32. On 1 December 2017, Claimant submitted a reply to the Disqualification Proposal.
33. On 6 December 2017, pursuant to Rule 9(3) of the ICSID Arbitration Rules, Dr. Alexandrov furnished explanations in response to the Disqualification Proposal. Professor Dr. Sachs and Rt. Hon. Lord Hoffmann did not provide explanations.
34. While the proceeding was suspended, Claimant filed its Reply Memorial on Quantum of Damages on 13 December 2017, together with: (i) Exhibits CE-1205 to CE-1527; (ii) Legal Authorities CA-429 to CA-449; (iii) updated indices of exhibits and authorities; (iv) one witness statement: Ninth WS of Timothy Livesey; (v) nine Expert Reports: Second ER of Prof. Graham Davis, ER of Fiona Cessford-Le Roux, ER of Neil Cusworth, ER of Dr. Leonard Drury, ER of Michael Jones, ER of Anton Mayer, ER of Rex E. Pingle, ER of Tony Ridley and ER of Mario Rossi. In addition, in response to the WS of Ali Rahim of 10 November 2017, Claimant submitted with the Tribunal’s authorization two Witness Statements: WS of Neil Cusworth and WS of Tony Ridley (“**Claimant’s Quantum Reply**”).
35. On 15 December 2017, each Party filed further observations on the Disqualification Proposal.
36. On 5 February 2018, the Chairman of the Administrative Council issued its decision, declining Respondent’s Proposal to Disqualify the entire Tribunal. The proceeding was resumed pursuant to ICSID Arbitration Rule 9(6).
37. On 6 February 2018, Claimant filed a proposal concerning pending matters (“**Pending Matters Proposal**”). On 7 February 2018, the Tribunal invited Respondent to comment by 8 February 2018. Following a request from Respondent of 8 February 2018, the deadline was extended by one day until 9 February 2018. On 9 February 2018, Respondent commented on Claimant’s Pending Matters Proposal. The Tribunal rendered its decision on these matters in its Procedural Order No. 22 of 21 February 2018.

38. On 7 February 2018, Respondent filed a request for leave to comment on Claimant's Pending Matters Proposal, where Respondent also submitted that Claimant had been copying submissions to the Tribunal and that Respondent was not privy to the Tribunal's emails. On the same date the Tribunal invited Claimant to comment by 8 February 2018. On 8 February 2018, Claimant filed a response to Respondent's message of 7 February 2018. On 9 February 2018, Respondent requested further clarifications from Claimant. On 10 February 2018, the Tribunal invited Claimant to comment, which it did on 12 February 2018.
39. On 7 February 2018, Respondent filed a request for the exclusion of evidence (of Mr. Craig's witness statement) and spoliation sanctions, (Application for a Ruling *in Limine* and for Spoliations Sanctions) ("**Application for a Ruling in Limine**"). At the Claimant's request, on 10 February 2018, the Tribunal granted Claimant leave to file its opposition to Respondent's Application for a Ruling *in Limine* until 23 February 2018. On 23 February 2018, Claimant filed an Opposition to Respondent's Application for a Ruling *in Limine*, requesting the Tribunal to dismiss the Spoliation Application or, in the alternative, defer any decision on matters raised by Respondent's Application until the hearing, together with Mr. Craig's Third Witness Statement. On 26 February 2018, the Tribunal invited Respondent to comment on Claimant's Opposition by 2 March 2018, and Claimant to submit, if it so wished, additional comments by 9 March 2018. On 28 February 2018, Respondent filed a request for the extension of the deadline to file a reply regarding exclusion of evidence until 5 March 2018, which was granted on 1 March 2018. On 5 March 2018, Respondent filed a Reply in support of Respondent's Application for a Ruling *in Limine*, together with (i) Ali Zahid Rahim's Second Witness Statement and (ii) an index of exhibits and legal authorities. On 13 March 2018, Claimant filed a Rejoinder on Respondent's Application for a Ruling *in Limine*. On 16 March 2018, the Tribunal issued Procedural Order No. 24 concerning Respondent's Application for a Ruling *in Limine*.
40. On 7 February 2018, Respondent filed a Request for the Tribunal to order Claimant to produce the Tanjeel Feasibility Study in its entirety (the "**Tanjeel Feasibility Study Request**"). On the same date, the Tribunal invited Claimant to comment by 9 February 2018. On 9 February 2018, Claimant objected to Respondent's Tanjeel Feasibility Study Request. On 12 February 2018, the Tribunal issued Procedural Order No. 21, rejecting Respondent's Tanjeel Feasibility Study Request as untimely and not sufficiently relevant to the case or material to its outcome. The Tribunal further set a procedural calendar for the remainder of the arbitration.
41. On 15 February 2018, Claimant filed a Request for Provisional Measures (the "**2018 Provisional Measures Request**"), requesting the Tribunal to: (i) order Pakistan to take steps to ensure that Balochistan withdraws the IHC (Islamabad High Court) Application and terminates the IHC Proceeding; (ii) order Pakistan to take steps to ensure that

Balochistan seeks an adjournment of the hearing scheduled for 21 Feb 2018 as a temporary measure pending disposition of the request; (iii) establish an expedited briefing schedule and a videoconference for oral argument of this Request; and, alternatively (iv) not admit any supposed new evidence obtained through the Islamabad High Court proceedings. Paragraph 72 of Claimant's Provisional Measures Request included a temporary measure request "*that the Tribunal order Pakistan to take steps to ensure that Balochistan seeks an adjournment of the hearing currently scheduled for 21 February 2018 as a temporary measure pending disposition of this Request, and establish an expedited briefing schedule and a videoconference for oral argument on this Request*" (the "**Temporary Measure Request**"). On 15 February 2018, the Tribunal invited Respondent to comment on Claimant's Temporary Measure Request by 19 February 2018. On the same date, Respondent filed an extension request until 21 February 2018. On 16 February 2018, the Tribunal invited Claimant to comment on Respondent's extension request, which it did on the same date. Subsequently, also on 16 February 2018, Respondent reiterated its extension request. On 17 February 2018, the Tribunal rejected Respondent's extension request, noting that Respondent had not yet been asked to comment on Claimant's Provisional Measures Request in its entirety but only on the Temporary Measure Request of adjourning the hearing that was scheduled before the Islamabad High Court on 21 February 2018. In particular, Respondent was invited to explain on what basis it considered that "*the jurisdictional issue will not be resolved at the next hearing before the IHC.*" On 19 February 2018, Respondent filed its comments on Claimant's Temporary Measure Request. On 20 February 2018, the Tribunal informed the Parties that the Tribunal denied Claimant's Temporary Measure Request and fixed a briefing schedule for written submissions on Claimant's Provisional Measures Request.

42. On 16 February 2018, Respondent filed an application requesting the Tribunal to clarify and reconsider Procedural Order No. 21 ("**Requests concerning PO-21**"). On 20 February 2018, at the Tribunal's invitation, Claimant filed observations on Respondent's Requests concerning PO-21 by 20 February 2018. On 21 February 2018, the Tribunal issued Procedural Order No. 22 regarding Respondent's Requests concerning PO-21 and other procedural matters.
43. On 23 February 2018, Respondent filed a full response to Claimant's Provisional Measures Request. On 2 March 2018, Claimant filed a Reply on Claimant's Provisional Measures Request. On 5 March 2018, the Tribunal confirmed that Respondent was invited to submit its Rejoinder on Claimant's Provisional Measures Request by 9 March 2018 and noted that the Tribunal would render a decision on Claimant's Request for Provisional Measures only if and when it had been provided with notice to do so from the Parties. On 9 March 2018, Respondent filed a Rejoinder on Claimant's Provisional Measures Request together with Exhibit RE-635.

44. On 26 February 2018, Respondent filed a Site Visit Report by Prof. Kadri Dagdelen with supporting documentation (the “**Site Visit Report**”). On 4 March 2018, Claimant filed observations on the Site Visit Report. On 5 March 2018, the Tribunal acknowledged receipt of Claimant’s letter dated 4 March 2018 regarding Prof. Dagdelen’s Site Visit Report, the interim results of the metallurgical testing and the process used to extract and transport water samples from the Fan Sediments, and invited Respondent to comment by 7 March 2018. On 7 March 2018, Respondent filed a response to the Claimant’s observations on the Site Visit Report. On 8 March 2018, the Tribunal; (i) provided directions to the Parties on the Site Visit Report related matters, ordering Respondent to submit “*documentary evidence and/or witness testimony to establish the process used to extract and transport water samples from the Fan Sediments, including a report from any vendor Pakistan employed*”; and (ii) directed the Parties to refrain from filing further applications and requests in order to allow the Parties and the Tribunal to prepare for the Hearing on Quantum. On 9 March 2018, Respondent filed an extension request, which was followed by objections from Claimant, and, subsequently, by a message from Respondent reiterating its extension request and attaching copy of a letter to Claimant’s counsel regarding Lab Costs. On 20 March 2018, Respondent filed a submission concerning the Site Visit and the extraction and transportation of water, together with supporting documents on water collection and a witness statement of Mr. Javaid Ahmed. On the same date, Respondent filed an Expert Report by Prof. Erik Spiller regarding Metallurgical Testing, along with 5 appendices.
45. On 28 February 2018, the Tribunal issued its Decision on Respondent’s Request for Reconsideration of the Tribunal’s Decision on Jurisdiction and Liability, which had been provided to the Parties as a draft on 3 February 2016 and was rendered in final form on 10 November 2017 (“**Decision on Respondent’s Reconsideration Request**”). For the reasons indicated therein, Respondent’s Request dated 6 November 2017 for Reconsideration of the Tribunal’s Decision on Jurisdiction and Liability was rejected, and the decision on the costs incurred in relation to Respondent’s Reconsideration Request was reserved for the Final Award. For a summary of the procedural history leading up to the Decision on Respondent’s Reconsideration Request, *see* paragraphs 2 to 13 of that Decision.
46. Also, on 28 February 2018, Claimant filed a renewed request for certain orders from the Tribunal regarding Respondent’s allegedly deficient production of documents pursuant to Procedural Order No. 20 (“**Claimant’s Document Production Request**”). On 1 March 2018, the Tribunal invited Respondent to comment. On 7 March 2018, Respondent filed observations on the Claimant’s Document Production Request with a Redfern Schedule and attachments. On 12 March 2018, the Tribunal issued Procedural Order No. 23 concerning Claimant’s Document Production Request, where it allowed Claimant to file, if it so wished, a supplemental reply on quantum.

47. On 19 March 2018, Respondent filed a request for the Tribunal to reconsider certain aspects to the Procedural Order No. 23, particularly, the timing fixed for Claimant's supplemental reply on quantum; noting that such supplemental reply on quantum should be filed simultaneously with Respondent's Rejoinder on Quantum. ("**Reconsideration Request concerning PO-23**"). On the same date, the Tribunal invited Claimant to comment by 22 March 2018. On 21 March 2018, Claimant objected to Respondent's request of 19 March 2018 regarding the Tribunal's authorization for Claimant to file a supplemental reply on quantum. On 22 March 2018, the Tribunal decided on Respondent's Reconsideration Request concerning PO-23. For the reasons indicated therein, the Tribunal did not consider it necessary to make any further orders on the scope of the supplemental reply on quantum.
48. On 29 March 2018, Respondent filed a Rejoinder on Quantum, together with: (i) Exhibits RE-576-3.12 to RE-768; (ii) Legal Authorities RLA-398 to RLA-422; (iii) four (4) Witness Statements of: WS of Ghulam Nabi, WS of Haji Arz Muhammad Badaich, WS of Irshad Khokhar and WS of Rehmat Baloch; and (iv) fifteen (15) Expert Reports: ER of Dr. Jerald S. Ault, ER of Vladimir Brailovsky and Prof. Louis T. Wells, ER of Dr. Kerry M. Connor, ER of Dr. James C. Burrows, ER of Prof. Kadri Dagdelen and Terry Owen, ER of Barbara Filas LLC, ER of Dr. Ikramul Haq, ER of David Henry and Leonidas Howden, ER of Dr. Marcella Nanni, ER of Zaki Rahman, ER of Dr. Sergey Ripinsky, ER of Prof. Donald Erik Spiller, ER of Julian Davies, ER of Christopher J. Neville, and ER of Terry Owen ("**Respondent's Rejoinder on Quantum**").
49. On 29 March 2018, Claimant filed a letter concerning Respondent's alleged failure to comply with the disclosure orders in Procedural Order 23, requesting the Tribunal to: (i) make adverse inferences in the Award; or, in the alternative (ii) to be taken into account by the Tribunal when assessing Respondent's arguments, the testimony of its witnesses, and whether it had met its burden on substantiating its assertions. Following the Tribunal's invitation, on 5 April 2018, Respondent filed comments on Claimant's letter of 29 March 2018. On 9 April 2018, the Tribunal decided on Claimant's request of 29 March 2018.
50. On 9 April 2018, Claimant filed a Supplemental Quantum Reply Memorial, together with Exhibits CE-1635 to CE-1664 ("**Claimant's Supplemental Quantum Reply**").
51. On 13 April 2018, in preparation for the Pre-Hearing Organizational Meeting, the Tribunal provided directions to the Parties, together with a Draft Agenda, inviting the Parties to provide the agreements and/or respective positions by 27 April 2018.
52. On 16 April 2018, Claimant filed a Response to Respondent's Site Visit Reports, together with the Second Expert Report of Anton Mayer, the Expert Report of Dr. Corby G. Anderson, accompanying exhibits, and an updated index. On 30 April 2018, Respondent submitted its reply concerning the Site Visit Reports and the Water Collection Methods

- (“**Reply on the Site Visit Report**”), along with three accompanying expert reports: (i) Prof. Kadri Dagdelen’s Rebuttal Report; (ii) Prof. Donald Erik Spiller’s *Follow-up Report to Expert Report of Dr. Corby G. Anderson (16 April 2018)*; and (iii) Expert Report of Dr. Keir Soderberg in response to critiques on water collection, together with a Second Witness Statement of Mr. Javaid Ahmed.
53. On 18 April 2018, the Parties filed simultaneous letters regarding their agreements and respective positions concerning the organization of the Hearing.
54. On 23 April 2018, the Tribunal provided the Parties with the directions regarding the organization of the Hearing.
55. On the same date, Claimant filed a request to exclude certain evidence submitted by Respondent with its Rejoinder on Quantum, namely the: (i) witness statements of Messrs. Baloch, Badaich, and Nabi; (ii) Expert Reports of Dr. Connor, Dr. Ault, and Mr. Neville, the Second Expert Report of Prof. Spiller, arguing that Respondent failed to comply with the requirements of Procedural Order No. 1; and (iii) the Expert Report of Water Resources Associates (WRA) in light of the termination of Mr. Holmes’ engagement (“**Exclusion of Evidence Request**”). On 26 April 2018, Respondent filed observations on Claimant’s Exclusion of Evidence Request of 23 April 2018. On 27 April 2018, the Tribunal invited Claimant to provide further comments. On 30 April 2018, the Tribunal decided on Claimant’s request of 23 April 2018: (i) denying the request to strike Expert Reports of Dr. Connor, Dr. Ault, Mr. Neville and Second Expert Report of Prof. Spiller; (ii) granting the request to strike witness statements of Messrs. Baloch, Badaich and Nabi; and (iii) noting that the decision regarding the Expert Report of WRA would follow, once Claimant had provided its comments due on 30 April 2018. On 30 April 2018, Claimant filed a letter in response to Respondent’s letter of 26 April 2018. On 1 May 2018, Respondent filed further observations on the Exclusion of Evidence Request.
56. On 23 April 2018, each Party filed a list with the names of the witnesses and experts that it intended to cross-examine during the Hearing. On 26 April 2018, Claimant filed a letter objecting to Respondent’s request to cross-examine Mr. Cory Williams and Mr. David Moore during the Quantum Hearing. At the Tribunal’s invitation, on 27 April 2018, Respondent filed comments on Claimant’s letter of 26 April 2018. At the Tribunal’s invitation, on 1 May 2018, Claimant filed a letter concerning the cross-examination of Mr. Williams and Mr. Moore.
57. On 27 April 2018, each Party filed its comments on the Draft Agenda for the Pre-Hearing Organizational Meeting.
58. On 27 April 2018, Claimant filed a further request for Production of Documents and for the Exclusion of Evidence (“**Further Document Production and Exclusion of Evidence Request**”). On 1 May 2018, Respondent filed observations on Claimant’s Further Document Production and Exclusion of Evidence Request, with attachments.

59. On 1 May 2018, each Party filed a request for the Tribunal to decide on the admissibility of additional evidence (“**Admissibility of Additional Evidence Requests**”). On 2 May 2018, the Tribunal invited the Parties to comment on each other’s requests. On 3 May 2018, Respondent filed a letter with comments (objections) to Claimant’s Admissibility of Additional Evidence Request. On 4 May 2018, Claimant requested leave to respond to Respondent’s letter of 3 May 2018 by 5 May 2018. Claimant’s request was granted by the Tribunal, and the Tribunal also invited Respondent to file a response, if it so wished, by 7 May 2018. On 6 May 2018, Claimant filed a letter dated 5 May 2018 in response to Respondent’s objections of 3 May 2018.
60. Also, on 1 May 2018, Claimant filed a request for the Tribunal to strike the Expert Report of Dr. Keir Soderberg, filed by Respondent on 30 April 2018 (“**Request to Strike**”). On 2 May 2018, Respondent filed observations on Claimant’s Request to Strike.
61. On 2 May 2018, the Tribunal decided on the outstanding issues concerning (i) the cross examination of Mr. Moore and Mr. Williams, and (ii) the request to strike portions of Dr. Burrows’ Rejoinder Report and to produce certain documents relied on in other experts’ rejoinder reports or Respondent’s Counter-Memorial.
62. On 3 May 2018, the Tribunal decided on the issue concerning Claimant’s Request to Strike Dr. Soderberg’s Expert Report filed together with Respondent’s Reply on the Site Visit.
63. On 4 May 2018, the President of the Tribunal held a Pre-Hearing Organizational Meeting with the Parties by telephone conference to discuss procedural and logistical matters relating to the organization of the Hearing.
64. Also, on 4 May 2018, Respondent filed a letter with clarifications on its position on the examination of multiple experts, which was followed by a brief response from Claimant.
65. On the same date, Respondent filed a request for the Tribunal to order the sequestration of Claimant’s water experts (Mr. Anton Mayer, Mr. Michael Jones, and Dr. Leonard Drury) (“**Sequestration of Water Experts Request**”). On 5 May 2018, the Tribunal invited Claimant to comment on Respondent’s Sequestration of Water Experts Request. On 7 May 2018, Claimant filed a letter objecting to Respondent’s Sequestration of Water Experts Request.
66. On 7 May 2018, the finalized *Agenda of the Pre-Hearing Organizational Meeting* held by telephone conference on 4 May 2018 between the President of the Tribunal and the Parties, was transmitted to the Parties on instructions of the President.
67. On 8 May 2018, the Tribunal decided on the Parties’ respective Admissibility of Additional Evidence Requests and on the Sequestration of Water Experts Request.
68. On 11 May 2018, pursuant to the Tribunal’s directions of 8 May 2018, Respondent filed rebuttal evidence and an index. On 12 May 2018, Claimant filed a letter regarding

Respondent's new proposed exhibits. On 13 May 2018, the Tribunal invited Respondent to comment in writing on Claimant's letter of 12 May 2018. On 14 May 2018, Respondent filed a letter in response to Claimant's objections to Respondent's rebuttal exhibits. On the same date, Claimant filed a letter in response to Respondent's letter of 12 May 2018.

69. A hearing on Quantum was held in London from 14 to 24 May 2018 (the "**Hearing on Quantum**"). The following persons were present at the Hearing on Quantum:

TRIBUNAL	
Prof. Dr. Klaus M. Sachs	President
Dr. Stanimir A. Alexandrov	Co-Arbitrator
Lord Hoffmann	Co-Arbitrator

ICSID SECRETARIAT	
Ms. Mercedes Cordido-Freytes de Kurowski	Secretary of the Tribunal

ASSISTANT TO TRIBUNAL	
Ms. Susanne Schwalb	Assistant to the Tribunal

CLAIMANT	
Mr./Ms. First Name/ Last Name	Affiliation
<i>Counsel</i>	
Mr. Donald Francis Donovan	Debevoise & Plimpton LLP
Mr. Mark W. Friedman	Debevoise & Plimpton LLP
Dr. Dietmar W. Prager	Debevoise & Plimpton LLP
Ms. Natalie L. Reid	Debevoise & Plimpton LLP
Mr. Carl Riehl	Debevoise & Plimpton LLP
Mr. Feisal Naqvi	HaidermotaBNR & Co
Ms. Berglind Halldorsdottir Birkland	Debevoise & Plimpton LLP
Ms. Elizabeth Nielsen	Debevoise & Plimpton LLP
Ms. Fiona Poon	Debevoise & Plimpton LLP
Mr. Guilherme Recena Costa	Debevoise & Plimpton LLP
Mr. Romain Zamour	Debevoise & Plimpton LLP
Mr. Adam Moss	Debevoise & Plimpton LLP
Mr. Gabriel Herscovici Junqueira	Debevoise & Plimpton LLP
Mr. William Mattessich	Debevoise & Plimpton LLP
Ms. Jennifer Wagner	Debevoise & Plimpton LLP

<i>Parties</i>	
Mr. William Hayes	Tethyan Copper Company Pty Limited
Mr. Ramón Jara	Tethyan Copper Company Pty Limited
Mr. Julian Anderson	Antofagasta plc
Mr. Jonathan Drimmer	Barrick Gold Corporation
<i>Fact Witnesses</i>	
Mr. Timothy Livesey	Witness
Ms. Cassie Boggs	Witness
Mr. Carlos Sepúlveda	Witness
Mr. Andrew Craig	Witness
Mr. Jean-Paul Luksic	Witness
<i>Experts</i>	
Mr. Mario Rossi	Expert
Dr. Corby G. Anderson	Expert
Dr. Leonard Drury	Expert
Mr. Michael Jones	Expert
Mr. Anton Mayer	Expert
Mr. Tony Ridley	Expert
Mr. Neil Cusworth	Expert
Ms. Fiona Cessford-LeRoux	Expert
Mr. Rex E. Pingle	Expert
Prof. Graham Davis	Expert
Dr. Florin Dorobantu	The Brattle Group
<i>Observers</i>	
Ms. Andrea Ahrens	
Ms. Tara Goalen	Law student

RESPONDENT	
Mr./Ms. First Name/ Last Name	Affiliation
<i>Counsel</i>	
Mr. Ignacio Torterola	GST LLP
Mr. Diego Brian Gosis	GST LLP
Mr. Quinn Smith	GST LLP
Ms. Mariana Lozza	GST LLP
Ms. Katherine Sanoja	GST LLP
Mr. Gary Shaw	GST LLP
Mr. J. Derek Womack	GST LLP
Mr. Pablo Parrilla	GST LLP

Mr. Nicolas Bianchi	GST LLP
Mr. Patricio Grané Riera	GST LLP
Mr. Joaquin Coronel	GST LLP
Mr. Ali Zahid Rahim	Axis Law Chambers
Mr. Hassan Ali	Axis Law Chambers
Mr. Muhammad Abdullah Tariq Gulzar	Axis Law Chambers
Ms. Neshmiya Adnan Khan	Axis Law Chambers
Mr. Usman Raza Jamil	RJT Litigators
Mr. Mehdi Tirmiz	RJT Litigators
Parties	
Mr. Ashtar Ausaf Ali	Attorney General for Pakistan
Mr. Ahmad Irfan Aslam	Head, International Disputes Unit, Office of the Attorney-General for Pakistan
Mr. Mian Shaoor Ahmad	Office of the Attorney-General for Pakistan
Mr. Danish Aftab	Office of the Attorney-General for Pakistan
Mr. Khuzaema Gauhar Siddiqui	Office of the Attorney-General for Pakistan
Mr. Azzam Ahmad Cheema	Office of the Attorney-General for Pakistan
Mr. Abdul Quddus Bizenjo	Chief Minister, Government of Balochistan
Mr. Aurangzeb Haque	Chief Secretary, Government of Balochistan
Mr. Hafiz Abdul Basit	Principal Secretary to the Chief Minister, Government of Balochistan
Mr. Babar Khan Yaseenzai	Additional Secretary to the Chief Minister, Government of Balochistan
Mr. Akbar Askani	Minister for Mines and Mineral Development, Government of Balochistan
Mr. Saleh Muhammad Baloch	Secretary, Mines and Mineral Development Department, Government of Balochistan
Mr. Ahmed Sharif Chaudhry	Deputy Secretary, Law and Parliamentary Affairs Department, Government of Balochistan
Mr. Durra Baloch	Additional Secretary, Mines and Mineral Development Department, Government of Balochistan
Mr. Sikandar Sultan Raja	Secretary Petroleum, Ministry of Energy (Petroleum Division)
Mr. Mukhtiar	Additional Secretary, Ministry of Energy (Petroleum Division)
Witness(es)	
Mr. Irshad Ali Khokhar	Witness
Expert(s)	
Dr. Keir Soderberg	Expert
Prof. Rasul Bakhsh Rais	Expert
Mr. Zaki Rahman	Expert
Prof. Kadri Dagdelen	Expert

Mr. Terry Owen	Expert
Mr. David Henry	Expert
Dr. Leonidas Howden	Expert
Mr. Vladimir Brailovsky	Expert
Prof. Louis T. Wells	Expert
Dr. James C. Burrows	Expert
Dr. Marcella Nanni	Expert
Ms. Barbara A. Filas	Expert
Dr. Kerry M. Connor	Expert
Prof. D. Erik Spiller	Expert
Mr. Julian Davies	Expert
Mr. Christopher J. Neville	Expert
Mr. Tiago Duarte-Silva	Expert's Assistant
<i>Observer(s)</i>	
Mr. Muhammad Umar Ali	Axis Law Chambers

COURT REPORTER	
Mr./Ms. First Name/ Last Name	Affiliation
Ms. Dawn K. Larson	English-Language Court Reporter

INTERPRETERS	
Mr./Ms. First Name/ Last Name	Affiliation
Ms. Shahida Sharif	Urdu-English Interpreter
Mr. Gul Ifat	Urdu-English Interpreter

70. On 21 May 2018, Claimant filed corrected copies of Exhibits CE-1556, CE-1778, and CE-1779, along with *errata* to Prof. Graham A. Davis' Quantum of Damages Reply Report. Also, on 21 May 2018, Respondent filed documents to address and respond to the corrected spreadsheets disclosed by Claimant on behalf of Prof. Davis. On 22 May 2018, Claimant objected to Respondent's rebuttal evidence filed on 21 May 2018.
71. On 20 August 2018, Respondent filed a letter with allegations of unauthorized disclosure in the *Eiser v Spain* annulment proceeding of the decision on the challenge to Dr. Alexandrov in the present case. At the Tribunal's invitation, on 28 August 2018, Claimant filed a letter with attachments, concerning Respondent's letter of 20 August 2018. On 30 August 2018, the Tribunal addressed a letter to the Parties on this issue.
72. On 31 August 2018, the Parties filed simultaneous post-hearing briefs ("**Claimant's Quantum Post-Hearing Brief**"; "**Respondent's Post-Hearing Brief on Quantum**").

73. On 28 September 2018, each Party filed a Submission on Costs (“**Claimant’s Submission on Costs**”; “**Respondent’s Submission on Costs**”).
74. On 15 November 2018, Respondent filed a letter requesting the Tribunal to decide on the admissibility of new evidence regarding a merger between Barrick Gold Corp and Randgold Resources Ltd, together with five documents identified as Exhibits RE-783 to RE-787.
75. On 16 November of 2018, the Tribunal invited Claimant to comment on Respondent’s request of 15 November 2018, by 30 November 2018.
76. On 30 November 2018, Claimant requested an extension of the deadline to comment on Respondent’s request of 15 November 2018, until 4 December 2018. The extension was granted. On 4 December 2018, Claimant requested a further extension of the deadline until 10 December 2018, which was granted by the Tribunal on 5 December 2018.
77. On 11 December 2018, Claimant filed a letter dated 10 December 2018, in response to Respondent’s request of 15 November 2018 and included 8 Exhibits (CE-1815 to CE-1822).
78. On 12 December 2018, the Tribunal decided on Respondent’s request of 15 November 2018 for the admissibility of new evidence.
79. On 12 February 2019, Respondent requested the Tribunal to admit into the record a recent decision regarding the *Rusoro* award. On 13 February 2019, the Tribunal invited Claimant to comment on Respondent’s request of 12 February 2019. On 20 February 2019, Claimant filed a letter submitting (i) that it did not object to Respondent’s request to introduce as new legal authority (RLA-423)—the 29 January 2019 decision of the Paris Court of Appeal partially setting aside the *Rusoro* award; (ii) that such decision is not relevant to the Tribunal’s task in this case; and (iii) its request the Tribunal to close the proceeding.
80. By letter of 22 February 2019, the Tribunal informed the Parties that in light of the fact that Claimant did not object to the new legal authority which Respondent was seeking to introduce into the record, the Tribunal admitted the new legal authority dated 29 January 2019 into the record. The Tribunal noted that it had taken note of the Parties’ positions regarding the relevance of this legal authority and asked the Parties to refrain from making any further submissions unless specifically requested by the Tribunal.
81. On 18 March 2019, Respondent requested the Tribunal to admit into the record a recently rendered new legal authority (RLA-424). On 19 March 2019, the Tribunal invited Claimant to comment on Respondent’s request of 18 March 2019. On 26 March 2019, Claimant filed a letter submitting that it did not object to the addition of the new legal authority to the record but considered that it had no relevance to the Tribunal’s decision.

82. By letter of 27 March 2019, the Tribunal informed the Parties that as Claimant did not object to its admission, the Tribunal admitted the new legal authority into the record.
83. By letter of the same date, the Tribunal further declared the proceedings closed in accordance with Rule 38(1) of the ICSID Arbitration Rules.

IV. FACTUAL BACKGROUND

84. For a detailed summary of the factual background to the dispute between the Parties, the Tribunal makes reference to Section IV of its Decision on Jurisdiction and Liability.
85. The Tribunal further notes that in the present phase of the proceeding, it has been presented with certain additional facts, supplementing the chronology of events as set out in the Decision on Jurisdiction and Liability, which are either undisputed between the Parties or are otherwise established by the evidence submitted in these proceedings to the satisfaction of the Tribunal. These will be addressed as part of the Tribunal's reasoning on the consequences flowing from Respondent's breaches.

V. POSITIONS OF THE PARTIES

A. Summary of Claimant's Contentions

86. Claimant submits that it should be awarded compensation in the amount of USD 8.5 billion plus interest, reflecting the damage that it has incurred as a result of Respondent's wrongful denial of the mining lease application submitted by TCCP to the Director General of the Mines & Mineral Development Department of Balochistan (the "**Licensing Authority**") on 15 February 2011 (the "**Mining Lease Application**" or the "**Application**"), which deprived it of the opportunity to build and operate the mine at Reko Diq.⁵

1. On the Legal Standards Governing Claimant's Claim for Compensation

87. Claimant submits that the Tribunal must award compensation equal to the "*market value*" of Claimant's investment as of 15 November 2011 and, in assessing that value, it must disregard all of the unlawful acts that Respondent has committed prior to that valuation date.⁶ In Claimant's view, the Australia-Pakistan BIT does not specify the remedies for Respondent's breaches of the Treaty and the Tribunal must therefore apply the standard of full reparation under customary international law, as established in *Chorzów Factory*, *i.e.*, the award "*must, as far as possible, wipe out all the consequences of the illegal act*

⁵ Claimant's Quantum Post-Hearing Brief, ¶¶ 2, 9.

⁶ Claimant's Quantum Reply, ¶ 35.

and reestablish the situation which would, in all probability, have existed if that acted had not been committed.”⁷

88. Claimant accepts that it must show that Respondent’s Treaty breaches caused its loss but considers that the causal relationship has already been determined by the Tribunal in its Decision on Jurisdiction and Liability and all that remains is for that loss to be quantified.⁸
89. Claimant further accepts that it has the burden of proof as to its loss. As to the standard of proof, Claimant submits that once it has been shown that a loss has been incurred, damages should be awarded even if the specific amount cannot be assessed with certainty.⁹
90. Claimant submits that the amount of its loss should be quantified based on the DCF valuation method, more specifically the “*practical, industry-informed application of well-established principles*” used in the modern DCF model applied by its valuation expert Prof. Davis which it considers to be “*the best method to value a development-stage mining project like Reko Diq.*”¹⁰
91. In Claimant’s view, neither a comparables valuation approach nor a cost-based method could capture the value of its investment as it puts the investor in the position as if the investment had never occurred – rather than the position as if the breaches had not occurred as required by the principle of full reparation. In Claimant’s view, the same applies to the valuation method applied by Respondent’s valuation expert Dr. Burrows because it is also a backward-looking method and has in any event not been correctly applied.¹¹

2. On the Terms of the Mineral Agreement and the Risks and Issues Raised by Respondent

92. Claimant takes the position that if the Governments had continued to negotiate in good faith, the parties would have entered into a “*mutually beneficial and commercially reasonable*” mineral agreement, as contemplated by the 2002 BM Rules and the 1995 National Mineral Policy (the “**Mineral Agreement**”), and the question remained only on what terms. According to Claimant, the fiscal terms that Prof. Davis used in his model were the terms on which the Governments and TCC would likely have agreed but for the Governments’ takeover and abandonment of negotiations: (i) a 2% provincial royalty; (ii)

⁷ Claimant’s Quantum Memorial, ¶¶ 14-15; Claimant’s Quantum Reply, ¶ 37, quoting from *Case Concerning the Factory at Chorzów (Germany v. Poland)*, 1928 PCIJ, Series A, No. 17 (Merits), Judgment No. 13 of 13 September 1928 [CA-80], ¶ 125.

⁸ Claimant’s Quantum Reply, ¶ 34; Claimant’s Quantum Post-Hearing Brief, ¶ 17.

⁹ Claimant’s Quantum Reply, ¶¶ 34, 69; Claimant’s Quantum Memorial, ¶ 30.

¹⁰ Claimant’s Quantum Post-Hearing Brief, ¶ 21.

¹¹ Claimant’s Quantum Reply, ¶¶ 92-94. See also Claimant’s Quantum Memorial, ¶ 128.

Export Processing Zone (“**EPZ**”) status for the first 15 years followed by the normal tax regime; (iii) extension of TCCP’s mining lease for the life of the mine; and (iv) participation by Balochistan through a 25% Net Profit Interest.¹²

93. Claimant further argues that neither of Respondent’s criticisms on geology and metallurgy affects the value of the project because they are factually incorrect and “*reveal a profound lack of understanding about mining practices in general and the Reko Diq project in particular.*” Claimant maintains that its resource estimate is “*highly reliable*” and submits that: (i) its metallurgical sampling adequately represented the material to be processed by the mine; and (ii) its metallurgical testing validated “*consistently high recoveries of copper and gold at marketable concentrate grades.*”¹³
94. Claimant submits that it was committed to building the mine at Reko Diq and had developed the necessary plans to do so. According to Claimant, “*TCC’s Feasibility Study covered all the technical aspects required to build a project of this scale, as well as the capital and operating costs required to engineer, construct, and eventually operate both the initial mine and the planned expansion case.*”¹⁴
95. According to Claimant, Respondent’s arguments on water ignore the Tribunal’s findings in its Decision on Jurisdiction and Liability. Claimant also notes that it had identified: (i) an aquifer that was “*not only an abundant source of water but which could be utilized without any significant effect on surrounding communities*”; (ii) three backup sources; and (iii) the possibility to build a sea water pipeline. Claimant further claims that any residual risk that remained as of November 2011 has been accounted for by Prof. Davis.¹⁵
96. Claimant contends that it “*fully recognized and addressed the relevant security risks, including those associated with transporting the slurry concentrate by pipeline to the port of Gwadar.*” Claimant refers to the chapters on security and risk included in both the Initial Mine Development Feasibility Study submitted by Claimant to the Government of Balochistan on 26 August 2010 (the “**Feasibility Study**”) and the Expansion Pre-Feasibility Study completed in July 2010 (the “**Expansion Pre-Feasibility Study**”) as well as the “*comprehensive Risk Register in which risks were catalogued, assigned a mitigation strategy, and tracked with respect to progress.*” According to Claimant, the costs associated with the security plans were accounted for in the operating and capital cost estimates, with “*significant contingencies totaling more than half a billion dollars*” built into the capital expense estimates.¹⁶ In any event, Claimant claims that Prof. Davis’

¹² Claimant’s Quantum Memorial, ¶ 48; Claimant’s Quantum Post-Hearing Brief, ¶¶ 229, 235-237.

¹³ Claimant’s Quantum Post-Hearing Brief, ¶¶ 36-37, 46.

¹⁴ Claimant’s Quantum Post-Hearing Brief, ¶ 72. *See also* Claimant’s Quantum Reply, ¶ 670.

¹⁵ Claimant’s Quantum Reply, ¶¶ 487-491.

¹⁶ Claimant’s Quantum Post-Hearing Brief, ¶¶ 128, 132; Claimant’s Quantum Reply, ¶¶ 592-594.

model “*fully accounts for any security costs.*” In particular, Claimant refers to Prof. Davis’ inclusion of a 0.5% annual likelihood of permanent pre-mature mine shut-down of Reko Diq due to acts of extreme political violence, which, according to Prof. Davis, “*reduces the value of the investment by US\$ 1.4 billion, or 14% relative to a scenario where this risk would be absent.*”¹⁷

97. Claimant submits that its approach to identifying, assessing and managing potential environmental and social risks of the project was consistent with international best practices and in line with what lenders and regulators would have expected for the Reko Diq project at this stage. Claimant considers that none of the criticisms raised by Respondent are material enough to have an effect on the quality of the Environmental and Social Impact Assessment for the Reko Diq Project dated November 2010 (“**ESIA**”). It further argues that the ESIA process reflected a dynamic collaboration between Claimant, its owners and third-party consultants and maintains that the final ESIA ensured compliance with the most stringent standards in the industry.¹⁸
98. Claimant submits that none of the allegations raised by Respondent with regard to permitting established an impact on the valuation of the project beyond the delays that Prof. Davis has already incorporated into his valuation model. Claimant contends that: (i) it did not experience significant problems securing approvals, licenses or permits for the project; (ii) it took appropriate steps to address future permitting needs; and (iii) in any event, Prof. Davis incorporated longer delays into his model than any of the delays posited by Respondent.¹⁹
99. Finally, Claimant asserts that in the absence of Respondent’s breaches, the Reko Diq project would have attracted the necessary financing, as it had the full support of its sponsors, Antofagasta and Barrick. According to Claimant, this is confirmed by the fact they the sponsors had invested hundreds of millions of US dollars in the Feasibility Study and were willing to contribute 60% of the project costs. It argues that lenders “*would have given great weight not only to the sponsors’ financial capacity but also to their managerial, technical, and operating expertise.*”²⁰

3. On Prof. Davis’ Adjustments for Systematic and Asymmetric Risks

100. Claimant submits that Prof. Davis appropriately discounted the project’s future cash flows for both systematic and asymmetric risks as well as for the time value of money. Claimant

¹⁷ Claimant’s Quantum Post-Hearing Brief, ¶¶ 143-144, *quoting from* Davis II, ¶ 178.

¹⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 146; Claimant’s Quantum Reply, ¶¶ 696-699.

¹⁹ Claimant’s Quantum Post-Hearing Brief, ¶¶ 186, 188.

²⁰ Claimant’s Quantum Post-Hearing Brief, ¶¶ 261, 269-270; Claimant’s Quantum Reply, ¶ 766, *quoting from* Pingle, ¶ 23.

explains that Prof. Davis applied risk-adjusted cash flows derived from futures and forward prices which are already discounted for systematic risk. It specifically rejects Respondent's allegation that the cash flows and specifically the revenues in Prof. Davis' model are the same as in the DCF model of the Expansion Pre-Feasibility Study.²¹

101. Claimant further rejects the allegation that Prof. Davis' model implies a 4.2% discount rate, which would be only 1.2 percentage points above the risk-free rate. According to Claimant, this implied rate does not fully capture the significant asymmetric risk adjustments made by Prof. Davis but most importantly does not capture the discount for systematic risk. Claimant further emphasizes that Prof. Davis increased the cost estimates in the Expansion Pre-Feasibility study by a total of 58%.²²
102. According to Claimant, Prof. Davis has also fully accounted for asymmetric risks, including the country risk affecting the project because of its location in Pakistan and in particular Balochistan. Claimant notes that according to Respondent, the most prominent risks associated with the project's location are political violence and security risks and argues that Prof. Davis took these into account in three ways: (i) he incorporated an annual 0.5% probability of a complete and permanent project shutdown; (ii) he included "*substantial premiums for insurance that would protect against the effects of political violence, terrorist attacks, and other security threats*"; and (iii) he adjusted various costs and production quantities to reflect the residual risk of various security threats. In addition to country risk, Claimant asserts that Prof. Davis also accounted for further asymmetric risk by incorporating the potential effects of project delays, which reduced the value of Claimant's investment by USD 1.3 billion.²³
103. According to Claimant, Respondent has failed to present any credible valuation which could have been compared with Prof. Davis' modern DCF valuation; it only submitted "*Dr. Burrows's odd and unconvincing 'prior transaction' approach*" which concluded that the project was worth even less than in 2006. Claimant contends that Dr. Burrows' prior transaction analysis is "*irredeemably flawed*" because the 2006 transaction is "*simply not 'comparable'*" to the 2011 project, as confirmed by the "*massive adjustments*" made by Dr. Burrows in his analysis. More importantly, Claimant argues that Dr. Burrows' analysis contradicts the "*foundational principle*" of the value curve according to which "*project value increases exponentially as sponsors' certainty about the underlying mineral resources and about the feasibility of the mine plan increases.*"²⁴
104. Claimant further emphasizes that Respondent's valuation experts Mr. Brailovsky and Prof. Wells did not present any DCF valuation of the project but only stated that the

²¹ Claimant's Quantum Post-Hearing Brief, ¶¶ 320-325; Claimant's Quantum Reply, ¶ 205.

²² Claimant's Quantum Post-Hearing Brief, ¶¶ 340-344; Claimant's Quantum Reply, ¶¶ 240-244.

²³ Claimant's Quantum Post-Hearing Brief, ¶¶ 389-394; Claimant's Quantum Reply, ¶¶ 246-250, 255.

²⁴ Claimant's Quantum Post-Hearing Brief, ¶¶ 468, 477-478; Claimant's Quantum Reply, ¶ 273.

project either had no value, a negative value or the value estimated by Dr. Burrows, without proving actual calculations or supporting evidence for their assertions. According to Claimant, the IRR reported in the Expansion Pre-Feasibility Study, on which they relied, is “*not a particularly useful indicator of the value of the Project*” given that it is “*by definition, a conservative analytical tool*” which was “*the result of conservative assumptions*” and did not reflect the actual rate of return expected for the project. Claimant adds that the IRRs and NPVs are evaluations rather than valuations as they are intended to test the project and determine that it can break even but not to calculate how profitable it can be.²⁵

105. Claimant further emphasizes that “[d]espite all of this deliberate conservatism,” the Expansion Pre-Feasibility Study confirmed the robustness of the project, yielding a net present value of USD 1.206 billion at a 10% discount rate. It adds that Prof. Davis’ update of the calculation to the valuation date yielded a net present value of USD 4.0 billion; Claimant’s 75% share of that NPV would have been USD 3.0 billion.²⁶

4. On Pre-Award and Post-Award Interest

106. Finally, Claimant submits that the principle of full reparation requires that it be awarded pre-award and post-award compound interest to be calculated at either: (i) Respondent’s short-term, unsecured, dollar-denominated borrowing rate, which corresponds to an annualized compound rate of 4%; or (ii) “*another conservative rate*” such as the US prime rate plus two percentage points, which corresponds to an annualized compound rate of 5.6%.²⁷

B. Summary of Respondent’s Contentions

107. Respondent submits that the Tribunal should award no damages to Claimant because it has failed to prove the necessary elements of its claim, including the technical and economic feasibility of the project, and has relied on a valuation method that produces artificially inflated results. In Respondent’s view, the real value of the project is speculative; in any event, it does not exceed USD 149.2 million as of the valuation date.²⁸

1. On the Legal Standards Governing Claimant’s Claim for Compensation

108. Respondent accepts that “*the proper measure of quantum is the market value of TCC on November 15, 2011.*” According to Respondent, “*market value*” is captured by the compensation standard agreed by the parties to the Treaty, *i.e.*, Article 7, which excludes

²⁵ Claimant’s Quantum Post-Hearing Brief, ¶¶ 485, 488-489, quoting from Pingle, ¶ 68; Claimant’s Quantum Reply, ¶ 334.

²⁶ Claimant’s Quantum Post-Hearing Brief, ¶ 490; Claimant’s Quantum Reply, ¶¶ 339, 369-370, 374-375, 377.

²⁷ Claimant’s Quantum Post-Hearing Brief, ¶¶ 508-512; Claimant’s Quantum Reply, ¶¶ 370-386, 406-407.

²⁸ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 3-5, 361.

the application of a *lex generalis* taken from customary international law. Respondent notes that Article 7(2) of the Treaty requires the Tribunal to assess whether the fair market value of Claimant's investment is "*readily ascertainable*" and considers that the valuation presented by Claimant "*is as far as a method could be from rendering a 'readily ascertainable' result.*" Consequently, Respondent argues that pursuant to Article 7(2) of the Treaty, the Tribunal must determine a value "*in accordance with generally recognized principles of valuation and equitable principles taking into account the capital invested, depreciation, capital already repatriated, replacement value, and other relevant factors.*"²⁹

109. Respondent submits that Claimant bears the burden of proving that the damages it alleges are a direct consequence of the Treaty breaches and that, in order to establish causation, it must prove that: (i) the alleged injury was caused by the wrongful act as a matter of fact; and (ii) the loss is not too remote and speculative. Respondent argues that the Tribunal's finding on the existence of a Treaty breach does not discharge Claimant's burden of proof on causation and maintains that Claimant has failed to prove that the amount of compensation is a direct consequence of the rejection of the Mining Lease Application.³⁰
110. Respondent further submits that Claimant also has the burden of proof on the existence and quantum of the damages it is seeking. It relies on its legal expert Dr. Ripinsky who states that a "*claimant must prove the losses it has incurred with reasonable, or sufficient, certainty.*" In Respondent's view, Claimant failed to provide reasonably and sufficiently certain information and therefore failed to discharge its burden of proof; Reko Diq "*faced key challenges that would have prevented it from becoming profitable, which requires the Tribunal to dismiss the compensation claims.*"³¹
111. Respondent contends that the valuation method applied by Claimant's valuation expert, which it describes as "*a rather unique variation of a discounted cash flow ('DCF') valuation, which has not been adopted by the mining industry or investment tribunals,*" cannot help in determining the fair market value of Claimant's investment as of the valuation date. According to Respondent, the "*modern DCF*" method does not meet the standard for a "*readily ascertainable*" market value but has been fabricated by Claimant and its expert to "*provide a designer, bespoke methodology allowing TCC to offer the*

²⁹ Respondent's Counter-Memorial on Quantum, ¶¶ 28, 49; Respondent's Post-Hearing Brief on Quantum, ¶ 302; Respondent's Rejoinder on Quantum, ¶¶ 64, 71, 78, *quoting from Exhibit CE-4*, Article 7(2).

³⁰ Respondent's Counter-Memorial on Quantum, ¶¶ 50-51, 58; Respondent's Rejoinder on Quantum, ¶¶ 49, 53.

³¹ Respondent's Counter-Memorial on Quantum, ¶¶ 59-62, 69; Respondent's Post-Hearing Brief on Quantum, ¶¶ 308-311, *quoting from Ripinsky I*, ¶ 6 and note 2.

*appearance of pseudo-scientific support for its predetermined outlandish valuation.*³² More generally, Respondent claims that “*the weight of authority clearly indicates that, as a general rule, the DCF method is not appropriate for investment projects that have not demonstrated their capacity to generate profits by a track record of performance.*”³³

112. Respondent submits that where the market value is not “*readily ascertainable,*” the Tribunal should look to a backward-looking approach. Respondent contends that its expert Dr. Burrows derived the best approximation to the fair market value of Claimant’s investment by using the prior transaction by which Antofagasta and Barrick acquired the shares in Claimant in 2006.³⁴

2. On the Terms of the Mineral Agreement and the Risks and Issues Affecting the Project

113. Respondent emphasizes that the Tribunal has not made any finding that Claimant had a legitimate expectation to conclude a Mineral Agreement and argues that there was no specific commitment to this effect nor were the Governments under a legal obligation to conclude a Mineral Agreement. Respondent further takes the position that “[g]iven the lengthy history or stalled negotiations and distant positions, the most likely outcome would be that no mineral agreement would have been agreed whatsoever.” At the same time, Respondent contends that the absence of a finding that a Mineral Agreement would have been concluded would render the value of Claimant’s plan to mine Reko Diq speculative.³⁵ As for the fiscal terms put forward by Claimant, Respondent submits that: (i) Pakistan would not have agreed to a royalty rate below the minimum of 5% required by law; (ii) Pakistan never agreed to grant EPZ status and Claimant abandoned this request during negotiations; (iii) the parties “*were nowhere close to agreeing to the overall fiscal regime*”; and (iv) the Governments “*roundly rejected*” a provision providing for an automatic renewal of the 30-year mining lease.³⁶
114. Respondent further submits that in order to determine the value of the copper and gold beneath the surface at Reko Diq, Claimant must achieve a level of certainty that it would be able and that it would be economically feasible to turn the rock into recoverable metal. Respondent emphasizes that if any of the issues that might arise poses a cost that is too high for the mineral to be economically extracted, the resources cannot be classified as

³² Respondent’s Post-Hearing Brief on Quantum, ¶¶ 306, 314; Respondent’s Counter-Memorial on Quantum, ¶ 113.

³³ Respondent’s Post-Hearing Brief on Quantum, ¶ 319, quoting from Ripinsky I, ¶ 8. See also Respondent’s Counter-Memorial on Quantum, ¶ 74 and 77.

³⁴ Respondent’s Counter-Memorial on Quantum, ¶ 116; Respondent’s Post-Hearing Brief on Quantum, ¶ 353.

³⁵ Respondent’s Counter-Memorial on Quantum, ¶¶ 130-135, 144; Respondent’s Post-Hearing Brief of Quantum, ¶¶ 20-25; Respondent’s Rejoinder on Quantum, ¶ 109

³⁶ Respondent’s Post-Hearing Brief of Quantum, ¶ 27.

anything more than inferred and do not have any economic value; they can never become reserves.³⁷

115. According to Respondent, Claimant has failed to show that its resource model is trustworthy given that: (i) it has not provided an independent analysis that admitted flaws were fixed; (ii) it did not rebut the findings of Respondent's mining expert regarding the flaws in the database underlying the resource model; and (iii) the method of Claimant's mining expert and its application are "*completely unreliable*."³⁸
116. Respondent further maintains that Claimant has not "*completely sampled and tested the deposits from a metallurgical perspective*," as the deposit is variable and not sufficiently consistent to rely on the "*limited sampling and testing*" conducted by Claimant. In particular, Respondent contends that Claimant did not sufficiently test the deposit at depths below 450 meters and claims that Claimant's metallurgical testing program was insufficient to prove that the ore below that depth was metallurgically consistent with the ore from shallower depths. In its view, "*the reasonable position is to assume metallurgical variability*," as a buyer would have done in light of the lack of testing for the deposits.³⁹
117. Respondent submits that, according to Claimant, Reko Diq is a "*mega project*" which would have cost almost USD 3.3 billion in capital expenditures in order to get the mine operational. Respondent claims, however, that the Feasibility Study and Expansion Pre-Feasibility Study "*failed to quantify sizable costs, adopted an overly aggressive construction schedule that did not prepare for the requirements of building a mine in Pakistan, and adhered to overly optimistic assumptions in its construction plan and cost estimates*." According to Respondent, the Feasibility Study was "*a blueprint for another Mega Project failure*."⁴⁰
118. Respondent argues that "[w]ater was a big concern for TCC" and emphasizes that the quantities of water needed for the construction and operation of the project would be equal to the level of daily water consumption of approximately 500,000 people. Respondent also points to the additional risks identified in Claimant's Risk Register, which confirms in its view that Claimant was aware that "*the availability of and right to use water could doom the entire project*."⁴¹ According to Respondent, Claimant "*fell far short of proving the size of the aquifer, its plans for mitigation, and the effects of its plans on surrounding*

³⁷ Respondent's Counter-Memorial on Quantum, ¶ 193.

³⁸ Respondent's Post-Hearing Brief on Quantum, ¶ 75.

³⁹ Respondent's Post-Hearing Brief on Quantum, ¶¶ 81, 95; Respondent's Rejoinder on Quantum, ¶¶ 172-173.

⁴⁰ Respondent's Counter-Memorial on Quantum, ¶ 352, Respondent's Post-Hearing Brief on Quantum, ¶¶ 108-109.

⁴¹ Respondent's Post-Hearing Brief on Quantum, ¶ 134; Respondent's Counter-Memorial on Quantum, ¶¶ 218, 221.

areas and countries.” Respondent considers it confirmed that the Fan Sediments would likely not have provided sufficient water for the project and contends that there was no feasibility assessment and no cost estimates on transporting the water from other water sources to Reko Diq. Respondent also submits that the solution to pump seawater to Reko Diq was not mentioned in the Feasibility Study and adds that, in any event, this water pipeline would have faced the same risks as the slurry pipeline to Port Gwadar.⁴²

119. Respondent considers it undisputed that Claimant was planning to build a mine in “*one of the most dangerous places in the world*” and that the security situation in Balochistan has worsened from 2006 to 2011 and continuing thereafter. However, Respondent contends that Claimant “*made little to no effort to identify and address the security risks that the Reko Diq project faced, largely ignored the threat of sabotage on the pipeline, and completely understated the costs to adequately secure the mine’s operations.*”⁴³ Respondent argues that in light of the security risks, a third-party buyer “*would likely have refrained from going forward*”; however, if it had decided to proceed, it could not have relied on Prof. Davis’ valuation model which, according to Respondent, “*does not account for the cumulative effect of attacks, the impact of security costs on the financials of the project as management saw it in 2010-2011, and a realistic view of the insurance market.*”⁴⁴
120. Respondent also claims that Claimant: “*(1) had no comprehensive plan to mitigate the public’s concerns and provide benefits; (2) failed to understand the socio-political conditions in the area and the Resource’s role in exacerbating already existing tensions; (3) failed to sufficiently engage the affected communities or involve them in strategic decision making during the consultation process; and (4) underestimated what it would take to obtain a social license and maintain it.*” Respondent further contends that Claimant’s ESIA failed to conform to the IFC Performance Standards and Equator Principles as well as to its own Environmental Design Criteria (EDC) in various areas, as a result of which it would not have been able to seek funding and would not have been able to obtain political risk insurance.⁴⁵
121. According to Respondent, Claimant would further have been required to show that it had the necessary permits. By contrast, Respondent claims that “*TCC did not even know all of the permits it needed, did not appreciate the practical difficulties of operating in*

⁴² Respondent’s Post-Hearing Brief on Quantum, ¶¶ 134, 163-164; Respondent’s Rejoinder on Quantum, ¶¶ 254-255.

⁴³ Respondent’s Post-Hearing Brief on Quantum, ¶ 166; Respondent’s Rejoinder on Quantum, ¶ 288; Respondent’s Counter-Memorial on Quantum, ¶¶ 256-257.

⁴⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 206.

⁴⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 207; Respondent’s Rejoinder on Quantum, ¶¶ 290-291; Respondent’s Counter-Memorial on Quantum, ¶¶ 313, 320.

*Balochistan, and failed to account for the specific difficulties of getting permits for the project.”*⁴⁶

122. Finally, Respondent asserts that the Reko Diq project would not have been financially feasible from a bankability perspective because there was “*no financing appetite*” in the market for the Reko Diq project given the “*significant flaws in the standards underlying the IMD FS and an array of other problems that made the project not bankable.*” In addition, Respondent argues that any decision by Claimant’s owners to fund the development of the project on an equity basis would have required them to break their internal policies and risk their market reputation.⁴⁷

3. On Prof. Davis’ Adjustments for Systematic and Asymmetric Risks

123. Respondent takes the view that Prof. Davis has not adequately accounted for the systematic risks in his valuation model because he has used “*inordinately speculative*” projections of futures prices and even called his projections “*certainty-equivalent.*” Respondent considers it “*simply untenable*” that a buyer would be convinced by Prof. Davis’ explanation of “*certainty-equivalent*” cash flows and accept the “*ridiculously low rate return*” in order to invest in a non-diversified, non-operational mining project in Balochistan instead of purchasing the same amount in US Treasury bonds.⁴⁸
124. Respondent contends that “[w]hen properly analyzed,” Prof. Davis’ valuation is equivalent to applying a discount rate of merely 1.2% above the risk-free rate. According to Respondent, Claimant has thereby ignored over 90% of the risk impact perceived by financial markets and institutions. Respondent also refers to the discount rates of 10% to 12% used by SNC Lavalin in the Expansion Pre-Feasibility Study, which led to a value of the project near zero. Respondent alleges that the revenues and costs projected by Prof. Davis are very similar to those in the financial model of the Expansion Pre-Feasibility Study, which makes it apparent that Prof. Davis made “*only minor adjustments to the cash flows*” and that these cash flows are therefore no more “*certainty-equivalent*” than those of SNC Lavalin. As a result, Respondent claims that there can be no justification for the application of a risk-free discount rate to the cash flows in Prof. Davis’ model.⁴⁹
125. In Respondent’s view, the implied discount rate of 4.2% in Prof. Davis’ model cannot be an adequate expression of all the risks to which the project’s cash flows would have been exposed, in particular the country risk, which has led other tribunals to apply risk

⁴⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 256; Respondent’s Rejoinder on Quantum, ¶ 350.

⁴⁷ Respondent’s Counter-Memorial on Quantum, ¶ 378.

⁴⁸ Respondent’s Rejoinder on Quantum, ¶¶ 420, 424, 433; Respondent’s Post-Hearing Brief on Quantum, ¶ 333.

⁴⁹ Respondent’s Rejoinder on Quantum, ¶¶ 423-424; Respondent’s Post-Hearing Brief on Quantum, ¶¶ 343-344, 438-439.

premiums between 10% and 20% as part of the discount rate, which would render the net present value of the cash flows estimated by Claimant negative.⁵⁰

126. Respondent submits that the only proper determination of the fair market value of Claimant's interest in Reko Diq has been provided by Dr. Burrows who, "*following best practices and his long forensic experience, ... identified the existence of a prior transaction that, with some adjustments, would be the best approximation to that fair market value,*" i.e., the acquisition by Barrick of 50% in Claimant in September 2006 for a value of USD 246 million.⁵¹ Respondent rejects the argument that Dr. Burrows failed to account for changes in the reported resources of the property, operating costs and mining technology between 2006 and 2011. In Respondent's view, a comparison with Antofagasta's expectations as of 2006 demonstrates that "*the parties had an accurate understanding of the total mineralization of the Reko Diq project*" but that "*additional development after 2006 needed to design the mine led to negative surprises about recovery costs.*" According to Respondent, there was therefore no need for an adjustment in Dr. Burrows' calculation to account for an increased size of the deposit or economies of scale.⁵²
127. Respondent submits that Dr. Burrows made the necessary adjustments to account for: (i) changes in expectations about metals prices; (ii) inflation of production costs in the global mining industry; (iii) changes in the general cost of capital for metals mines; and (iv) changes in country risk for Pakistan, which results in a fair market value not exceeding USD 149.2 million as of the valuation date. According to Respondent, this valuation shows that Claimant has "*artificially inflated its claim by billions of dollars, or over 98.2% of the value claimed of USD 8.5 billion.*"⁵³

4. On Pre-Award and Post-Award Interest

128. Respondent submits that under the applicable rules of international law, any interest awarded should be simple and accrue at a risk-free rate such as the one-month US Treasury bills. According to Respondent, any higher rate would reward Claimant for risks to which the assets being valued were not exposed after the valuation date or "*simply contradict the applicable law.*"⁵⁴

⁵⁰ Respondent's Post-Hearing Brief on Quantum, ¶¶ 349-351.

⁵¹ Respondent's Post-Hearing Brief on Quantum, ¶ 352; Respondent's Counter-Memorial on Quantum, ¶¶ 404-407.

⁵² Respondent's Rejoinder on Quantum, ¶¶ 332-448.

⁵³ Respondent's Counter-Memorial on Quantum, ¶¶ 409-412; Respondent's Post-Hearing Brief on Quantum, ¶¶ 361-362.

⁵⁴ Respondent's Post-Hearing Brief on Quantum, ¶ 364; Respondent's Counter-Memorial on Quantum, ¶ 416.

VI. THE PARTIES' REQUESTS FOR RELIEF

A. Claimant's Request for Relief

129. In its Quantum Post-Hearing Brief dated 31 August 2018, Claimant requests that the Tribunal issue an award:⁵⁵

- (i) Ordering Pakistan to pay monetary damages in an amount that would wipe out all the consequences of Respondent's illegal acts, valued at USD 8.5 billion as of 15 November 2011;
- (ii) Ordering Pakistan to pay pre-award compound interest on the above amount for the period from 15 November 2011 through the date of the award at a rate equal to Respondent's short-term cost of borrowing, valued at USD 2.42 billion as of 30 April 2018,⁵⁶ and subject to updating closer to the date of the award;
- (iii) Ordering Pakistan to pay all the costs of the arbitration and all of TCCA's professional fees and expenses on a full indemnity basis, in an amount to be specified in TCCA's application for costs with respect to the entire arbitration, to be filed on 28 September 2018 pursuant to the Tribunal's oral order on the last day of the hearing;
- (iv) Ordering Pakistan to pay post-award interest on all of the above amounts until full payment of those amounts is made, at an annually compounding rate equal to Respondent's annualized short-term cost of borrowing, calculated as the sum of: (i) the annualized market yield on one-month U.S. Treasury bills on the date of the award; and (ii) the market one-year credit default swap spread on Pakistan's sovereign debt on that same date;
- (v) Ordering Pakistan to pay the full amount due, in U.S. dollars, outside of Pakistan, without any reduction, claim, or offset whatsoever for taxes, any other fiscal obligation, or any other reason; and
- (vi) Ordering any such further relief as the Tribunal may deem appropriate.

B. Respondent's Request for Relief

130. In its Post-Hearing Brief on Quantum dated 31 August 2018, Respondent requests that the Tribunal decide as follows:⁵⁷

- (i) TCC has not shown it has any basis to receive compensation;

⁵⁵ Claimant's Quantum Post-Hearing Brief, ¶ 517.

⁵⁶ Exhibit CE-1785.

⁵⁷ Respondent's Post-Hearing Brief on Quantum, Section VII.

- (ii) There is no basis to award damages with a DCF methodology;
- (iii) Any damages should be no more than the 2006 transaction updated to the Valuation Date;
- (iv) Any interest should be simple and calculated on the one-month U.S. Treasury bill; and
- (v) Pakistan should receive its full costs and attorneys' fees, update with interest.

VII. THE TRIBUNAL'S REASONING

131. At the outset of its reasoning, the Tribunal wishes to emphasize that it has carefully reviewed all of the arguments and evidence presented by the Parties in the course of the present phase of the proceedings concerning the consequences flowing from Respondent's breaches of the Treaty as well as, to the extent relevant in the present context, the arguments and evidence adduced in the previous phases on jurisdiction and liability and on Respondent's Application to Dismiss the Claims. Although the Tribunal may not address all such arguments and evidence in full detail in its reasoning below, the Tribunal has nevertheless considered and taken them into account in arriving at its decision.

132. The Tribunal's reasoning is structured as follows:

- First, the Tribunal will recall the main findings it has made in the Decision on Jurisdiction and Liability which it deems relevant to its assessment of the Parties' arguments raised in this last phase of the proceedings. The Tribunal will also refer to the findings it has made in its Decision on Respondent's Reconsideration Request and make certain general remarks on the development of Respondent's position regarding the feasibility of Claimant's project at Reko Diq.
- Second, the Tribunal will determine the relevant legal standards governing Claimant's claim for compensation. As part of this assessment, the Tribunal will address: (i) the applicable standard of compensation; (ii) the requirement of causation between Respondent's Treaty breaches and the damages alleged by Claimant; (iii) the standard and burden of proof that apply to ascertaining the feasibility of the project and the value of Claimant's investment; and (iv) the appropriate valuation method to determine the value of Claimant's investment and the corresponding compensation to which Claimant is entitled. In the context of (iv), the Tribunal will address the different valuation methods used by the Parties' valuation experts and examine whether Claimant has established, in principle, that it is appropriate to determine the damages it has incurred based on the valuation method relied on by its valuation expert, Prof. Davis.

- Third, once the Tribunal has determined the relevant legal standards, it will assess whether Claimant has established that it would have concluded a Mineral Agreement with the Federal and Provincial Governments and, if so, the terms on which such an agreement would likely have been concluded. The Tribunal will further examine whether Claimant has established the feasibility of the project and address the various risks and issues raised by Respondent in this last phase of the arbitration proceedings. Provided that the Tribunal decides, in principle, to follow the valuation method relied on by Prof. Davis, it will also assess whether Prof. Davis has appropriately accounted for each of these risks in his valuation of the project.
- Fourth, and again provided that the Tribunal decides, in principle, to follow the valuation method relied on by Prof. Davis, the Tribunal will assess whether he has appropriately accounted for all relevant systematic and asymmetric risks affecting the project.
- Fifth, the Tribunal will verify whether the conclusion it has reached on the amount of damages incurred based on the valuation method relied on by Prof. Davis is reconcilable with the results yielded by other valuation or evaluation methods relied on by Respondent's experts in this arbitration or contemporaneously applied by TCCA.
- Finally, the Tribunal will address Claimant's request for an award of pre-award and post-award interest on the amount of compensation owed to it by Respondent.

A. Relevant Findings Made by the Tribunal in the Decision on Jurisdiction and Liability and the Decision on Respondent's Reconsideration Request

133. At the outset of its analysis, the Tribunal will: (i) recall the main findings it has made in the Decision on Jurisdiction and Liability which it deems relevant to its assessment of the Parties' arguments raised in this last phase of the proceedings; (ii) refer to the findings it has made in its Decision on Respondent's Reconsideration Request; and (iii) make certain general remarks on the development of Respondent's position regarding the feasibility of Claimant's project at Reko Diq.

1. Findings Made in the Tribunal's Decision on Jurisdiction and Liability

134. As part of its analysis of Respondent's jurisdictional objections, the Tribunal held that Claimant had an "*investment*" within the meaning of Article 1(1)(a) of the Treaty, which consisted of the following:

"Claimant's activities in Pakistan were primarily based on two pillars: (i) TCCA's own direct 75% interest in the CHEJVA and the Joint Venture that was thereby established; and (ii) its 100% interest in its Pakistani subsidiary TCCP, which was established for the exclusive purpose of carrying out

*Claimant's activities in Pakistan. Through TCCP, Claimant indirectly held all further rights in the Reko Diq Project that were not held by the Joint Venture.”*⁵⁸

135. The Tribunal held that these two pillars constitute “assets,” which were “owned or controlled” by TCCA and were “admitted by [Pakistan] subject to its law and investment policies” applicable at the time the investment was made.⁵⁹
136. On that basis, the Tribunal made the following findings on liability.

a. Respondent Has Breached Article 3(2) of the Treaty

137. First, the Tribunal found that Respondent has failed to accord Claimant fair and equitable treatment in violation of its obligation under Article 3(2) of the Treaty.
138. The Tribunal held that the protection of an investor’s legitimate expectations is an important element of the FET standard under Article 3(2) of the Treaty.⁶⁰ Based on a thorough analysis of the Parties’ submissions and the evidence in the record, the Tribunal concluded with regard to the scope of legitimate expectations created by Respondent:

*“In conclusion, the Tribunal finds that by means of both the contractual and the regulatory framework of Claimant's investment as well as the conduct of the GOB and the GOP during the time period in which Claimant explored the area at Reko Diq, Respondent created the legitimate expectation that Claimant would be entitled to a mining lease upon submission of an application that met the routine requirements as set out in rule 48(3)(a) of the 2002 BM Rules. Even though these requirements contained certain discretionary elements, the Governments created the impression that such discretion had either already been exercised or that it would be exercised in Claimant's favor because they recognized the general principle that, after having invested millions of dollars into the exploration of the area, Claimant should also be the one that would later reap the benefit of its exploitation together with its Joint Venture partner. Finally, both the GOB and the GOP repeatedly assured Claimant that they would support and facilitate Claimant's investment.”*⁶¹

139. Specifically, with regard to the role assumed by the GOB in this context, the Tribunal held:

“Pursuant to these provisions [i.e., Clauses 7.2a), 5.7.1, 5.7.2, 24.6.2 and 24.6.3 of the CHEJVA], the GOB was under an obligation to provide administrative support in procuring the required licenses and permits and to perform all reasonable acts to give effect to the purposes of the CHEJVA and

⁵⁸ Decision on Jurisdiction and Liability, ¶ 632.

⁵⁹ Decision on Jurisdiction and Liability, ¶¶ 633-642.

⁶⁰ Decision on Jurisdiction and Liability, ¶ 812.

⁶¹ Decision on Jurisdiction and Liability, ¶ 958.

*the interests of the Joint Venture as a whole, i.e., to the exploration and exploitation of the mineral resources at Reko Diq. It is undisputed between the Parties that the GOB did provide such support for, and thus facilitated, Claimant's investment over a period of many years, including the time period in which the 2006 Novation Agreement was signed.”*⁶²

140. The Tribunal then examined whether Respondent breached the legitimate expectations it had created and, based on a thorough analysis of the evidentiary record regarding, in particular, the GOB project at Reko Diq, found that there “*is sufficient evidence that mining activities formed part of the GOB's project and that the GOB thus did not intend to implement a complementary processing project, but rather a competing mining and processing project (albeit at a smaller scale) that was not compatible with Claimant's project.*”⁶³ The press coverage in 2010 reinforced the Tribunal’s conclusion that “*that the GOB had decided to take over the project and, accordingly, to deny TCCP's Mining Lease Application.*”⁶⁴
141. This conclusion was not, however, sufficient for a finding that Respondent breached its FET obligation because there might have been, at the same time, legitimate reasons for denying the Mining Lease Application submitted by TCCP to the Licensing Authority on 15 February 2011.⁶⁵ Consequently, the Tribunal examined each of the ten grounds stated in the Licensing Authority’s notice of its intent to reject the Mining Lease Application dated 21 September 2011 (the “**Notice of Intent to Reject**”).⁶⁶ The Parties had grouped those grounds into three sets of grounds, *i.e.*: (i) that TCCP was not the proper applicant; (ii) that the Feasibility Study, which formed part of the Mining Lease Application, did not provide for processing, smelting and refining of the ore; and (iii) that TCCP failed to submit a proper/complete feasibility study on the discovered deposits in the exploration area. For the reasons set out in detail in the Decision on Jurisdiction and Liability, the Tribunal concluded that “*none of the reasons given in the Notice of Intent to Reject could have justified the denial of the Mining Lease Application.*”⁶⁷
142. In the first phase of the arbitration proceedings, Respondent further raised four additional grounds which, in its view, justified the Licensing Authority’s denial of the Mining Lease Application, *i.e.*: (i) that TCCP failed to prove that the mine could be profitably developed and operated; (ii) that TCCP failed to establish that it had or could obtain the resources to carry out the mining operations effectively; (iii) that TCCP failed to adequately address

⁶² Decision on Jurisdiction and Liability, ¶ 947.

⁶³ Decision on Jurisdiction and Liability, ¶ 1151.

⁶⁴ Decision on Jurisdiction and Liability, ¶ 1159.

⁶⁵ Decision on Jurisdiction and Liability, ¶ 1160.

⁶⁶ **Exhibit CE-7.**

⁶⁷ Decision on Jurisdiction and Liability, ¶ 1126.

the security risks of the pipeline; and (iv) that TCCP failed to fully assess the water source for the project.⁶⁸

143. With regard to these reasons, the Tribunal first held:

*“Respondent should not be allowed to rely on reasons additional to those invoked in the Notice of Intent to Reject because Respondent would thereby be allowed to ignore the procedural requirements set out in rule 48(4) and (5) of the 2002 BM Rules and, more generally, this would violate Claimant's right to be heard both during the procedure before the Licensing Authority and the appeal before the Secretary of the MMDD.”*⁶⁹

144. In any event, the Tribunal considered that *“none of the additional reasons invoked by Respondent would justify the denial of the Mining Lease Application in the present case.”*⁷⁰

145. As certain findings made by the Tribunal in the context of these additional grounds are particularly relevant to the arguments raised by Respondent in this last phase of the proceedings, the Tribunal considers it worth recalling these reasons in more detail at this point.

i. Respondent’s Allegation That TCCP Failed to Prove that the Mine Could Be Profitably Developed and Operated

146. In the context of the first additional ground, *i.e.*, that Claimant failed to demonstrate in the Feasibility Study *“that the mine can be profitably developed and operated”* as required under rule 48(3)(a)(i) of the Mineral Rules enacted by Balochistan in 2002 to implement the National Mineral Policy (**“2002 BM Rules”**),⁷¹ the Tribunal recalled, *inter alia*, the oral testimony of Antofagasta’s chairman Mr. Luksic who explained that *“[e]ven if you have a start that is tight, your expansions are going to be extremely, extremely profitable”*⁷² and held:

*“In light of this undisputed testimony and further taking into account the fact that two of the world’s largest mining companies were willing to invest large amounts of equity into this project, the Tribunal considers it sufficiently established that the mining project as envisaged by Claimant, i.e., consisting of the initial mine development set out in the Feasibility Study and the expansions set out in the Pre-Feasibility Expansion Study, could be ‘profitably developed and operated’ as required under rule 48(3)(a)(i) of the 2002 BM Rules.”*⁷³

⁶⁸ Cf. Decision on Jurisdiction and Liability, ¶ 1231.

⁶⁹ Decision on Jurisdiction and Liability, ¶ 1232.

⁷⁰ Decision on Jurisdiction and Liability, ¶ 1233.

⁷¹ **Exhibit RE-1**, rule 48(3)(a)(i).

⁷² Transcript Hearing on Jurisdiction and Liability (Day 3), p. 695 lines 13-17.

⁷³ Decision on Jurisdiction and Liability, ¶ 1234, *quoting from*.

147. While taking note of the fact that the Expansion Pre-Feasibility Study did not form part of the Mining Lease Application and thus was not among the documents considered by the Licensing Authority, the Tribunal added:

“In any event, the Tribunal is not convinced by Respondent's argument that the initial mine development as presented in the Feasibility Study would have been unprofitable. While Respondent focused its argument primarily on the allegation that Claimant made wrong assumptions with regard to the tax and royalty regime, Claimant's witness Mr. Livesey explained during the Hearing that the profitability was much more sensitive to the prices of fuel and metals, in particular copper, and further stated that in light of the subsequent rise of the copper prices after the completion of the Feasibility Study, the profitability had increased ‘into high teens to twenties IRR even in the normal tax regime.’ This is reflected in the sensitivity analysis on metal prices conducted in Chapters 28.3.1 and 28.3.2 of the Feasibility Study, which further includes the statement that a ‘conservative base copper price’ was selected for this analysis.”⁷⁴

148. Finally, the Tribunal considered Respondent's argument that Claimant had made wrong assumptions regarding the tax and royalty regime:

“[T]he Tribunal notes that the applicable tax and royalty rates were still subject to the Mineral Agreement negotiations. While such negotiations had apparently stalled before the Mining Lease Application was filed, the parties may well have decided to revive them after the grant of the mining lease, given that Claimant would then have been the only one allowed to conduct mining operations in the area. There would thus have been a mutual interest to achieve agreement on the remaining issues. In the Tribunal's view, Claimant would have been in a far better bargaining position as holder of the mining lease over the area than it was before, in particular once it became clear that the Governments considered that Claimant did not have a right to convert its exploration license into a mining lease. Therefore, the Tribunal is not convinced that Claimant made unrealistic assumptions in the absence of which the project would have been unprofitable without any future expansions.”⁷⁵

⁷⁴ Decision on Jurisdiction and Liability, ¶ 1238, quoting from Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1398 lines 12-22 and referring to pp. 1410-1422 and **Exhibit RE-133**, pp. 28-20 to 28-26. Specifically, with regard to Table 28.20 entitled “Impact of Price on IRR,” Mr. Livesey further explained that “if you were to take today's prices on copper and gold, you would actually be off the chart another block to the right, down on that bottom line, and your IRR would be somewhat close to 20 percent.” Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1415 lines 16-19.

⁷⁵ Decision on Jurisdiction and Liability, ¶ 1239.

ii. Respondent’s Allegation That TCCP Failed to Establish That It Had or Could Obtain the Resources to Carry Out the Mining Operations Effectively

149. As to the second additional reason that Respondent invoked for the first time in these arbitration proceedings, *i.e.*, that TCCP failed to demonstrate that it had or could obtain the “*technical and financial resources and experience to carry out mining operations effectively*” as required under rule 48(3)(a)(iii) of the 2002 BM Rules,⁷⁶ the Tribunal again referred, *inter alia*, to Mr. Luksic’s testimony that Claimant’s shareholders had had meetings with the World Bank but “*you need to have a fully approved project before you get the financing.*” He also stated that “*the World Bank seemed very committed. ... [T]hey were very committed to Pakistan developing mining. It had a special man in charge of a mining program, and they were very committed.*”⁷⁷ The Tribunal then held:

*“In light of this testimony and again taking into account that Antofagasta and Barrick Gold as two of the world’s largest mining companies were willing to contribute large amounts of equity to the project, it appears improbable that they would not have been able to obtain third-party financing from financial institutions, such as the World Bank and/or the Asian Development Bank. In the Tribunal’s view, the absence of a Mineral Agreement might have made such financing more challenging, but there was no indication that it would have been impossible.”*⁷⁸

iii. Respondent’s Allegation That TCCP Failed to Adequately Address the Security Risks of the Pipeline

150. With regard to the third additional reason, *i.e.*, that TCCP failed to adequately address the security risks associated with transporting the concentrate via pipeline to the Port of Gwadar, the Tribunal referred to Mr. Livesey’s testimony on the issue as well as the fact that “*the Feasibility Study contained separate sections on both security and risk, which identified certain issues and set out the strategies to address them.*”⁷⁹ The Tribunal took note of the fact that “*it is also stated in the chapter on asset evaluation that certain ‘residual risks,’ including security risks, were identified the value of which was not included in the economic evaluation of the project,*” but the Tribunal did “*not agree with Respondent that TCCP therefore failed to adequately address security risks.*”⁸⁰ It held:

“The same section cited by Respondent states that such risks ‘will require further mitigation attention during the subsequent stages.’ In the Tribunal’s

⁷⁶ Exhibit RE-1, rule 48(3)(a)(iii).

⁷⁷ Decision on Jurisdiction and Liability, ¶¶ 1243-1244, quoting from Transcript Hearing on Jurisdiction and Liability (Day 3), p. 635 lines 15-18 and p. 675 lines 6-17.

⁷⁸ Decision on Jurisdiction and Liability, ¶ 1245.

⁷⁹ Decision on Jurisdiction and Liability, ¶ 1253, referring to Exhibits RE-132 and RE-134.

⁸⁰ Decision on Jurisdiction and Liability, ¶ 1253, referring to Exhibit RE-133, p. 28-30.

view, it is plausible that not all risks can be fully assessed and quantified at such an early stage of the project and that the risk mitigation strategy evolves over time and the further development of the project. Therefore, the Tribunal sees no reason to assume a failure on the part of TCCP to adequately address security risks in the Feasibility Study.”⁸¹

151. The Tribunal further noted that, as emphasized by Mr. Livesey, “*at no point until the rejection of the Mining Lease Application did the GOB raise any concerns and that, in fact, the pipeline was not even mentioned in the Notice of Intent to Reject. He concluded that ‘I don’t see why this is all of a sudden become a significant issue.’*”⁸² The Tribunal added:

“[T]he GOB had known about the option to transport the concentrate by means of a slurry pipeline since December 2007 when Claimant presented the transport options as part of its Mineral Agreement Proposals to the Governments in Dubai. While the GOB did express its interest in having built a road to Gwadar in order to improve the infrastructure of the region, there is no indication in the record that it ever raised any security concerns with regard to the pipeline option. Respondent’s witness Mr. Yaqoob confirmed during the Hearing that ‘there was no official discussion with the Government of Balochistan on security issues’ and further that, to his knowledge, there was also no internal discussion between the Licensing Authority and the GOB.

Further taking into account the fact that the pipeline as such, let alone the allegedly ignored security risks, were not mentioned in the Notice of Intent to Reject, the Tribunal is therefore not convinced that this additional reason invoked by Respondent in this arbitration played any role in the decision-making process of the Licensing Authority at the relevant time.”⁸³

iv. Respondent’s Allegation That TCCP Failed to Fully Assess the Water Source for its Project

152. Finally, the Tribunal turned to the fourth additional reason invoked by Respondent, *i.e.*, that TCCP failed to assess the water source that it intended to use for its project to full feasibility level. Based on the evidence in the record, it appeared to the Tribunal that, “*as far as the Pakistani side of the aquifer is concerned, it is undisputed that Claimant did make a full feasibility assessment of the groundwater source that it intended to use for the project, i.e., the Baghicha Bore Field.*”⁸⁴ The Tribunal further relied on Mr. Livesey’s witness testimony regarding the flow of water from Pakistan into Afghanistan as well as

⁸¹ Decision on Jurisdiction and Liability, ¶ 1253.

⁸² Decision on Jurisdiction and Liability, ¶ 1254, quoting from Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1281 line 16 to p. 1282 line 13.

⁸³ Decision on Jurisdiction and Liability, ¶¶ 1255-1256, referring to **Exhibit CE-219**, pp. 41, 46 and quoting from Transcript Hearing on Jurisdiction and Liability (Day 7), p. 1925 lines 5-12.

⁸⁴ Decision on Jurisdiction and Liability, ¶¶ 1257-1258, quoting from **Exhibit CE-410**, pp. 1-1 to 1-2.

the fact that Claimant maintained licenses to the other areas with potential water sources and also noted that the GOB had chosen the same water source for its own mining project.⁸⁵ It concluded:

*“Based on this record, the Tribunal is convinced that Claimant did in fact make an adequate assessment of the groundwater source it intended to use for its project so that Respondent’s fourth additional reason also does not present a justifiable basis for denying TCCP’s Mining Lease Application.”*⁸⁶

v. Conclusion on Respondent’s Breach of Article 3(2) of the Treaty

153. In its overall conclusion on its assessment of whether Respondent breached Article 3(2) of the Treaty, the Tribunal summarized its findings as follows:

*“In conclusion, the Tribunal finds that none of the reasons invoked in the Notice of Intent to Reject and/or in this arbitration justified the Licensing Authority’s decision to deny TCCP’s Mining Lease Application. The Tribunal is convinced that the real motive for the denial was the fact that the GOB had decided to develop and implement its own mining project rather than to collaborate with Claimant pursuant to the CHEJVA and that the grounds invoked by the Licensing Authority served only as a pretext to conceal this motive. The Tribunal recalls that Respondent had created legitimate expectations on Claimant’s part that it would be entitled to convert its exploration license into a mining lease ‘subject only to compliance with routine Government requirements.’ Given that Claimant in fact fulfilled all of the requirements under rule 48 of the 2002 BM Rules in its Mining Lease Application, Respondent’s denial, motivated by its desire to mine the area on its own, violated Claimant’s legitimate expectations and thereby breached the FET obligation under Article 3(2) of the Treaty.”*⁸⁷

154. As a result of this finding, the Tribunal did not have to express an opinion as to whether the Governments’ conduct in the Mineral Agreement negotiations amounted to a breach of the FET standard.⁸⁸

b. Respondent Has Breached Article 7(1) of the Treaty

155. Second, the Tribunal found that Respondent has carried out a measure having effect equivalent to expropriation that did not comply with the requirements for a lawful expropriation under Article 7(1) of the Treaty.

⁸⁵ Cf. Decision on Jurisdiction and Liability, ¶¶ 1260-1262, quoting from **Exhibit CE-419**, p. 1-2 and Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1329 line 16 to p. 1331 line 1 and p. 1331 lines 5-13 and **Exhibit CE-372**, pp- 12-13.

⁸⁶ Decision on Jurisdiction and Liability, ¶ 1263.

⁸⁷ Decision on Jurisdiction and Liability, ¶ 1264.

⁸⁸ Cf. Decision on Jurisdiction and Liability, ¶ 1265.

156. The Tribunal first noted that there had been no direct taking of Claimant's 75% interest in the Chagai Hills Exploration Joint Venture Agreement dated 29 July 1993 ("CHEJVA") and the unincorporated contractual joint venture established under the CHEJVA ("Joint Venture") or its 100% interest in TCCP and thus no direct expropriation.⁸⁹ However, the Tribunal held:

"[T]he sole purpose of the Joint Venture under the CHEJVA and, likewise, of TCCP was to carry out the exploration and eventual mining operations at Reko Diq. After Claimant had spent more than US\$ 240 million on its exploration work and had completed its Feasibility Study on the Initial Mine Development of the area, TCCP filed an application for a mining lease, which would have allowed Claimant to amortize the expenditures it had incurred during the exploration period. By denying TCCP's Mining Lease Application, however, the Licensing Authority rendered it impossible for Claimant to make use of the information and data it had collected and thereby also rendered Claimant's interest in both the CHEJVA and in TCCP useless. Without a mining lease, neither of them could any longer fulfill their exclusive purpose, after the exploration had been completed; thus, following the denial of TCCP's Application, the value of both the CHEJVA and TCCP was effectively neutralized.

*Consequently, the Tribunal finds that the denial of TCCP's Mining Lease Application was a measure having an effect equivalent to expropriation."*⁹⁰

157. The Tribunal considered that the GOB's motivation, *i.e.*, to deny the Mining Lease Application because it had decided to implement its own project rather than to continue its collaboration with Claimant, also excluded the classification of the denial as a *bona fide* regulatory measure.⁹¹

158. In terms of legality of the expropriatory measure, the Tribunal considered it common ground that the expropriation was not accompanied by the payment of "*prompt, adequate and effective*" compensation.⁹² Given the GOB's desire to implement its own project rather than to continue collaborating with Claimant, it further held:

*"Apart from the fact that this finding renders it questionable whether the expropriatory measure served a public purpose, the Tribunal in any event considers that the denial was discriminatory because it favored the GOB's local project over the project of a foreign company."*⁹³

159. It concluded that "*Respondent has not complied with (at least) two out of four Treaty requirements and therefore breached Article 7(1) of the Treaty.*"⁹⁴

⁸⁹ Decision on Jurisdiction and Liability, ¶ 1325.

⁹⁰ Decision on Jurisdiction and Liability, ¶¶ 1328-1329.

⁹¹ Decision on Jurisdiction and Liability, ¶ 1329.

⁹² Decision on Jurisdiction and Liability, ¶ 1335.

⁹³ Decision on Jurisdiction and Liability, ¶ 1336.

⁹⁴ Decision on Jurisdiction and Liability, ¶ 1336.

c. Respondent Has Breached Article 3(3) of the Treaty

160. Third, the Tribunal found that Respondent has impaired the use of Claimant's investment in violation of Article 3(3) of the Treaty.

161. In addition to the conduct leading the Tribunal's finding on a breach of the FET standard, Claimant invoked several additional actions of Balochistan which, in its view, had also impaired its investment.⁹⁵ The Tribunal did not consider it necessary to assess each of these actions by themselves but held:

*"[I]f considered together with the denial of the Mining Lease Application, Respondent's conduct clearly impaired, if not prevented altogether, the use of Claimant's investment. By denying TCCP's Mining Lease Application, Respondent prevented Claimant from making any use of its exploration work and of any possibility to amortize its expenditures – much less to realize the benefit of its investment. Given that both the Joint Venture in which Claimant had a 75% interest and Claimant's subsidiary TCCP were established for the sole purpose of carrying out the exploration and, ultimately, the mining operations at Reko Diq, Claimant's investment was rendered useless when the Mining Lease Application was denied."*⁹⁶

162. The Tribunal held that several of the additional actions invoked by Claimant, *i.e.*: (i) Balochistan's change of position in the Supreme Court proceedings in early 2011; (ii) the GOB's decision to start denying administrative clearances for TCC's expatriate staff, three days after its own project had been approved and on the same day that the Mines & Mineral Development Department took over as the GOB's representative on the Operating Committee; (iii) Balochistan's use of Claimant's exploration data for its own project; and (iv) the decision of the Balochistan Cabinet on 24 December 2009 "*not to go ahead with the proposed Mineral and Shareholder agreements with TCCP,*"⁹⁷ together with the Tribunal's impression from the record that no actual negotiations took place after this decision, supported its previous findings.⁹⁸ It concluded:

*"[A]s confirmed by the above mentioned actions, the denial of the Mining Lease Application impaired the use of Claimant's investment. The Tribunal is further convinced that Respondent's measures were motivated by the desire to implement its own project – without having a justified ground for denying the Mining Lease Application. Therefore, the measures were also 'arbitrary, unreasonable and discriminatory' and thus fulfill even the stricter standard of protection that has been advanced by Respondent."*⁹⁹

⁹⁵ Cf. Decision on Jurisdiction and Liability, ¶ 1364.

⁹⁶ Decision on Jurisdiction and Liability, ¶ 1365.

⁹⁷ Exhibit CE-31, p. 16.

⁹⁸ Decision on Jurisdiction and Liability, ¶¶ 1367-1371.

⁹⁹ Decision on Jurisdiction and Liability, ¶ 1372.

d. Final Remark on Causation

163. As a final remark on Respondent's argument on causation, the Tribunal held:

*“While the Tribunal is aware that Respondent has further raised the argument that Claimant's claim must fail in limine because it has failed to address causation, the Tribunal considers it sufficient to state at this point that Respondent's conduct deprived Claimant of the value of its investment and thereby directly caused a loss that is to be quantified at a later stage of the proceedings. In the Tribunal's view, any specific questions on whether Respondent's conduct was causal for individual parts of Claimant's – yet unquantified – claim cannot be dealt with in the abstract but will be addressed as part of the quantum phase of the proceedings.”*¹⁰⁰

2. Findings Made in the Tribunal's Decision on Respondent's Reconsideration Request

164. The Tribunal further recalls that in the course of this last phase of the proceedings, *i.e.*, on 6 November 2017, Respondent filed a request for reconsideration of the Tribunal's findings in its Decision on Jurisdiction and Liability. Specifically, Respondent argued that it had recently discovered evidence that, in its view, undermined Claimant's claims regarding the results of the drilling for water and the metallurgical drilling. It requested that the Tribunal reconsider its (Draft) Decision on Jurisdiction and Liability and find that there was *“insufficient water and significant uncertainties regarding mineral recoverabilities that prohibit any award finding that TCCA should have received a mining lease.”*¹⁰¹

165. In its Decision on Respondent's Reconsideration Request, the Tribunal found that it had the power to reconsider the Decision on Jurisdiction and Liability within a certain scope and limits, in particular taking guidance from the requirements of Article 51 of the ICSID Convention.¹⁰² On that basis, the decisive question for the Tribunal to determine was whether the allegedly newly discovered facts presented by Respondent were *“of such a nature as decisively to affect the pre-award decision.”*¹⁰³

166. In its Reconsideration Request, Respondent argued that certain findings made by the Tribunal in the context of the ground invoked by the Licensing Authority that TCCP failed to submit a proper/complete Feasibility Study on the discovered deposits in the Exploration Area (referred to as the third set of grounds) as well as in the context of the additional grounds invoked by Respondent in these proceedings, *i.e.*, that TCCP failed to prove that the mine could be profitably developed and operated, and that TCCP failed to assess the water source that it intended to use for its project to full feasibility level.¹⁰⁴

¹⁰⁰ Decision on Jurisdiction and Liability, ¶ 1374.

¹⁰¹ Respondent's Reconsideration Request, ¶ 41.

¹⁰² Decision on Respondent's Reconsideration Request, ¶¶ 68-69.

¹⁰³ Decision on Respondent's Reconsideration Request, ¶ 79.

¹⁰⁴ Cf. Decision on Respondent's Reconsideration Request, ¶¶ 84, 86-87.

Respondent presented two sets of allegedly new facts: (i) the results of studies performed by Claimant's water consultant SMEC, which, according to Respondent and its experts Mr. Holmes and Dr. Nanni, do not support the conclusion drawn by Claimant in the Feasibility Study regarding the size of the Fan Sediments aquifer and the amount of water available; and (ii) the metallurgical sampling and testing performed by Claimant's consultant Ammtec, which, according to Respondent and its experts Prof. Dagdelen and Mr. Owen, was done improperly and yielded compromised results.¹⁰⁵

167. The Tribunal analyzed both sets of allegedly new facts.

a. Respondent's Allegation That the Results of the Drilling for Water Merit Reconsideration

168. The Tribunal first assessed Respondent's allegation that the results of the drilling for water merit reconsideration because it had allegedly identified an error in the Feasibility Study regarding the storage coefficient of the water source chosen by Claimant. It held that, even if this allegation were to be proven through further written submissions on the merits, it could not have a decisive, or outcome-determinative, impact on the Decision on Jurisdiction and Liability.¹⁰⁶ The Tribunal noted:

*"Respondent does not allege that the alleged error it has identified in the Feasibility Study was known to the Licensing Authority at the time it rejected TCCP's Mining Lease Application and/or that it formed part of either of the ten grounds invoked in the Notice of Intent to Reject. It rather argues that '[r]egardless of the text of the reasons to deny the mining lease application, a fatally flawed IMD FS cannot create a mining lease application.'"*¹⁰⁷

169. Recalling its finding in the Decision on Jurisdiction and Liability that "*Respondent should not be allowed to rely on reasons additional to those invoked in the Notice of Intent to Reject,*" the Tribunal concluded that "*a potential error in the Feasibility Study that was not known to the Licensing Authority in November 2011 cannot decisively affect the Tribunal's conclusion that the denial of the Mining Lease Application was not justified by any of the reasons that the Licensing Authority invoked and that 'the real motive for the denial was the fact that the GOB had decided to develop and implement its own mining project rather than to collaborate with Claimant pursuant to the CHEJVA and that the grounds invoked by the Licensing Authority served only as a pretext to conceal this motive.'*"¹⁰⁸

¹⁰⁵ Respondent's Reconsideration Request, ¶¶ 34-39.

¹⁰⁶ Decision on Respondent's Reconsideration Request, ¶¶ 93-94, 96.

¹⁰⁷ Decision on Respondent's Reconsideration Request, ¶ 95, *quoting from* Respondent's Reconsideration Request, ¶ 29.

¹⁰⁸ Decision on Respondent's Reconsideration Request, ¶ 96, *quoting from* Decision on Jurisdiction and Liability, ¶¶ 1232 and 1264.

170. The Tribunal then emphasized the following:

“[C]ontrary to what Respondent’s submission appears to suggest, it did not make a finding that the Feasibility Study was complete and/or that all assumptions and conclusions presented in the Study were fully accurate. What the Tribunal did find was that none of the reasons invoked by the Licensing Authority and, albeit it would not have been strictly necessary for its liability finding, none of the additional reasons invoked by Respondent in the liability phase, justified a denial of the Mining Lease Application. The question whether the assumptions made in the Feasibility Study were adequate and realistic will become relevant in the present quantum phase for the purposes of assessing the amount of damages to which Claimant is entitled as a result of Respondent’s Treaty breach. However, the error alleged by Respondent, even if true, will not affect the Tribunal’s finding that there was such a Treaty breach, i.e., that the grounds invoked by the Licensing Authority at the time served only as a pretext to conceal the GOB’s real motive to take over Reko Diq and develop its own project instead of collaborating with Claimant.”¹⁰⁹

171. As to the alleged errors identified by Respondent, the Tribunal noted that neither Party had presented any opinions from independent experts in the liability phase and that “[a]s Respondent’s reference to its experts Mr. Holmes and [Dr.] Nanni shows, it was apparently only through their review of the relevant data that the alleged errors were detected. Consequently, the Tribunal will assess the arguments presented by Respondent with regard to the water issue in its analysis on quantum once the Parties have completed their written submissions and the Tribunal has heard the fact and expert witnesses during the hearing on quantum on this issue.”¹¹⁰

b. Respondent’s Allegation That the Results of the Metallurgical Drilling Merit Reconsideration

172. The Tribunal then analyzed Respondent’s allegation that the results of the metallurgical drilling merits reconsideration because Claimant allegedly failed to adequately sample rock from below 450 meters in depth and because the testing was allegedly done improperly and yielded poor recoverability results. Similarly to its analysis of the first allegation, the Tribunal again noted that “Respondent does not argue that the alleged absence of proper metallurgy sampling and testing was known to the Licensing Authority at the time it rejected the Mining Lease Application. As a result, the Tribunal’s finding that Respondent should not be allowed to rely on any additional reasons in this arbitration in order to avoid liability under the Treaty applies with equal force.”¹¹¹

¹⁰⁹ Decision on Respondent’s Reconsideration Request, ¶ 97.

¹¹⁰ Decision on Respondent’s Reconsideration Request, ¶ 99.

¹¹¹ Decision on Respondent’s Reconsideration Request, ¶ 101.

173. The Tribunal further did not agree that Respondent's allegation regarding metallurgical sampling and testing affected its findings on liability. It emphasized that it had not yet made any findings on metallurgical sampling or testing and/or whether the assumptions made in the Expansion Pre-Feasibility Study were realistic and reflected the true value of the Reko Diq project at the time.¹¹² It concluded:

“Similarly to the water issue, neither of the Parties presented any opinions from independent experts on metallurgy in the liability phase as they have now done in the quantum phase. Respondent again primarily refers to the testimony of its experts, in this case Prof. Dagdelen and Mr. Owen, who reviewed the relevant data and detected the alleged errors. Once the Parties have completed their written submissions and the Tribunal has heard the fact and expert witnesses during the hearing on quantum, the Tribunal will make a finding on this issue if and to the extent it becomes relevant to determine the amount of damages to which Claimant is entitled as a result of Respondent's Treaty breach that the Tribunal has determined in its Decision on Jurisdiction and Liability.”¹¹³

c. Final Remark on the Scope of Its Decision

174. As a final remark, the Tribunal emphasized:

“[I]n line with the scope of the present decision, its findings on the alleged facts presented by Respondent are limited to the relevance, or rather the lack of relevance, of these alleged facts to the Tribunal's findings on jurisdiction and liability. The present decision is therefore without prejudice to any future findings that the Tribunal may make in relation to the issues raised by Respondent in the course of the quantum phase of this arbitration for the purposes of determining the amount of damages to which Claimant is entitled as a result of Respondent's breach of the Treaty.”¹¹⁴

3. Remarks on the Development of Respondent's Position Regarding the Feasibility of Claimant's Project

175. As a further preliminary point to be made regarding Respondent's allegation that the risks and issues to which it has pointed in this last phase of the proceedings render the project unfeasible, the Tribunal notes that this allegation stands in rather stark contrast to the position its officers expressed during the time period in which the GOB was still collaborating with Claimant on the project and the position taken by Respondent and the evidence on which it relied at the beginning of this arbitration.

¹¹² Decision on Respondent's Reconsideration Request, ¶¶ 102-103.

¹¹³ Decision on Respondent's Reconsideration Request, ¶ 104.

¹¹⁴ Decision on Respondent's Reconsideration Request, ¶ 107.

176. In fact, Respondent stated in its submissions on Claimant's Request for Provisional Measures, which concerned the Reko Diq Copper & Gold Project initiated by the GOB, that "*Claimant is right to categorise the RekoDiq deposits as of huge economic importance*"¹¹⁵ and that "*Claimant's conduct can be interpreted as a deliberate attempt to conceal the extent of the mineral deposits in the Reko Diq Mining Area.*"¹¹⁶ According to Respondent, "*Claimant was actively downplaying its economics before the Governments*" when referring to the project being "*relatively skinny in economic terms, pointing out the estimated 13% IRR, too low for any Pakistani business house to invest in the project.*"¹¹⁷
177. In these submissions, Respondent placed particular reliance on the first witness statement from Dr. Samar Mubarakmand, who served as member (Science & Technology) of the Planning Commission and prepared, *inter alia*, a technical feasibility of the GOB's Reko Diq project in the Planning Commission.¹¹⁸ Dr. Mubarakmand stated that he had received a copy of the Feasibility Study before he had to make a statement before the Supreme Court of Pakistan.¹¹⁹ During the Hearing on Claimant's Request for Provisional Measures, he confirmed that he "*looked at all the relevant parts in detail*" and that he "*had a good look at*" the Feasibility Study before making that statement.¹²⁰
178. In his statement before the Supreme Court, Dr. Mubarakmand noted that the value of the deposit H-15 which Claimant planned to develop was reported in the Feasibility Study to be USD 104 billion and added that most of the copper was in other deposits such as H-14, H-13, H-8 and H-27, which he referred to "*huge deposits of high concentration Copper Ore.*" In his view, it was "*likely that the real deposits in EL-5 area are much more than the value of \$104 billion as indicated by TCC's Feasibility Study.*" As for gold, Dr. Mubarakmand similarly stated that "[h]ere again the total deposits of Gold in EL-5 have not been revealed in TCC's Feasibility Study."¹²¹
179. Dr. Mubarakmand then referred to the GOB's own Reko Diq project, which was intended to start with process 15,000 tons per day "*but as the mine grows wider and deeper with time, more ore is expected per day and therefore every 5-6 years the size of the plant is enhanced.*" Assuming a processing of 110,000 tons of ore per day, for comparison with Claimant's project, Dr. Mubarakmand estimated a profit of USD 2,354 million per year or a total of USD 131,824 billion over the life of the mine.¹²² According to Dr.

¹¹⁵ Respondent's Response to Claimant's Request for Provisional Measures, ¶ 119.

¹¹⁶ Respondent's Rejoinder on Claimant's Request for Provisional Measures, ¶ 37.

¹¹⁷ Respondent's Rejoinder on Claimant's Request for Provisional Measures, ¶ 37, quoting from **Exhibit CE-84**.

¹¹⁸ Mubarakmand I, ¶ 3 and Annex 5, ¶ 5.

¹¹⁹ Mubarakmand I, ¶¶ 13-14 and Annex 5.

¹²⁰ Transcript Hearing 6 November 2012, p. 102 lines 21-24.

¹²¹ Mubarakmand I, Annex 5, ¶¶ 6-8.

¹²² Mubarakmand I, Annex 5, ¶ 10.

Mubarakman, *“the Feasibility Study submitted by TCC is just the tip of the ice berg in the EL-5 area.”*¹²³

180. In his first witness statement, Dr. Mubarakmand confirmed his opinion that *“the value of the gold and copper in the exploration area was vastly greater than the value in area H-15.”*¹²⁴ He further explained that he decided to develop the GOB’s project on H-4, *inter alia*, because *“at the outset H-4 was a better place to mine for technical reasons. H-14 and H-15 have an overburden of 140 metres of rock, which means that rock to this depth has to be removed before mining of the copper mineral can begin. The overburden of H-4 on the other hand is 40 metres, which means it is easier to get to the copper mineral underneath. Further, the mineral at H-14 and H-15 is copper sulphide ore, whereas the mineral at H-4 is copper oxide ore. The refining process for copper sulphide ore takes longer and is more expensive than the refining process for copper oxide ore, which is simpler and less energy intensive.”*¹²⁵
181. The Tribunal notes that Dr. Mubarakmand did not express any doubts, neither in his statement before the Supreme Court nor in his witness testimony before this Tribunal, that the project envisaged by Claimant was technically and economically feasible. To the contrary, he believed that a mining project at Reko Diq could be commercially much more attractive than reported by Claimant. During the Hearing on Claimant’s Request for Provisional Measures, Dr. Mubarakmand affirmed that it was his testimony that the Feasibility Study was part of a *“ruse in order to defraud the Government of Balochistan from the real extent of minerals that TCC had presented on its website in 2006.”*¹²⁶ Respondent also alleged that Claimant was *“conceal[ing] the extent of the mineral deposits in the Reko Diq Mining Area”* and *“actively downplaying its economics before the Governments.”*¹²⁷
182. The Tribunal further recalls that while Respondent now points to numerous allegedly critical issues that rendered the project unfeasible, neither of these issues was raised by the Licensing Authority in its Notice of Intent to Reject. Based on the record of these proceedings, the Tribunal is also not aware that any other agency or official of the GOB or the GOP raised these issues during the time period in which the joint venture partners were still collaborating or even when the GOB had decided to take over the project and deny TCCP’s Mining Lease Application in violation of Respondent’s obligations under the Treaty. As the Tribunal found in its Decision on Jurisdiction and Liability, it was only during these arbitration proceedings that Respondent started to invoke additional grounds

¹²³ Mubarakmand I, Annex 5, ¶ 17.

¹²⁴ Mubarakmand I, ¶ 15.

¹²⁵ Mubarakmand I, ¶ 17.

¹²⁶ Transcript Hearing 6 November 2012, p. 120 lines 13-23.

¹²⁷ Respondent’s Rejoinder on Claimant’s Request for Provisional Measures, ¶ 37.

such as an alleged failure to establish the profitability of the planned mine and the ability to obtain financing, security risks regarding the pipeline, and a failure to fully assess the water source.

183. In this last phase of the proceedings, Respondent has further raised the argument that Claimant's shareholders, Antofagasta and Barrick, "*did not have the relevant experience, track record, and personnel to make the project successful*" and that their participation on this project would therefore have been "*more of a liability than benefit.*"¹²⁸

184. In this regard, the Tribunal notes that the GOB itself stated in its submission to the Balochistan High Court in 2007 that "*Antofagasta of Chile, one of the largest copper producers in the world and Barrick Gold Corporation of Canada, the number one gold producer in the world*" purchased Claimant's shares in 2006 and that "[b]oth the Federal and Provincial Governments have appreciated and welcomed two big giants from mining industry in Pakistan."¹²⁹ The GOB further stated:

*"It is specifically denied that any company has been associated with the project with 'zero mining experience and zero financial standing'. It is submitted that the worlds largest copper and gold mining companies have been brought forward to fund the project which is excellent news and will expedite exploration and extraction enabling the Province of Balochistan to make windfall profits."*¹³⁰

185. In a memorandum to the Balochistan's Chief Secretary dated 31 December 2009, the Secretary of the Mines & Mineral Development Department commented that "[m]ining is one of the most difficult activities to be carried out requiring huge amount of investment, rich expertise and skills, and very careful planning and proper management to make it a success." He further commented that TCCP had "*done tremendous efforts in discovering and explring the Reko-Diq Copper & Gold prospects*" and that "[t]he way of working and performance reflect that their attitude is serious and they are committed to develop the project. They appear professional businessmen with the required will, resources and rich expertise in developing such kind of resources."¹³¹

186. Against this background, it strongly appears to the Tribunal that Respondent's allegation that Barrick and Antofagasta lacked the relevant experience to build and operate the mine at Reko Diq¹³² has been created *post-hoc* for these arbitration proceedings. While Respondent may have correctly pointed out that Antofagasta had never operated a mine outside of Chile and that Barrick was not operating copper mines itself as of 2006,¹³³ it is

¹²⁸ Respondent's Post-Hearing Brief on Quantum, ¶ 6.

¹²⁹ Exhibit CE-212, p. 4.

¹³⁰ Exhibit CE-212, p. 14.

¹³¹ Exhibit CE-31, p. 19.

¹³² Cf. Respondent's Rejoinder on Quantum, ¶ 29.

¹³³ Cf. Respondent's Post-Hearing Brief on Quantum, ¶¶ 14-15.

apparent that both companies decided in 2006 to become 50% (indirect) shareholders in TCCA and to combine their respective experience in the mining sector. Whereas Antofagasta brought experience in building and operating copper mines, Barrick contributed experience in operating gold mines in several countries with difficult conditions across the globe. Accordingly, contemporaneous statements of the GOB clearly indicate that the participation of Antofagasta and Barrick was considered a significant benefit to the project.

187. The Tribunal further cannot follow Respondent's criticism that Mr. Livesey, who was leading the preparation of the Feasibility Study, had not managed a feasibility study before. Mr. Livesey explained that before he became Project Director in late 2006, he had worked in the Tethyan belt for four years and before that on the Zambian copper belt for two years and on polymetallic nickel-copper belts in South Africa.¹³⁴ In addition, Mr. Livesey testified that his team consisted not only of Tethyan staff who were seconded or recruited into Tethyan but "*for each main discipline [had] oversight from both owners, Barrick and Antofagasta.*" He further explained that he reported to a technical committee which consisted of representatives from both Barrick and Antofagasta with the chairmanship alternating between the two.¹³⁵
188. For the avoidance of doubt, the Tribunal will certainly not brush off any of the concerns and issues raised by Respondent but will nevertheless assess each of them in detail and determine whether they have an impact on the feasibility of the project and/or the value of Claimant's investment. However, the Tribunal considers that it must also be taken into account in this assessment that neither of these issues was raised by the Governments at the time and that it therefore cannot help the impression that some of these allegedly critical issues were invoked only as a defense in these arbitration proceedings.

B. Legal Standards Governing Claimant's Claim for Compensation

189. The Tribunal will now determine the relevant legal standards governing Claimant's claim for compensation. As pointed out by Claimant,¹³⁶ the Parties are in disagreement on four issues, which the Tribunal will address in turn: (i) the applicable standard of compensation; (ii) the requirement of causation between Respondent's Treaty breaches and the damages alleged by Claimant; (iii) the standard and burden of proof that apply to ascertaining the feasibility of the project and the value of Claimant's investment; and (iv) the appropriate valuation method to determine the value of Claimant's investment and the corresponding compensation to which Claimant is entitled. In the context of (iv), the Tribunal will address the different valuation methods used by the Parties' valuation

¹³⁴ Transcript Hearing on Quantum (Day 2), p. 344 lines 11-20.

¹³⁵ Transcript Hearing on Quantum (Day 2), p. 346 line 16 to p. 347 line 14.

¹³⁶ Claimant's Quantum Post-Hearing Brief, ¶¶ 12 *et seq.*

experts and determine whether Claimant has established, in principle, that it is appropriate to determine the damages it has incurred based on the valuation method relied on by its valuation expert, Prof. Davis.

1. Summary of Claimant's Position

a. Standard of Compensation

190. Claimant submits that there is common ground between the Parties that the Tribunal must award compensation equal to the “*market value*” of Claimant’s investment as of 15 November 2011 and that in assessing that value, it must disregard all of the unlawful acts that Respondent has committed prior to that valuation date.¹³⁷
191. Claimant argues that the Australia-Pakistan BIT does not specify the remedies for Respondent’s breaches of the Treaty. In Claimant’s view, the Tribunal must therefore apply the standard of full reparation under customary international law, as established in *Chorzów Factory*: the award “*must, as far as possible, wipe out all the consequences of the illegal act and reestablish the situation which would, in all probability, have existed if that acted had not been committed.*”¹³⁸
192. Claimant submits that the *Chorzów Factory* standard is widely understood as the prevailing compensation standard for breaches of international law and is also reflected in the ILC Articles on State Responsibility of States for Internationally Wrongful Acts (“**ILC Articles**”), which impose an obligation on States to “*make full reparation*” for injuries caused by internationally wrongful acts.¹³⁹
193. In Claimant’s view, this standard is particularly appropriate in this case as Respondent rejected Claimant’s initial request for specific performance and thereby rendered restitution in kind impossible. Claimant contends that the Tribunal must therefore award “*a sum corresponding to the value which [such] restitution in kind would bear.*”¹⁴⁰
194. Claimant rejects Respondent’s argument that the Tribunal should apply what Claimant refers to as “*the compensation condition*” in Article 7 of the Treaty. According to Claimant, “*the payment of prompt, adequate and effective compensation*” is only one of

¹³⁷ Claimant’s Quantum Reply, ¶ 35.

¹³⁸ Claimant’s Quantum Memorial, ¶¶ 14-15; Claimant’s Quantum Reply, ¶ 37, quoting from *Case Concerning the Factory at Chorzów (Germany v. Poland)*, 1928 PCIJ, Series A, No. 17 (Merits), Judgment No. 13 of 13 September 1928 [CA-80], ¶ 125.

¹³⁹ Claimant’s Quantum Memorial, ¶ 16, quoting from International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, Y.B. INT’L L. COMM’N (2001), VOL. II, UN Doc. A/CN.4/SER.A/2001/Add.1 (Part 2) [CA-1], Art. 31(2).

¹⁴⁰ Claimant’s Quantum Memorial, ¶¶ 17-19; Claimant’s Quantum Post-Hearing Brief, ¶ 13, quoting from *Case Concerning the Factory at Chorzów (Germany v. Poland)*, 1928 PCIJ, Series A, No. 17 (Merits), Judgment No. 13 of 13 September 1928 [CA-80], ¶ 125.

the “*conditions*” for a lawful expropriation and the second and third paragraphs of Article 7 specify how that compensation is to be “*computed*” and “*paid*” but neither of these provisions intends to specify remedies for Respondent’s breaches of Articles 3 and 7.¹⁴¹ Claimant specifically rejects the argument that as Article 7 also refers to indirect expropriations which, according to Respondent, would always be unlawful, it must also apply to unlawful expropriations. It maintains that Article 7 only determines liability; it does not determine what damages are due for the breach.¹⁴²

195. Claimant further notes that any “*standard*” in Article 7 would concern only expropriations but could not be applied to determine the remedies for Respondent’s breaches of Articles 3(2) and 3(3) of the Treaty.¹⁴³ Claimant refers to the tribunal in *Crystallex v. Venezuela*, which held:

“[T]he Article VII(1) ‘standard’ is only concerned with expropriation, and not breaches of other BIT standards. Because the Tribunal has found breaches of FET (in addition to an expropriation), the Tribunal considers that the ‘full reparation’ principle under customary international law must be applied as a consequence of its decision on liability. In other words, given the cumulative nature of the breaches that the Tribunal must compensate, and especially in view of its findings on FET that the Respondent’s conduct caused all the investments made by Crystallex to become worthless, the Tribunal will apply the full reparation standard according to customary international law.”¹⁴⁴

196. Claimant rejects the argument that there is a consistent practice that tribunals would calculate damages for Treaty breaches under the standard of compensation set out in the expropriation provision and claims that “*the overwhelming weight of authority*” rather confirms that the customary international law standard of full reparation applies and none of the cases cited by Respondent actually supports its argument. In Claimant’s view, this is also confirmed by Respondent’s legal expert Dr. Ripinsky, who states in his treatise that “[a]n award of compensation for unlawful expropriation is governed by customary international law.”¹⁴⁵
197. In any event, Claimant notes that even if Article 7 were to be applied to determine the remedies for Respondent’s breaches, the first sentence of Article 7(2) provides for compensation equal to the “*market value of the investment immediately prior to the expropriation.*” According to Claimant, this sentence is consistent with the full reparation standard and, where neither the valuation date nor the use of the fair market value standard

¹⁴¹ Claimant’s Quantum Reply, ¶ 39; Claimant’s Quantum Post-Hearing Brief, ¶ 14.

¹⁴² Claimant’s Quantum Post-Hearing Brief, ¶ 15. *See also* Claimant’s Quantum Reply, ¶ 40.

¹⁴³ Claimant’s Quantum Reply, ¶ 41.

¹⁴⁴ *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶ 876.

¹⁴⁵ Claimant’s Quantum Reply, ¶¶ 42-43, *quoting from Sergey Ripinsky & Kevin Williams, Damages in International Investment Law* (2008) [CA-431], p. 88.

is in dispute, can be seen as satisfying the *Chorzów Factory* standard.¹⁴⁶ Claimant adds: “*Here too, payment of fair market value immediately before the expropriation would satisfy the Chorzów Factory standard, so long as all consequences of Pakistan’s other unlawful conduct before the expropriation date are also excluded from the valuation.*”¹⁴⁷

198. Claimant notes that Respondent, however, relies on the second sentence of Article 7(2), which applies “[w]here that value cannot be readily ascertained.” Claimant argues that Respondent has failed to explain why that would be the case and the alternative compensation calculation in Article 7(2) should apply.¹⁴⁸
199. Finally, Claimant argues that even if Article 7(2) were to have any relevance, the standard of compensation for a lawful expropriation could only serve as a floor for any damages award for Respondent’s willful breaches of the Treaty and it would not support Respondent’s proposed alternative valuation methods.¹⁴⁹
200. In response to Respondent’s argument that the Tribunal’s determination of compensation “*must be equitable,*” proportionate and avoid disparity between the amount invested by Claimant and the compensation awarded, Claimant argues that awarding full reparation in the form of damages equal to the fair market value of Claimant’s investment as of 15 November 2011 is also “*the just result*” of Respondent’s Treaty breaches which have given Respondent “*total control of the immensely valuable asset it took from TCCA.*”¹⁵⁰
201. Claimant contends that Respondent overstates the role of equitable considerations which, according to Dr. Ripinsky, could “*be applied only within the boundaries of judicial discretion left by legal rules.*”¹⁵¹ In Claimant’s view, such discretion is eliminated by the clear customary international law legal principle of full reparation, which “*militates against under-compensation as well as against over-compensation.*” Claimant emphasizes, however, that the Tribunal must take into account all relevant circumstances of the case and “*exercise[] its judgment in a reasoned manner,*” to “*make the best estimate that it can of the amount of the loss.*”¹⁵²
202. In addition, Claimant argues that equitable considerations would in any event weigh in favor of TCCA because the compensation must account for the egregiousness of

¹⁴⁶ Claimant’s Quantum Memorial, ¶¶ 20-21; Claimant’s Quantum Reply, ¶¶ 45-46, quoting from **Exhibit CE-4**, Article 7(2).

¹⁴⁷ Claimant’s Quantum Memorial, ¶ 21.

¹⁴⁸ Claimant’s Quantum Reply, ¶¶ 47-49, quoting from **Exhibit CE-4**, Article 7(2); Claimant’s Quantum Post-Hearing Brief, ¶ 16.

¹⁴⁹ Claimant’s Quantum Reply, ¶ 49.

¹⁵⁰ Claimant’s Quantum Reply, ¶¶ 50-52.

¹⁵¹ Claimant’s Quantum Reply, ¶ 55, quoting from Ripinsky I, ¶ 28.

¹⁵² Claimant’s Quantum Reply, ¶ 56, quoting from *Gold Reserve Inc. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/09/1, Award of 22 September 2014 [CA-177], ¶ 686 and *Kardassopoulos & Fuchs v. Republic of Georgia*, ICSID Case Nos. ARB/05/18 & ARB/07/15, Award of 3 March 2010 [CA-50], ¶ 594.

Respondent's breaches which included a secret plan to oust TCCA while repeatedly misrepresenting Respondent's intentions until the feasibility work was complete. Claimant adds that any uncertainty about the fair market value of its investment has been caused by Respondent's Treaty breaches.¹⁵³

203. As for Respondent's reliance on the principle of proportionality, Claimant argues that this principle is already incorporated in the principle of full reparation because, as noted in the commentary on the ILC Articles, "[c]ompensation is limited to damage actually suffered as a result of the internationally wrongful act, and excludes damage which is indirect or remote."¹⁵⁴ In addition, Claimant claims that awarding anything less than fair market value would unjustly enrich Respondent because it now has exclusive control over the asset that it took from TCCA and the fair market value of TCCA's investment represents only 44% of the total value of the resource as of the valuation date.¹⁵⁵

204. Finally, Claimant rejects Respondent's argument regarding a "disparity" between the amount invested and the fair market value of the investment as of the valuation date and refers to the treatise of Dr. Ripinsky where he stated that "[t]here are numerous examples of businesses being sold for a price much higher than the amount originally invested, particularly if the business proves successful" and that when an investor "develops its business 'from scratch'," any "connection between the invested amount and the value of the investment appears to be much weaker."¹⁵⁶ Claimant further quotes:

*"By the very nature of the entrepreneurial activity, the sum total of investments is normally lower than the value of a business created as a result. To create a business, in addition to money, an investor usually contributes other ingredients such as management skills, know-how and technology, which add value of the investment and are of particular importance in areas such as energy, infrastructure or construction, frequently featuring in investor-State arbitrations. It is not abnormal for a business's FMV to exceed the invested amount several times over."*¹⁵⁷

205. Claimant also refers to Irmgard Marboe, who considers in her work on damages in investment law that "[g]reat care must ... be taken not to link the amount of compensation or damages closely to the investment actually undertaken, if the investment has good

¹⁵³ Claimant's Quantum Reply, ¶¶ 54, 57-59.

¹⁵⁴ Claimant's Quantum Reply, ¶¶ 60-61, quoting from International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, Y.B. INT'L L. COMM'N (2001), VOL. II, UN Doc. A/CN.4/SER.A/2001/Add.1 (Part 2) [CA-1], Art. 34, Commentary ¶ 5.

¹⁵⁵ Claimant's Quantum Reply, ¶ 62.

¹⁵⁶ Claimant's Quantum Reply, ¶¶ 63-64, quoting from Sergey Ripinsky & Kevin Williams, Damages in International Investment Law (2008) [CA-431], pp. 229-230.

¹⁵⁷ Sergey Ripinsky & Kevin Williams, Damages in International Investment Law (2008) [CA-431], pp. 230-231.

future prospects” because the State could otherwise be motivated to expropriate or impair it.¹⁵⁸

206. Claimant further notes that there is a correlation between the risk of the investment and the returns an investor would expect, arguing that “*when a very risky investment succeeds, there should be an especially significant ‘disparity’ between the amount invested and the value of the investment.*” Claimant submits that is precisely the business model of the global mining industry and notes that there is common ground between the Parties that only 1 in every 10,000 exploration projects results in a productive mine. According to Claimant, the Governments knew when they decided to take over the project that Reko Diq is that 1-in-10,000 discovery – knowledge that was established through the efforts of Claimant and its owners to de-risk every aspect of the project; accordingly, the fair market value must necessarily constitute a very high multiple of the amount invested.¹⁵⁹

b. Requirement of Causation

207. Claimant accepts that it must show that Respondent’s Treaty breaches caused its loss. It notes, however, that the Tribunal has already found that Respondent’s conduct in taking over Reko Diq “*deprived Claimant of the value of its investment and thereby directly caused a loss.*” In Claimant’s view, the causal relationship has thereby been determined and all that remains is for that loss to be quantified.¹⁶⁰

208. In particular, Claimant contends that Respondent cannot rely on the absence of a Mineral Agreement because the Tribunal has already found that the Governments abandoned the negotiations in bad faith pursuant to Balochistan’s unlawful decision to take over the project. Similarly, Claimant considers that Respondent cannot benefit from the absence of third-party financing commitments or specific permits, which could not have been pursued without the mining lease that Balochistan unlawfully denied.¹⁶¹

209. More generally, Claimant submits that the Tribunal must establish fair market value in a hypothetical context where Respondent would have fully respected its obligations under the Treaty and must correct for any negative effect that the conduct of the Governments has had on the value of Claimant’s investment. Claimant claims that its damages may also

¹⁵⁸ Claimant’s Quantum Reply, ¶ 65, *quoting from Irmgard Marboe, Methods of Valuation in International Practice, Calculation of Compensation and Damages in International Investment Law* (2d ed. 2017) [CA-434], ¶ 5.204.

¹⁵⁹ Claimant’s Quantum Reply, ¶¶ 66-68 (emphasis in original).

¹⁶⁰ Claimant’s Quantum Reply, ¶ 34; Claimant’s Quantum Post-Hearing Brief, ¶ 17, *quoting from* Decision on Jurisdiction and Liability, ¶ 1374.

¹⁶¹ Claimant’s Quantum Post-Hearing Brief, ¶ 18.

not be reduced by the risk of future Treaty violations against which the Treaty is meant to protect.¹⁶²

210. Claimant concludes:

“Thus, the Tribunal must assume that Balochistan would have honored (instead of repudiated) all of its obligations under the CHEJVA, including the obligation to be ‘just and faithful’ to TCC and ‘not do or omit to be done anything whereby the interests of the Joint Venture . . . are prejudiced.’ The Tribunal must also assume that both Governments would have acted consistently with TCCA’s legitimate expectation— arising directly from the Governments’ own representations—that the Governments would support and facilitate TCCA’s investment.”¹⁶³

c. Standard and Burden of Proof

211. Claimant accepts that it has the burden of proof as to its loss.¹⁶⁴

212. As to the standard of proof, Claimant submits that once it has been shown that a loss has been incurred, damages should be awarded even if the specific amount cannot be assessed with certainty. Claimant quotes from the *Crystallex* tribunal, which held that *“once the fact of future profitability is established and is not essentially of speculative nature, the amount of such profits need not be proven with the same degree of certainty.”¹⁶⁵*

213. Claimant contends that while the fact of the loss is subject to the normal balance-of-probabilities standard, the quantum of the loss can be proven by providing a *“reasonable basis”* for the tribunal’s assessment.¹⁶⁶ On the basis of the record before it, the Tribunal must then *“make the best estimate that it can of the amount of the loss.”¹⁶⁷* Quoting from the tribunal in *Gemplus v. Mexico*, Claimant argues that it *“would be wrong in principle”* to deprive it of the value of its investment on *“lack of evidentiary grounds when that lack of evidence is directly attributable to the Respondent’s own wrongs.”¹⁶⁸*

214. According to Claimant, the *“absolute certainty”* standard advanced by Respondent is not supported by any case and could never be satisfied.¹⁶⁹ Claimant submits that the

¹⁶² Claimant’s Quantum Memorial, ¶¶ 23-27.

¹⁶³ Claimant’s Quantum Memorial, ¶ 29, quoting from **Exhibit CE-1**, Article 24.6.2.

¹⁶⁴ Claimant’s Quantum Reply, ¶¶ 34, 69.

¹⁶⁵ Claimant’s Quantum Memorial, ¶ 30, quoting from *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶ 875.

¹⁶⁶ Claimant’s Quantum Reply, ¶ 69, quoting from *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶ 876; Claimant’s Quantum Post-Hearing Brief, ¶ 19.

¹⁶⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 19, quoting from *Kardassopoulos & Fuchs v. Republic of Georgia*, ICSID Case Nos. ARB/05/18 & ARB/07/15, Award of 3 March 2010 [CA-50], ¶ 594.

¹⁶⁸ Claimant’s Quantum Memorial, ¶ 31, quoting from *Gemplus S.A., SLP S.A., and Gemplus Industrial S.A. de C.V. v. United Mexican States*, ICSID Case No. ARB(AF)/04/3, Award of 16 June 2010 [CA-104], ¶ 13-99.

¹⁶⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 20.

authorities on which Respondent relies in support of its alleged “*heightened requirement*” for proof of damages support only “*the undisputed proposition that a ‘possibility of damages’ is not enough to establish the fact of the loss, and the tautological proposition that what is sufficient is ‘a sufficiently certain damages case.’*”¹⁷⁰

215. Claimant maintains that not only is there no heightened standard of proof but, to the contrary, tribunals have repeatedly held that “*less certainty is required in proof of the actual amount of damages.*” In light of the Tribunal’s findings in its Decision on Jurisdiction and Liability, Claimant argues that there can be no doubt that it has suffered a loss and therefore considers it sufficient to provide a reasonable basis to quantify that loss.¹⁷¹ In Claimant’s view, the fact of the loss is in any event incontestable as Respondent itself called Claimant’s investment “*a profitable project or national importance*” and estimated that the Reko Diq deposits were worth more than a hundred billion US dollars.¹⁷²

d. Appropriate Valuation Method

216. Claimant submits that the amount of its loss should be quantified based on the DCF valuation method, more specifically the “*practical, industry-informed application of well-established principles*” used in the modern DCF model applied by its expert Prof. Davis which it considers to be “*the best method to value a development-stage mining project like Reko Diq.*”¹⁷³
217. Claimant contends that the DCF method is employed by tribunals “*whenever the claimant has established the fact of future profitability.*” According to Claimant, the DCF approach is appropriate in the present case for the following reasons: (i) it would have been used by actual buyers and sellers if Reko Diq had been sold in November 2011; (ii) it is endorsed by internationally-recognized standards in the mining industry such as the standards of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) and the VALMIN Committee established to provide standards for mineral property valuation in Australia; (iii) TCCA has provided ample evidence for the DCF inputs in this arbitration, including the Feasibility Study which proved “*decades of profitability even under unfavorable market conditions*” and the Expansion Pre-Feasibility Study which proved Reko Diq’s enormous reserves; and (iv) recent ICSID cases featuring similar facts affirmed the suitability of income-based methodologies for valuing projects like Reko

¹⁷⁰ Claimant’s Quantum Reply, ¶ 70, quoting from Respondent’s Counter-Memorial on Quantum, ¶¶ 67-69.

¹⁷¹ Claimant’s Quantum Reply, ¶ 71, quoting from *Joseph Charles Lemire v. Ukraine*, ICSID Case No. ARB/06/18, Award of 28 March 2011 [RLA-82], ¶ 246.

¹⁷² Claimant’s Quantum Memorial, ¶ 32, quoting from **Exhibit CE-212** and referring to **Exhibit CE-111**.

¹⁷³ Claimant’s Quantum Post-Hearing Brief, ¶ 21.

Diq.¹⁷⁴ In this regard, Claimant points out, *inter alia*, that the tribunal in *Gold Reserve v. Venezuela* concluded that “a DCF method can be reliably used in the instant case because of the commodity nature of the product and detailed mining cash flow analysis previously performed” and that the *Crystallex* tribunal concluded that “predicting future income from ascertained [gold] reserves to be extracted by the use of traditional mining techniques could be done with a significant degree of certainty, even without a record of past production.”¹⁷⁵

218. Claimant maintains that the tribunals’ findings in *Crystallex* and *Gold Reserve*, as well as in *Rusoro v. Venezuela* and even *Khan v. Mongolia* support the application of the DCF method in this case.¹⁷⁶ Claimant argues that contrary to Respondent’s submission, the respondent State in *Gold Reserve* did raise the argument that the investment was not yet operational but did not succeed on this argument and that the tribunal specifically rejected alternative valuation methods by the claimant’s experts, preferring “to use the DCF model only.”¹⁷⁷ Claimant further contends that the *Crystallex* tribunal endorsed forward-looking methodologies and while the claimant did not advance a DCF valuation, applied another income-based approach which as Dr. Ripinsky agreed “resembles” DCF.¹⁷⁸ As for the *Khan* tribunal’s rejection of the DCF method, Claimant argues that it was based on the uncertainties associated with projects run by junior companies and explicitly held to be incomparable to “large, producing multi-project companies.”¹⁷⁹ Finally, Claimant notes that in *Copper Mesa*, the claimant itself cited the CIMVal standards “to note that income-based approaches are not suitable for properties at an exploration stage” and was facing violent local opposition.¹⁸⁰ According to Claimant, the latter also applied to the project in

¹⁷⁴ Claimant’s Quantum Memorial, ¶¶ 101-111.

¹⁷⁵ Claimant’s Quantum Memorial, ¶¶ 112-121, quoting from *Gold Reserve Inc. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/09/1, Award of 22 September 2014 [CA-177], ¶ 830, and *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶¶ 877-880.

¹⁷⁶ Claimant’s Quantum Reply, ¶ 83, quoting from *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶¶ 879, 880, *Gold Reserve Inc. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/09/1, Award of 22 September 2014 [CA-177], ¶ 830, *Rusoro Mining Limited v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/12/5, Award of 22 August 2016 [CA-361], ¶¶ 784-785 and 758-759, and *Khan Resources Inc. v. Government of Mongolia*, UNCITRAL, PCA Case No. 2011-09, Award on the Merits of 2 March 2015 [RLA-353], ¶ 391.

¹⁷⁷ Claimant’s Quantum Reply, ¶¶ 85-86, quoting from *Gold Reserve Inc. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/09/1, Award of 22 September 2014 [CA-177], ¶¶ 684, 830.

¹⁷⁸ Claimant’s Quantum Reply, ¶ 87, referring to *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶¶ 882-884, and quoting from Ripinsky I, ¶ 65.

¹⁷⁹ Claimant’s Quantum Reply, ¶ 88, quoting from *Khan Resources Inc. v. Government of Mongolia*, UNCITRAL, PCA Case No. 2011-09, Award on the Merits of 2 March 2015 [RLA-353], ¶ 392.

¹⁸⁰ Claimant’s Quantum Reply, ¶ 89, quoting from *Copper Mesa Mining Corporation v. Republic of Ecuador*, UNCITRAL, PCA Case No. 2012-2, Award of 15 March 2016 [CA-272], ¶¶ 7.24, 7.3 and 6.99.

Bear Creek where the tribunal concluded that the project could not “*be considered to be viable*” in the short term due to “*widespread social unrest*.”¹⁸¹

219. Claimant argues that the appropriate valuation method is a question of fact to be assessed on a case-by-case basis and not as a matter of law. It rejects what it refers to as Respondent’s “*bright-line rule*” that non-operational ventures cannot be valued using a DCF method.¹⁸² Claimant quotes from the *Crystallex* tribunal which held that “*there is no one methodology best suited for determining the fair market value of the investment lost in every situation*” and that “*whether a particular method is appropriate to utilize is based on the circumstances of each individual case*.”¹⁸³
220. In Claimant’s view, Respondent’s “*bright-line rule*” is not supported by any of the authorities it cites and not even by its own legal expert Dr. Ripinsky who merely states that a record of profitability is “*treated ... as the best evidence to support the application of the DCF method*” and quotes the *Vivendi* tribunal for the proposition that “*the absence of a history of demonstrated profitability does not absolutely preclude the use of DCF valuation methodology*.”¹⁸⁴ Claimant also refers to Dr. Ripinsky’s treatise in which he states:

*“Consider a situation where an investor obtains a concession for the exploration and exploitation of oil: the investor will carry a risk of not discovering oil and thus losing the totality of its investment. At the same time, once the exploration campaign proves successful, the major risk of the investment is gone, and one should be able to predict with reasonable certainty the range of revenues that the concession will generate, even without a prior record of profitable operations. Perhaps with such situations in mind, it has been suggested that lost profits should be awarded where they can be proven with reasonable certainty and calculated on a ‘rational basis,’ even if the claimant is a new business ... This argument makes sense; however, it remains for a tribunal in each particular case to decide whether the evidence on the record is sufficient.”*¹⁸⁵

221. Claimant claims that DCF valuation is particularly suited to value development-stage mining projects. Claimant considers that this is confirmed by Respondent’s valuation experts who in its view support a forward-looking analysis of the project’s future profitability and by Dr. Ripinsky who notes in his expert report that “*in some respects,*

¹⁸¹ Claimant’s Quantum Reply, ¶ 90, quoting from *Bear Creek Mining Corporation v. Republic of Peru*, ICSID Case No. ARB/14/2, Award of 30 November 2017 [CA-432], ¶¶ 599, 602.

¹⁸² Claimant’s Quantum Reply, ¶ 91; Claimant’s Quantum Post-Hearing Brief, ¶¶ 21-22.

¹⁸³ Claimant’s Quantum Reply, ¶ 75, quoting from *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶ 886.

¹⁸⁴ Claimant’s Quantum Reply, ¶¶ 77-78, quoting from *Ripinsky I*, ¶¶ 44, 50.

¹⁸⁵ *Sergey Ripinsky & Kevin Williams, Damages in International Investment Law* (2008) [CA-431], pp. 283-284.

*the mining sector may be more amenable to application of the DCF methods.*¹⁸⁶

Claimant also refers to its own expert Prof. Davis who explains that “*compared with valuing assets in other sectors,*” in the mining industry, “*many aspects of the projected cash flows are readily known*” or ascertainable.¹⁸⁷

222. Claimant further argues that neither a comparables valuation approach nor a cost-based method could capture the value of its investment. It refers to Dr. Ripinsky who states that awarding sunk costs is “*generally considered to be a conceptually weak method of estimating the fair market value of start-up projects (as opposed to acquisitions of existing, operational enterprises)*” and puts the investor in the position as if the investment had never occurred – rather than the position as if the breaches had not occurred as required by the principle of full reparation. Quoting from Dr. Ripinsky, Claimant argues that the costs approach “*generally does not meet the legal requirement to make the award equivalent to the investment’s fair market value.*”¹⁸⁸ In Claimant’s view, the same applies to the valuation method applied by Dr. Burrows because it is also a backward-looking method and has in any event not been correctly applied.¹⁸⁹
223. Finally, Claimant rejects the argument that Prof. Davis’ “*modern DCF*” model has never been applied in investment arbitration, emphasizing that it is “*simply a form of the widely adopted DCF method*” and properly reflects economic reality in this case.¹⁹⁰ According to Claimant, it is in fact the only method capable of accurately valuing a project like Reko Diq.¹⁹¹
224. Claimant submits that “[t]he modern DCF method more accurately discounts future cash flows for both systematic and asymmetric risks, incorporates market information, and incorporates management’s flexibility to choose different options in response to evolving circumstances” which makes it “*particularly well-suited for the valuation of a long-life mine like Reko Diq.*”¹⁹² Claimant adds that the modern DCF approach has been observed to be “*particularly useful for valuing mines and other natural resources assets because of the volatility of natural resources prices and the existence of well-developed forward*

¹⁸⁶ Claimant’s Quantum Reply, ¶¶ 80-82, quoting from **Exhibit CE-1439**, p. 4, *Gold Reserve Inc. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/09/1, Award of 22 September 2014 [CA-177], ¶¶ 830-831, Brailovsky-Wells I, ¶¶ 107 and 95, and Ripinsky I, ¶ 77.

¹⁸⁷ Claimant’s Quantum Reply, ¶ 82, quoting from Davis II, ¶ 23.

¹⁸⁸ Claimant’s Quantum Reply, ¶¶ 92-93, quoting from Ripinsky I, ¶ 87 and *Sergey Ripinsky & Kevin Williams, Damages in International Investment Law* (2008) [CA-431], p. 231. See also Claimant’s Quantum Memorial, ¶ 128.

¹⁸⁹ Claimant’s Quantum Reply, ¶ 94.

¹⁹⁰ Claimant’s Quantum Post-Hearing Brief, ¶¶ 22-23.

¹⁹¹ Claimant’s Quantum Reply, ¶ 73; Claimant’s Quantum Memorial, ¶ 122.

¹⁹² Claimant’s Quantum Memorial, ¶ 130.

markets that provide reliable market information about risk-adjusted price expectations.”¹⁹³

225. Claimant further submits that by contrast to treating risk as a constant, annually compounding factor as is done in the traditional DCF model, modern DCF can take into account that “*the risk associated with late-stage cash flows is more or less constant over time for copper and gold mines.*” In addition, Claimant argues that modern DCF can separately account for the two types of risk, *i.e.*: (i) systematic risks which are addressed by using risk-adjusted price projections of future prices from markets in forward contracts; and (ii) asymmetric risks for which modern DCF makes individual appropriate adjustments to account for the average effect of each risk on cost and production quantities. As risks are thereby priced at source, the cash flows can then be discounted at the risk-free rate.¹⁹⁴
226. Claimant submits that the modern DCF method further uses simulation of a large number of scenarios in order to account for the uncertainty regarding, *e.g.*, the fluctuation of copper prices in the future, and permit the incorporation of active management such as the choice whether to expand the mine depending on the development of prices. Claimant refers to its witness Mr. Luksic who explained that the flexibility to adapt productivity to price cycles “*is immensely valuable.*”¹⁹⁵ Claimant further notes that while the traditional DCF method gives relatively little value to expected cash flows after the first two decades of mine life, Mr. Luksic explained that “*this flexibility is what makes long-life mines so attractive: they help you manage the volatility of commodity prices. ... Copper prices go through cycles of highs and lows and when you have a long life of mine you can ride those cycles in a way that maximizes value.*”¹⁹⁶
227. According to Claimant, the modern DCF valuation method is rooted in “*decades-old work of Nobel Prize-winning economists*” and is “*widely taught in business schools and routinely applied in the mining industry.*” Therefore, even if this method were to be considered “*new*” to international arbitration, this would be due to an unsurprising lag of incorporating existing industry practice into arbitral adjudication. In Claimant’s view, the same applied to the use of the DCF method in general, which was widely used in the industry before it became established in arbitration.¹⁹⁷

¹⁹³ Claimant’s Quantum Memorial, ¶ 132.

¹⁹⁴ Claimant’s Quantum Memorial, ¶¶ 134-138.

¹⁹⁵ Claimant’s Quantum Memorial, ¶¶ 141-147, quoting from Luksic II, ¶ 15.

¹⁹⁶ Claimant’s Quantum Memorial, ¶¶ 148-149, quoting from Luksic II, ¶ 15.

¹⁹⁷ Claimant’s Quantum Reply, ¶¶ 95-98.

2. Summary of Respondent's Position

a. Standard of Compensation

228. Respondent accepts that “*the proper measure of quantum is the market value of TCC on November 15, 2011.*”¹⁹⁸
229. According to Respondent, the only issue in dispute between the Parties in this regard is whether “*market value*” refers to the standard of compensation in the Treaty or the *Chorzów Factory* standard. According to Respondent, “*market value*” is captured by the compensation standard agreed by the parties to the Treaty.¹⁹⁹ Respondent adds that there is a “*growing trend*” to apply the BIT compensation standard regarding expropriation to all Treaty breaches and refers to the tribunal in *Occidental v. Ecuador*, which found that the claimant’s investment had not been accorded fair and equitable treatment and was expropriated and then determined “*as mandated by Article III of the Treaty, the fair market value of this investment.*”²⁰⁰ Respondent submits that the BIT standard for expropriation was also applied by the tribunals in *OIEG v. Venezuela*, *CME v. Czech Republic* and *Flughafen v. Venezuela*.²⁰¹
230. Respondent argues that the compensation standard to be applied to the quantification of damages for all breaches in this case is therefore the standard set out in Article 7 of the Treaty, which applies to direct and indirect, and thus any form of, expropriation. Respondent further argues that if the category of unlawful expropriations existed, all indirect expropriation would fall within that category; as a result, Article 7 would also apply to any expropriations, including unlawful expropriations, and exclude the application of a *lex generalis* taken from customary international law.²⁰²
231. Respondent further disagrees with Claimant’s reference to *Chorzów Factory* as reflecting customary international law and adds that, in any event, Claimant agrees that Article 7 of the Treaty is “*consistent*” with what it considers to be the customary international law standard.²⁰³
232. Respondent agrees with Claimant that the fair market value standard requires to identify “*the cash-equivalent amount a willing buyer would pay a willing seller to purchase the*

¹⁹⁸ Respondent’s Counter-Memorial on Quantum, ¶ 28.

¹⁹⁹ Respondent’s Rejoinder on Quantum, ¶ 64.

²⁰⁰ Respondent’s Counter-Memorial on Quantum, ¶¶ 47-48; Respondent’s Rejoinder on Quantum, ¶ 65, quoting from *Occidental Petroleum Corporation and Occidental Exploration and Production Company v. The Republic of Ecuador*, ICSID Case No. ARB/06/11, Award of 5 October 2012 [RLA-337], ¶ 792.

²⁰¹ Respondent’s Rejoinder on Quantum, ¶¶ 66-67.

²⁰² Respondent’s Post-Hearing Brief on Quantum, ¶ 302. See also Respondent’s Rejoinder on Quantum, ¶¶ 68-69; Respondent’s Counter-Memorial on Quantum, ¶¶ 46, 49.

²⁰³ Respondent’s Counter-Memorial on Quantum, ¶ 46, quoting from Claimant’s Quantum Memorial, ¶¶ 20-21.

- asset at the Valuation Date, both with reasonable knowledge of the facts and circumstances surrounding the asset and neither being under any compulsion to transact.*²⁰⁴ In Respondent's view, this eliminates any use of "*speculative, feeble or financially or technically unsound bases*" to determine the fair market value of Claimant's investment.²⁰⁵
233. Respondent contends that the wording of Article 7(2) of the Treaty, which can be found in 17 of 23 BITs signed by Australia, is "*not typical of international investment treaties*" and should therefore be given special consideration by the Tribunal.²⁰⁶
234. Respondent notes that Article 7(2) of the Treaty requires the Tribunal to assess whether the fair market value of Claimant's investment is "*readily ascertainable*" and considers that the valuation presented by Claimant "*is as far as a method could be from rendering a 'readily ascertainable' result.*"²⁰⁷ According to Respondent, Claimant has conceded as much when stating that "*a claimant in TCCA's position has wrongfully been deprived of the opportunity to prove quantum with certainty.*"²⁰⁸
235. Respondent rejects the argument that the uncertainty is a result of Pakistan's breaches of the Treaty and claims that it rather "*derives from the infancy of TCCA's project in Pakistan coupled with the multiple hurdles that it faced going forward.*" Respondent claims that, by contrast, in the *Gemplus* case relied on by Claimant, the lack of evidence was directly attributable to the respondent as the claimants were owning a concession agreement with an operational track record behind it. Respondent further argues that if Claimant's argument were followed, this would apply in all cases in which damages for an unlawful expropriation or other supposed breaches of the treaty are calculated based on the BIT compensation standard.²⁰⁹
236. Consequently, Respondent argues that pursuant to Article 7(2) of the Treaty, the Tribunal must determine a value "*in accordance with generally recognized principles of valuation and equitable principles taking into account the capital invested, depreciation, capital already repatriated, replacement value, and other relevant factors.*"²¹⁰
237. Respondent refers to the separate opinion of Judge Bhandari in *Maritime Delimitation in the Caribbean Sea and the Pacific Ocean (Costa Rica v. Nicaragua)* who considered that "[i]n a case such as this, in which the evidence presented to the Court is inadequate to

²⁰⁴ Respondent's Post-Hearing Brief on Quantum, ¶ 307, quoting from Davis I, ¶ 5.

²⁰⁵ Respondent's Post-Hearing Brief on Quantum, ¶ 307.

²⁰⁶ Respondent's Counter-Memorial on Quantum, ¶¶ 71-72.

²⁰⁷ Respondent's Rejoinder on Quantum, ¶ 71.

²⁰⁸ Respondent's Rejoinder on Quantum, ¶ 77, quoting from Claimant's Quantum Reply, ¶ 71.

²⁰⁹ Respondent's Rejoinder on Quantum, ¶¶ 73-76.

²¹⁰ Respondent's Counter-Memorial on Quantum, ¶ 49; Respondent's Rejoinder on Quantum, ¶ 78, quoting from **Exhibit CE-4**, Article 7(2).

*precisely quantify the compensation to be awarded to an injured party, ... the most appropriate decision is to award the injured State a lump sum amount of compensation based on equitable considerations.*²¹¹

238. According to Respondent, the only amount factually supported with “*sufficient certainty*” would be the sunk costs of Claimant’s investment.²¹²

b. Requirement of Causation

239. Respondent submits that Claimant bears the burden of proving that the damages it alleges are a direct consequence of the Treaty breaches and that, in order to establish causation, it must prove that: (i) the alleged injury was caused by the wrongful act as a matter of fact; and (ii) the loss is not too remote and speculative. Respondent refers to the tribunal in *Biwater Gauff v. Tanzania* according to which there must be a “*sufficient link between the wrongful act and the damage in question*” and there is “*a threshold beyond which damage, albeit linked to the wrongful act, is considered too indirect or remote.*”²¹³

240. Respondent submits that under customary international law, Claimant must show that its losses were caused by the Treaty breaches as a matter of fact. Respondent refers to Article 31 of the ILC Articles as well as the *Gemplus* tribunal, which held that there must be “*a sufficient causal link between the treaty breach by the state and the loss sustained by the claimant.*”²¹⁴ Respondent considers that Claimant has failed to establish factual causation and points in particular to the absence of a Mineral Agreement which left “*key commercial terms*” uncertain. Respondent emphasizes that the Tribunal did not find that the non-conclusion of the Mineral Agreement constitutes a breach of the Treaty.²¹⁵

241. Respondent further submits that Claimant must show that its losses were caused by the Treaty breaches as a matter of law. Respondent points to the *Biwater Gauff* tribunal, which held that there was a “*lack of linkage between each of the wrongful acts of the Republic, and each of the actual, specific heads of loss and damage*” and concluded that

²¹¹ Respondent’s Rejoinder on Quantum, ¶ 79, quoting from *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua)*, Separate Opinion of Judge Bhandari of 2 February 2018 [RLA-399], ¶ 11.

²¹² Respondent’s Rejoinder on Quantum, ¶ 80.

²¹³ Respondent’s Counter-Memorial on Quantum, ¶¶ 50-51; Respondent’s Rejoinder on Quantum, ¶ 49, quoting from *Biwater Gauff (Tanzania) Limited v. United Republic of Tanzania*, ICSID Case No. ARB/05/22, Award of 24 July 2008 [CA-43], ¶ 785.

²¹⁴ Respondent’s Counter-Memorial on Quantum, ¶¶ 52-53, quoting from International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, Y.B. INT’L L. COMM’N (2001), VOL. II, UN Doc. A/CN.4/SER.A/2001/Add.1 (Part 2) [CA-1], Art. 31 and *Gemplus, S.A., SLP, S.A. and Gemplus Industrial, S.A. de C.V. v. United Mexican States*, ICSID Case No. ARB(AF)/04/3 & ARB(AF)/04/4, Award of 16 June 2010 [CA-104], ¶ 11.8.

²¹⁵ Respondent’s Counter-Memorial on Quantum, ¶ 54.

the damage was “*attributable to other factors.*”²¹⁶ Quoting from the Commentary to the ILC Articles, Respondent submits that the test of legal causality is whether damages are directly linked to the breach and not “*too indirect, remote and uncertain to be appraised.*”²¹⁷

242. According to Respondent, Claimant has failed to prove that Respondent directly caused the damages it is seeking and that its alleged losses are not too remote or speculative. Respondent considers that “*the speculative nature of the damages forms one of the key conclusions*” reached by its experts Mr. Brailovsky and Prof. Wells.²¹⁸

243. Respondent emphasizes that the Tribunal’s finding on the existence of a Treaty breach does not discharge Claimant’s burden of proof on causation and maintains that Claimant has failed to prove that the amount of compensation is a direct consequence of the rejection of the Mining Lease Application.²¹⁹

c. Standard and Burden of Proof

244. Respondent submits that Claimant has the burden of proof on the existence and quantum of the damages it is seeking.²²⁰ Respondent adds that a claimant must also provide evidence of the damages it alleges and refers to the tribunal in *AES v. Kazakhstan*, which did not award damages because “*Claimants failed to duly establish their damage,*” and the tribunal in *Rompetrol v. Romania*, which declined to award damages under a certain head due to a “*failure by the claimant to produce any reliably concrete evidence of actual losses under this head.*”²²¹

245. Respondent further relies on its legal expert Dr. Ripinsky who states that a “*claimant must prove the losses it has incurred with reasonable, or sufficient, certainty.*”²²² Respondent further quotes from Dr. Ripinsky’s first expert report:

“Claimant bears the burden of proving the losses it has incurred and the amount of damages that is commensurate with these losses. In international investment law, claimant must prove damages with reasonable, or sufficient, certainty. This standard applies to both past as well as future losses. For

²¹⁶ Respondent’s Counter-Memorial on Quantum, ¶¶ 55-56, quoting from *Bewater Gauff (Tanzania) Limited v. United Republic of Tanzania*, ICSID Case No. ARB/05/22, Award of 24 July 2008 [CA-43], ¶ 785.

²¹⁷ Respondent’s Counter-Memorial on Quantum, ¶¶ 57-58, quoting from Report of the International Law Commission on the work of its 53rd session, UN GAOR, 56th Sess., Supp. No. 10, Chapter IV, Commentary to Article 31, ¶ 10, U.N. Doc. A/56/10 (2001) [RLA-339].

²¹⁸ Respondent’s Rejoinder on Quantum, ¶ 51.

²¹⁹ Respondent’s Rejoinder on Quantum, ¶ 53; Respondent’s Counter-Memorial on Quantum, ¶ 58.

²²⁰ Respondent’s Counter-Memorial on Quantum, ¶¶ 59-62.

²²¹ Respondent’s Counter-Memorial on Quantum, ¶¶ 63-66, quoting from *The AES Corporation and Tau Power B.V. v. Kazakhstan*, ICSID Case No. ARB/10/16, Award of 1 November 2013 [RLA-358], ¶¶ 468-469 and *The Rompetrol Group N.V. v. Romania*, ICSID Case No. ARB/06/3, Award of 6 May 2013 [RLA-268], ¶ 293.

²²² Respondent’s Post-Hearing Brief on Quantum, ¶ 308, quoting from Ripinsky I, ¶ 6.

*obvious reasons, the task of meeting this standard is more challenging in relation to future losses and valuation methods based on future projections.”*²²³

246. Specifically with regard to Claimant’s reliance on a “modern DCF” method, Respondent quotes from Dr. Ripinsky’s report:

*“[T]he standard of proof requires the claimant to demonstrate with sufficient certainty that the validity of these assumptions and the critical parameters (‘fundamentals’) underlying the DCF analysis are – individually and taken together – established with sufficient certainty.”*²²⁴

247. Respondent considers that Claimant failed to provide reasonably and sufficiently certain information and therefore failed to discharge its burden of proof. In Respondent’s view, Reko Diq “faced key challenges that would have prevented it from becoming profitable, which requires the Tribunal to dismiss the compensation claims.” It refers to Dr. Ripinsky who states that “[i]n some investor-State disputes, tribunals have refused to grant compensation, despite finding a treaty breach, where the claimant had failed to prove that it had suffered a loss as a result of the respondent State’s unlawful conduct or to provide a reasonable basis for the estimation of damages.”²²⁵

248. In Respondent’s view, the rule that a claimant, who cannot prove having incurred specific given amounts and the causal link between these amounts and the proven internationally wrongful act, cannot recover these amounts was confirmed by the ICJ in *Maritime Delimitation in the Caribbean Sea and the Pacific Ocean (Costa Rica v. Nicaragua)*.²²⁶ In Respondent’s view, Claimant has explicitly admitted that it cannot prove quantum with certainty and it cannot shift its evidentiary shortcomings on Pakistan.²²⁷ Respondent again refers to Dr. Ripinsky who explains:

*“The point is sometimes made that where a State is to blame for a project’s interruption, the claimant should be given the benefit of doubt in respect of any uncertainty in determining what exactly would have happened in the absence of a breach. This position does not seem to be methodologically correct from the point of view of the burden and standard of proof, nor does it respect the task of determining the FMV as of a certain date (i.e. on the basis of facts available as of that date).”*²²⁸

249. Respondent rejects Claimant’s argument regarding the standard of proof and notes that even the tribunal in *Lemire v. Ukraine* on which Claimant relies endorsed “the

²²³ Ripinsky I, ¶ 22. See also Respondent’s Counter-Memorial on Quantum, ¶ 67, quoting from Ripinsky I, ¶ 23.

²²⁴ Respondent’s Counter-Memorial on Quantum, ¶ 68, quoting from Ripinsky I, ¶ 41.

²²⁵ Respondent’s Counter-Memorial on Quantum, ¶ 69; Respondent’s Post-Hearing Brief on Quantum, ¶¶ 310-311, quoting from Ripinsky I, note 2.

²²⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 312.

²²⁷ Respondent’s Rejoinder on Quantum, ¶ 56.

²²⁸ Ripinsky I, ¶ 76 and note 48.

requirement that speculative losses be excluded from the calculation” and ultimately rejected the claimant’s future quantum scenario as *“too uncertain.”*²²⁹

250. Respondent argues that the *“Modern DCF”* methodology applied by Prof. Davis requires *“a high level of certainty”*; by opting for that *“fragile model,”* Claimant opted for the requisite standard of proof.²³⁰ Quoting from *ADM v. Mexico*, Respondent argues that *“lost profits are allowable insofar as the Claimants prove that the alleged damage is not speculative or uncertain – i.e., that the profits anticipated were probable or reasonably anticipated and not merely possible.”*²³¹ The tribunal in *Vivendi v. Argentina* stated that *“compensation is generally awarded only where future profitability can be established (the fact of profitability as opposed to the amount) with some level of certainty.”*²³²

d. Appropriate Valuation Method

251. Respondent contends that the valuation method applied by Claimant’s valuation expert, which it describes as *“a rather unique variation of a discounted cash flow (‘DCF’) valuation, which has not been adopted by the mining industry or investment tribunals,”* cannot help in determining the fair market value of Claimant’s investment as of the valuation date.²³³

252. In Respondent’s view, the *“modern DCF”* method does not meet the standard for a *“readily ascertainable”* market value.²³⁴ Respondent claims that Prof. Davis only selectively uses market information such as commodity forward rates and interest rates but otherwise uses his own assumptions about long-term price projections, capital and operating costs as well as asymmetric risks. Respondent therefore rejects the argument that this is a *“true market-based approach.”*²³⁵

253. According to Respondent, the *“Modern DCF”* method has been fabricated by Claimant and its expert to *“provide a designer, bespoke methodology allowing TCC to offer the appearance of pseudo-scientific support for its predetermined outlandish valuation.”* Respondents considers that Prof. Davis expressly admitted during the Hearing on

²²⁹ Respondent’s Rejoinder on Quantum, ¶ 54, quoting from *Joseph Charles Lemire v. Ukraine*, ICSID Case No. ARB/06/18, Award of 28 March 2011 [RLA-82], ¶ 261.

²³⁰ Respondent’s Rejoinder on Quantum, ¶ 57.

²³¹ *Archer Daniels Midland Company and Tate & Lyle Ingredients Americas, Inc. v. United Mexican States*, ICSID Case No. ARB(AF)/04/5, Award of 21 November 2007 [RLA-345], ¶ 285.

²³² *Compañía de Aguas del Aconquija S.A. and Vivendi Universal v. Argentine Republic*, ICSID Case No. ARB/97/3, Award of 20 August 2007) [RLA-398], ¶ 8.3.3.

²³³ Respondent’s Post-Hearing Brief on Quantum, ¶ 306.

²³⁴ Respondent’s Counter-Memorial on Quantum, ¶ 113.

²³⁵ Respondent’s Counter-Memorial on Quantum, ¶ 115.

Quantum that his method was a way to reach a predetermined value that would not be validated by actual valuation methods.²³⁶

254. Respondent emphasizes that there is no arbitration case in which the “*Modern DCF*” approach would have been applied and points out that in the only case in which it was raised, *Bear Creek*, it was dismissed by the tribunal as inappropriate in the circumstances of valuing the mining assets.²³⁷ Respondent further notes that Prof. Davis was able to point to only one transaction in the mining industry in which it was applied – which was described in the press as “*the worst mining deal ever.*” Respondent adds that neither Claimant nor its shareholders used “*Modern DCF*” in their transactions on mining assets.²³⁸ Respondent contends that CIMVal also describes the method as “[n]ot widely used and not widely understood,” which confirms, in Respondent’s view that the method cannot reflect “*generally recognized principles of valuation*” as required by Article 7(2) of the Treaty.²³⁹

255. Respondent refers to its experts Mr. Brailovsky and Prof. Wells who consider:

*“In sum, the ‘modern’ part of the approach used in the Brattle Report boils down mainly to the application of a risk-free discount rate to a project that is extremely risky. The Report does not adjust projected cash flows to account for these risks. This is amply demonstrated when the result is compared to the results obtained in the SNC-Lavalin studies, which are praised by TCC and use methods typical of those applied by real buyers and sellers to value such an asset. ... Similarly, the result in the Brattle Report is grossly out of line with the arm’s length purchase price of the identical asset five years earlier.”*²⁴⁰

256. More generally, Respondent claims that, quoting from the expert report of Dr. Ripinsky, “*the weight of authority clearly indicates that, as a general rule, the DCF method is not appropriate for investment projects that have not demonstrated their capacity to generate profits by a track record of performance.*”²⁴¹ Respondent submits that, *inter alia*, the World Bank Guidelines on Treatment of Foreign Direct Investment and the Commentary to the ILC Articles support DCF valuations only for going concerns.²⁴² Respondent also

²³⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 314, referring to Transcript Hearing on Quantum (Day 8), p. 2371 line 8 to p. 2372 line 3.

²³⁷ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 317-318, referring to *Bear Creek Mining Corporation v. Republic of Peru*, ICSID Case No. ARB/14/2, Award of 30 November 2017 [CA-432], ¶ 604. See also Respondent’s Counter-Memorial on Quantum, ¶ 119.

²³⁸ Respondent’s Post-Hearing Brief on Quantum, ¶ 317.

²³⁹ Respondent’s Counter-Memorial on Quantum, ¶¶ 119-120, quoting from **Exhibit CE-4**, Article 7(2).

²⁴⁰ Respondent’s Counter-Memorial on Quantum, ¶ 121, quoting from Brailovsky/Wells I, ¶ 87.

²⁴¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 319, quoting from Ripinsky I, ¶ 8. See also Respondent’s Counter-Memorial on Quantum, ¶ 74 and 77.

²⁴² Respondent’s Counter-Memorial on Quantum, ¶¶ 75-76, quoting from World Bank Guidelines on the Treatment of Foreign Direct Investment, § IV.6(ii), (iii) (RE-564) and Report of the International Law Commission on the

refers to a large number of investment treaty cases in which the application of a DCF method was denied due to a lack of a sufficient operational track record and/or proven profitability.²⁴³

257. Respondent argues that an exception to this general rule requires “*several important fundamentals to be in place as at the date of valuation, such as inter alia the existence of confirmed financing necessary for the project as well as clarity about the commercial terms of operation and a detailed (independently verified) business plan.*” Respondent adds that further “*fundamental uncertainties*” that generally preclude reliance on DCF “*may include technological, logistical, infrastructure, regulatory and other risks.*”²⁴⁴
258. In this regard, Respondent notes that only 1 in every 10,000 exploration projects results in a productive mine and argues that even on the basis of a well-prepared feasibility study, the risk of failure is still substantial, *i.e.*, within 10-15%.²⁴⁵ It refers to the tribunal in *Mesa v. Ecuador*, which rejected the methodologies before it to value a copper mining project that had not yet begun production except for a cost-based approach because it considered them “*too uncertain, subjective and dependent upon contingencies, which cannot be fairly assessed by the Tribunal.*”²⁴⁶ Respondent also relies on the tribunal in *Khan v. Mongolia*, which rejected the DCF method as “*too speculative*” because it considered it “*far from certain*” whether the mine would have reached production, on what terms the parties would have participated in the venture and whether the claimants would have been involved.²⁴⁷
259. According to Respondent, this excludes any form of DCF, let alone the “*Modern DCF*” method crafted by Prof. Davis, as confirmed by the submissions of Peru in *Bear Creek* where the State pointed out that the project “*has no history of profitable operation and is subject to serious uncertainties, including difficult-to quantify social license risk. For this reason, investment treaty tribunals routinely reject the use of DCF valuation for non-producing assets.*”²⁴⁸

work of its 53rd session, UN GAOR, 56th Sess., Supp. No. 10, Chapter IV, Commentary to Article 31, ¶ 25, U.N. Doc. A/56/10 (2001) [RLA-339].

²⁴³ Respondent’s Counter-Memorial on Quantum, ¶¶ 80-95.

²⁴⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 319, quoting from Ripinsky I, ¶¶ 10-11. .

²⁴⁵ Respondent’s Counter-Memorial on Quantum, ¶ 98, referring to Dagdelen/Owen I, ¶¶ 43, 47.

²⁴⁶ Respondent’s Counter-Memorial on Quantum, ¶ 99, quoting from *Copper Mesa Mining Corporation v. Ecuador*, PCA Case No. 2012-02, Award of 15 March 2016 [CA-272], ¶ 7.24.

²⁴⁷ Respondent’s Counter-Memorial on Quantum, ¶ 100, quoting from *Khan Resources Inc, Khan Resources BV and CAUC Holding Company Ltd v. Mongolia*, PCA Case No. 2011-09, Award on the Merits of 2 March 2015 [RLA-375], ¶ 393.

²⁴⁸ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 320-321, quoting from *Bear Creek Mining Corporation v. Republic of Peru*, ICSID Case No. ARB/14/21, Respondent’s Rejoinder on the Merits and Reply on Jurisdiction of 13 April 13 2016, ¶ 629.

260. Respondent further refers to the tribunal in *Metalclad v. Mexico*, which held:

*“W[h]ere the enterprise has not operated for a sufficiently long time to establish a performance record or where it has failed to make a profit, future profits cannot be used to determine going concern or fair market value. The Tribunal agrees with Mexico that a discounted cash flow analysis is inappropriate in the present case because the landfill was never operative and any award based on future profits would be wholly speculative.”*²⁴⁹

261. In Respondent’s view, the same is confirmed by the *Crystallex* tribunal on which Claimant relies because it found that only *“once the fact of future profitability is established and is not essentially of a speculative nature, the amount of such profits need not be proven with the same degree of certainty.”*²⁵⁰

262. Respondent further argues that while uncertainties may be accepted in valuations for commercial purposes, this does not apply to legal proceedings where valuation serves to measure damages and tribunals should therefore *“be strict about evidentiary certainty of claims for damages.”*²⁵¹

263. In response to Claimant’s argument that there is no *“bright-line”* rule excluding the application of DCF *“as a matter of law,”* Respondent agrees that the applicability of DCF is decided on the facts of each case but maintains that it is inappropriate to apply DCF where the facts show no proof of profitability or sufficient certainty of the viability of the project in the future. Respondent considers it decisive that Claimant relies on only three cases in support of its argument that DCF should be applied and argues that none of these cases supports Claimant’s case.²⁵²

264. Respondent notes that only the *Gold Reserve* tribunal applied a DCF method, based on an agreement between the parties, and in all cases the damages awarded by the tribunals were *“roughly equal to the amounts claimed as investments made in the project.”*²⁵³ Respondent further argues that the facts in *Gold Reserve* and *Crystallex* were substantially different from the facts in the present case, in particular as regards the stage of the project, investments made and, in *Gold Reserve*, an agreement on the valuation method, whereas the *Crystallex* tribunal rejected DCF as *“inappropriate for a gold project.”*²⁵⁴ The *Rusoro* tribunal also considered a DCF methodology *“inappropriate”* given the *“lack of a proven*

²⁴⁹ Respondent’s Rejoinder on Quantum, ¶ 59, quoting from *Metalclad Corp. v. Mexico*, ICSID Case No. ARB(AF)97/1, Award of 25 August 2000 [RLA-417], ¶¶ 120-121.

²⁵⁰ Respondent’s Rejoinder on Quantum, ¶ 54, quoting from *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)11/2, Award of 4 April 2016 [CA-360], ¶¶ 874-875.

²⁵¹ Respondent’s Rejoinder on Quantum, ¶ 62.

²⁵² Respondent’s Rejoinder on Quantum, ¶¶ 82-85.

²⁵³ Respondent’s Counter-Memorial on Quantum, ¶ 101.

²⁵⁴ Respondent’s Rejoinder on Quantum, ¶¶ 86-89; Respondent’s Counter-Memorial on Quantum, ¶¶ 102-103.

record of financial performance” and set out criteria for its application which, according to Respondent, are not present in Claimant’s project.²⁵⁵

265. Respondent also refers to the *Khan* tribunal which rejected DCF as too speculative for the project and rejects the argument that this was due to the “*junior*” character of the company.²⁵⁶ Finally, Respondent relies on *Bear Creek* in which the tribunal, despite the fact that “*Bear Creek was better positioned and more advanced than TCCA,*” took into account that the claimant had not received many of the required governmental approvals and concluded that the project remained too speculative and uncertain to rely on the DCF method. Most importantly, Respondent emphasizes that the *Bear Creek* tribunal did not apply “*Modern DCF.*”²⁵⁷ Quoting from Dr. Ripinsky, Respondent argues that the tribunal thereby followed “*the consistent line of earlier decisions that deemed the DCF method to be generally inappropriate for valuing investment projects without a performance track record.*”²⁵⁸
266. Respondent emphasizes its position that Dr. Ripinsky’s statements in his expert reports submitted in this arbitration are consistent with his public writings. It draws the Tribunal’s attention to the fact that in the quotes relied on by Claimant, Dr. Ripinsky stated that DCF may be considered “*if the business proves successful*” and referred to “*established businesses.*”²⁵⁹ As for the cost approach, Dr. Ripinsky clarified that “*if the evidence on the record does not allow for the use of an income-based or market-based method, the historic cost approach may be the only remaining option.*”²⁶⁰
267. Respondent submits that where the market value is not “*readily ascertainable,*” the Tribunal should look to a backward-looking approach.²⁶¹ Respondent contends that its expert Dr. Burrows derived the best approximation to the fair market value of Claimant’s investment by using the prior transaction by which Antofagasta and Barrick acquired the shares in Claimant in 2006. Respondent emphasizes that “[t]o clarify, the valuation submitted by Pakistan through the independent expert Dr. Burrows intends to challenge, and not to cure, the procedural and scientific defects of TCC’s case on quantum, which under applicable law should be dismissed by the Tribunal.”²⁶²

²⁵⁵ Respondent’s Rejoinder on Quantum, ¶ 92; Respondent’s Counter-Memorial on Quantum, ¶ 104, *quoting from Rusoro Mining Limited v. Venezuela*, ICSID Case No. ARB(AF)12/5, Award of 22 August 2016 [CA-361], ¶¶ 87-96.

²⁵⁶ Respondent’s Rejoinder on Quantum, ¶ 93.

²⁵⁷ Respondent’s Rejoinder on Quantum, ¶¶ 93-98.

²⁵⁸ Respondent’s Rejoinder on Quantum, ¶ 99, *quoting from Ripinsky II*, ¶ 26.

²⁵⁹ Respondent’s Rejoinder on Quantum, ¶¶ 101-105.

²⁶⁰ Respondent’s Rejoinder on Quantum, ¶¶ 106-107, *quoting from Ripinsky II*, ¶¶ 49-52.

²⁶¹ Respondent’s Counter-Memorial on Quantum, ¶ 116.

²⁶² Respondent’s Post-Hearing Brief on Quantum, ¶ 353.

268. Respondent maintains that the fair market value would be most accurately determined by Dr. Burrows' reference to the set of prior transactions involving the acquisition of Claimant, including a number of adjustments to account for changes that occurred until the valuation date, *i.e.*, changes in metal prices and country risk as well as "*subsequent efficient, proven investments.*"²⁶³ According to Respondent, neither of the remaining approaches proposed by Claimant nor "*an uninformed, exaggerated guess on the size of the mineral deposits actually available for mining,*" whether made by Prof. Davis or Dr. Mubarakmand, would have been taken into account by a willing buyer in determining the fair market value.²⁶⁴ In light of the remaining uncertainties associated with the project, Respondent concludes that no prospective transaction would have been concluded based on a forecast of future profits of the mine as of the valuation date.²⁶⁵
269. Respondent further argues that if the Tribunal were to find that Dr. Burrows' valuation does not reflect the fair market value of Claimant's investment, "*the only other valuation that could validly be performed under the Treaty is one based on actual, efficient, proven investments made, adjusted for principles of equity.*" Respondent adds that not all investments made would be compensable and claims that the Treaty would "*call for further reductions due to the inefficiencies in TCC's exploration work.*"²⁶⁶
270. In this context, Respondent notes that Article 7(2) of the Treaty also refers to "*equitable principles*" and relies on the Commentary to the ILC Articles to argue that the quantification of damages should reach "*an equitable and acceptable outcome.*" Respondent also refers to the principle of proportionality and points to the disparity between the amount claimed and the amount that Claimant allegedly invested, which Respondent considers to be "*completely disproportionate and inequitable.*"²⁶⁷

3. Tribunal's Analysis

271. The Tribunal will address the four issues discussed by the Parties, *i.e.*: (i) the applicable standard of compensation; (ii) the requirement of causation; (iii) the applicable standard and burden of proof; and (iv) the valuation method to be applied to determine Claimant's damages, in turn.

a. Standard of Compensation

272. At the outset, the Tribunal notes that there is common ground between the Parties regarding the date as of which the losses that Claimant claims to have incurred have to be

²⁶³ Respondent's Post-Hearing Brief on Quantum, ¶ 354, *quoting from* Burrows I, ¶ 3.

²⁶⁴ Respondent's Post-Hearing Brief on Quantum, ¶ 355.

²⁶⁵ Respondent's Counter-Memorial on Quantum, ¶ 112.

²⁶⁶ Respondent's Counter-Memorial on Quantum, ¶¶ 122-125.

²⁶⁷ Respondent's Counter-Memorial on Quantum, ¶¶ 126-128.

quantified. Respondent explicitly “*accepts, that the proper measure of quantum is the market value of TCC on November 15, 2011.*”²⁶⁸ The Parties’ agreement regarding the date of valuation is based on the Tribunal’s finding in its Decision on Jurisdiction and Liability that Respondent has breached its obligations under Articles 3(2), 7(1) and 3(3) of the Treaty by denying TCCP’s Mining Lease Application in order to allow the GOB to implement its own project instead.²⁶⁹ The denial was notified to TCCP by the Licensing Authority’s letter dated 15 November 2011.²⁷⁰ The Tribunal therefore agrees with the Parties that Claimant’s alleged losses have to be quantified as of that date.

273. The Parties further agree that in order to quantify Claimant’s losses, the Tribunal must determine the “*market value*” of TCC or, more precisely, the market value of Claimant’s investment in the Reko Diq project as of 15 November 2011. The Tribunal has found in its Decision on Jurisdiction and Liability that following the denial of TCCP’s Mining Lease Application, the value of the CHEJVA and TCCP, and thus of Claimant’s investment, was effectively neutralized.²⁷¹ The Tribunal therefore agrees with the Parties that Claimant’s losses are equivalent to the (entire) value that its investment would have had if TCCP’s Mining Lease Application has not been denied in violation of Respondent’s obligations under the Treaty.
274. The Tribunal further agrees with the Parties that the value to be determined is the “*market value*” which, as defined by Claimant’s valuation expert Prof. Davis and quoted with approval by Respondent,²⁷² represents “*the cash-equivalent amount a willing buyer would pay a willing seller to purchase the asset at the Valuation Date, both with reasonable knowledge of the facts and circumstances surrounding the asset and neither being under any compulsion to transact.*”²⁷³
275. There is also common ground that the value has to be determined “*but for*” the Treaty breaches that the Tribunal has determined in its Decision on Jurisdiction and Liability. While the Parties are in disagreement as to the extent to which but-for assumptions have to be made, in particular regarding the conclusion and terms of a Mineral Agreement, the general principle of performing a but-for valuation is undisputed and can be derived from both standards of compensation on which the Parties rely. In fact, this aspect relates to the requirement of causation between Respondent’s breaches and the losses incurred by Claimant and will be addressed in more detail below.

²⁶⁸ Respondent’s Counter-Memorial on Quantum, ¶ 28.

²⁶⁹ Decision on Jurisdiction and Liability, ¶ 1373.

²⁷⁰ **Exhibit CE-11.**

²⁷¹ Decision on Jurisdiction and Liability, ¶ 1328.

²⁷² Respondent’s Post-Hearing Brief on Quantum, ¶ 307.

²⁷³ Davis I, ¶ 5.

276. As for the standard of compensation, the Parties disagree as to whether the Tribunal should calculate compensation based on Article 7(2) of the Treaty, as alleged by Respondent, or based on the standard of full reparation under customary international law, as alleged by Claimant. Article 7(1) and (2) of the Treaty provides as follows:

“1. Neither Party shall nationalise, expropriate or subject to measures having effect equivalent to nationalisation or expropriation (hereinafter referred to as ‘expropriation’) the investments of investors of the other Party unless the following conditions are complied with:

(a) the expropriation is for a public purpose related to the internal needs of that Party and under due process of law;

(b) the expropriation is non-discriminatory; and

(c) the expropriation is accompanied by the payment of prompt, adequate and effective compensation.

2. The compensation referred to in paragraph 1(c) of this Article shall be computed on the basis of the market value of the investment immediately before the expropriation or impending expropriation became public knowledge. Where that value cannot be readily ascertained, the compensation shall be determined in accordance with generally recognised principles of valuation and equitable principles taking into account the capital invested, depreciation, capital already repatriated, replacement value, and other relevant factors.”²⁷⁴

277. The Tribunal agrees with Claimant that the wording of Article 7(2) (“*The compensation referred to in paragraph 1(c)...*”) indicates that the provision is, at least primarily, intended to clarify how the compensation must be calculated in order for an expropriation to comply with the legality requirements set out in Article 7(1). The Tribunal is aware that both Parties have relied on case law supporting their respective arguments regarding the question whether or not the provision should further apply to calculate the compensation for an expropriation carried out in violation of the legality requirements in Article 7(1) and/or compensation for Treaty breaches other than an expropriation.

278. In the Tribunal’s view, it is not necessary to express an opinion on this point in the abstract. While Claimant takes the position that the Tribunal should apply the compensation standard set out in *Chorzów Factory* which it considers to be the relevant standard under customary international law, it also argues that this approach is consistent with Article 7 of the Treaty, in particular the first sentence in Article 7(2) pursuant to which compensation “*shall be computed on the basis of the market value of the investment*

²⁷⁴ **Exhibit C-4**, Article 7(1) and (2).

*immediately before the expropriation or impending expropriation became public knowledge.*²⁷⁵

279. The dispute between the Parties concerns the second sentence in Article 7(2), which sets out criteria for determining compensation “[w]here [market] value cannot be readily ascertained.” Respondent argues that the valuation method presented by Claimant to determine the market value of its investment does not produce a “readily ascertainable” result and therefore leads to the application of the criteria in the second sentence. Claimant, on the other hand, maintains that the market value of its investment can be ascertained based on the valuation performed by its valuation expert Prof. Davis.
280. Consequently, if the Tribunal reaches the conclusion that the market value of Claimant’s investment can be “readily ascertained” based on the evidence and valuation methods before it, there is no need to decide whether this result is based on the compensation provision in Article 7(2) of the Treaty or a compensation standard under customary international law.
281. As will be out in more detail below, the Tribunal is convinced that in the specific circumstances of this individual case, the valuation method relied on by Claimant and its valuation expert Prof. Davis is the most appropriate measure to value Claimant’s investment in Reko Diq. While it will therefore not be strictly necessary to resort to the additional criteria set out in the second sentence of Article 7(2), the Tribunal will in any event give due consideration to generally recognized principles of valuation and verify whether the result it has reached based on Prof. Davis’ method is reconcilable with the amount of capital invested by Claimant in order to ensure that Claimant will be awarded compensation in the amount that truly reflects the damages it has incurred as a result of Respondent’s breaches of the Treaty.

b. Requirement of Causation

282. There is common ground between the Parties and Claimant explicitly accepts that “*it must show that Pakistan’s breaches of the Treaty caused TCCA’s loss.*”²⁷⁶ According to Claimant, however, the causal relationship between Respondent’s breaches and its damage has already been determined because the Tribunal has found in its Decision on Jurisdiction and Liability that “*Respondent’s conduct deprived Claimant of the value of its investment and thereby directly caused a loss that is to be quantified at a later stage of the proceedings.*”²⁷⁷

²⁷⁵ Claimant’s Quantum Memorial, ¶ 20; Claimant’s Quantum Reply, ¶¶ 45-46, quoting from **Exhibit CE-4**, Article 7(2).

²⁷⁶ Claimant’s Quantum Reply, ¶ 34; Claimant’s Quantum Post-Hearing Brief, ¶ 17.

²⁷⁷ Decision on Jurisdiction and Liability, ¶ 1374.

283. The Tribunal recalls that its finding was made as part of its conclusion on Claimant's claims, which may be quoted again at this point:

“In conclusion, the Tribunal finds that, by denying TCCP’s Mining Lease Application in order to allow the GOB to implement its own project instead, Respondent breached its obligation to accord Claimant fair and equitable treatment under Article 3(2) of the Treaty, carried out a measure having effect equivalent to expropriation that did not comply with the requirements for a lawful expropriation under Article 7(1) of the Treaty, and impaired the use of Claimant’s investment in violation of Article 3(3) of the Treaty.

While the Tribunal is aware that Respondent has further raised the argument that Claimant’s claim must fail in limine because it has failed to address causation, the Tribunal considers it sufficient to state at this point that Respondent’s conduct deprived Claimant of the value of its investment and thereby directly caused a loss that is to be quantified at a later stage of the proceedings. In the Tribunal’s view, any specific questions on whether Respondent’s conduct was causal for individual parts of Claimant’s – yet unquantified – claim cannot be dealt with in the abstract but will be addressed as part of the quantum phase of the proceedings.”²⁷⁸

284. The Tribunal affirms its previous finding that Respondent’s conduct has deprived Claimant of the value of its investment and has thereby caused a loss that is equal to the value that Claimant’s investment would have had if Respondent had not denied TCCP’s Mining Lease Application in violation of its obligations under the Treaty. The Tribunal has not, however, made a finding as to specific aspects of causation. In particular, the Tribunal has not yet made a definitive finding as to whether the Reko Diq project would have succeeded in the manner presented by Claimant and/or whether the assumptions made by Claimant and its valuation expert Prof. Davis reflect the true value of the Reko Diq project. As for the assumptions made in the Feasibility Study and Expansion Pre-Feasibility Study, this was explicitly emphasized by the Tribunal in its Decision on Respondent’s Reconsideration Request.²⁷⁹
285. Specifically with regard to the negotiations of the Mineral Agreement, Respondent is correct in pointing out that the Tribunal has not made a finding that the non-conclusion of a Mineral Agreement by the Governments amounts to a breach of Respondent’s obligations under the Treaty. Consequently, the Tribunal agrees with Respondent that a but-for valuation cannot assume that a Mineral Agreement would have existed as of the date of valuation. On the other hand, the Tribunal recalls its findings that in the absence of Respondent’s breaches, once Claimant would have received a mining lease, there would have been a mutual interest to achieve agreement on the remaining issues in the

²⁷⁸ Decision on Jurisdiction and Liability, ¶¶ 1373-1374.

²⁷⁹ Decision on Respondent’s Reconsideration Request, ¶¶ 99, 103.

Mineral Agreement negotiations.²⁸⁰ The question whether a Mineral Agreement would have been concluded after the valuation date and, if so, on what terms, will be addressed in more detail below.

286. At this point, *i.e.*, in the context of causation, the Tribunal considers it sufficient to recall the Parties' agreement that Claimant must show that Respondent's breaches caused its losses. In other words, Claimant is entitled to compensation in the amount of the value that its investment would have had *but for* Respondent's breaches. If and to the extent the Tribunal is not convinced that a specific risk or downside affecting Claimant's investment would not have existed in the but-for scenario, it will make the appropriate deduction in order to determine those, and only those, losses that were caused by Respondent's breaches of the Treaty.

c. Standard and Burden of Proof

287. There is no dispute between the Parties and Claimant specifically accepts that "*TCCA has the burden of proof as to its loss.*"²⁸¹
288. The Parties are in dispute, however, as to the standard of proof that applies to the quantification of Claimant's loss. Claimant distinguishes between the fact of the loss, which it considers to be subject to "*the normal standard of balance of the probabilities,*" and the quantum of the loss in respect of which it considers it sufficient to provide a "*reasonable basis*" for the Tribunal's assessment. Respondent, on the other hand, takes the position that Claimant must prove its losses, including the quantum, "*with reasonable, or sufficient, certainty.*"
289. While Respondent repeatedly uses the term "*absolute certainty*" in its Post-Hearing Brief, it is not entirely clear to the Tribunal whether it thereby suggests that this is the standard that Claimant has to meet or rather a standard that Claimant purports to meet.²⁸² In its Rejoinder, Respondent contends that the "*modern*" DCF method used by Prof. Davis "*requires absolute certainty*"²⁸³ or "*a high level of certainty*" because it is "*such a fragile model.*"²⁸⁴ In its Post-Hearing Brief, however, it reiterates its references to Dr. Ripinsky who supports a standard of "*reasonable, or sufficient, certainty.*"²⁸⁵
290. In any event, the Tribunal is not convinced that a standard of "*absolute certainty*" could or should be applied to the quantification of Claimant's damages. Respondent does not cite any authority in this respect and its own legal expert does not support such a strict

²⁸⁰ Decision on Jurisdiction and Liability, ¶ 1239.

²⁸¹ Claimant's Quantum Reply, ¶ 34. *See also* ¶ 69.

²⁸² *Cf. e.g.* Respondent's Post-Hearing Brief on Quantum, ¶¶ 70, 106.

²⁸³ Respondent's Rejoinder on Quantum, ¶ 283.

²⁸⁴ Respondent's Rejoinder on Quantum, ¶ 57.

²⁸⁵ Respondent's Post-Hearing Brief on Quantum, ¶¶ 308-309, *quoting from* Ripinsky I, ¶¶ 6, 22.

standard of proof. As pointed out by Claimant, a standard of “*absolute certainty*” would mean that damages would – almost certainly – never be awarded. There can hardly be absolute proof for a hypothetical situation.

291. In the Tribunal’s view, the application of the modern DCF method, if considered appropriate by the Tribunal, would not warrant a different standard of proof. As the Tribunal will discuss in more detail below, the term “*certainty-equivalent cash flows*” does not mean that cash flows have to be proven with “*absolute certainty*” but rather that existing uncertainties have been quantified and incorporated into these cash flows. Whether or not this has been done in a sufficient manner will form part of the assessment whether Claimant has in fact met its burden of proof. It does not justify raising the threshold of what has to be proven.
292. Respondent’s legal expert Dr. Ripinsky states with regard to the standard of proof in his expert report:

“Claimant bears the burden of proving the losses it has incurred and the amount of damages that is commensurate with these losses. In international investment law, claimant must prove damages with reasonable, or sufficient, certainty. This standard applies to both past as well as future losses. For obvious reasons, the task of meeting this standard is more challenging in relation to future losses and valuation methods based on future projections.

In a number of cases, arbitral tribunals have held that future losses must be proved with ‘sufficient (degree of) certainty’, ‘sufficient degree of probability’, ‘some level of certainty’, ‘comparative likelihood’ and that they must be ‘probable and not merely possible’. The Commentaries to the ILC Articles on State Responsibility refer to ‘sufficient certainty’ as a requirement for the anticipated income stream to become a legally protected interest. In the context of the United Nations Compensation Commission, ‘reasonable certainty’ served as the standard of proof.”²⁸⁶

293. Claimant does not specifically dispute Dr. Ripinsky’s opinion but relies on the tribunal’s findings in *Crystallex v. Venezuela* in support of its argument that once the fact of the loss has been proven, the standard of proof for the quantum of damage does not require the same degree of certainty. The Tribunal notes that in its assessment which standard of proof it should apply to lost profits, the *Crystallex* tribunal considered several of the authorities quoted by Dr. Ripinsky and drew the following conclusions:

“The ILC Articles recognize that in certain cases compensation for loss of profits may be appropriate. Indeed, Article 36(2) of the ILC Articles provides that ‘[t]he compensation shall cover any financially assessable damage including loss of profits insofar as it is established’. The commentary to the ILC Articles further notes that ‘[t]ribunals have been reluctant to provide compensation for claims with inherently speculative elements’ and ‘[i]n cases

²⁸⁶ Ripinsky I, ¶¶ 22-23.

where lost future profits have been awarded, it has been where an anticipated income stream has attained sufficient attributes to be considered a legally protected interest of sufficient certainty to be compensable. This has normally been achieved by virtue of contractual arrangements or, in some cases, a well-established history of dealings’.

Furthermore, according to an oft-cited authority, ‘in order to be allowable, prospective profits must not be too speculative, contingent, uncertain, and the like. There must be proof that they were reasonably anticipated; and that the profits anticipated were probable and not merely possible’. The same idea was expressed by the tribunal in ADM v. Mexico which held that ‘lost profits are allowable insofar as the Claimants prove that the alleged damage is not speculative or uncertain – i.e., that the profits anticipated were probable or reasonably anticipated and not merely possible’.

Furthermore, the Vivendi v. Argentina tribunal noted that ‘compensation for lost profits is generally awarded only where future profitability can be established (the fact of profitability as opposed to the amount) with some level of certainty’.

In the Tribunal’s view, all these authorities show that, once the fact of future profitability is established and is not essentially of speculative nature, the amount of such profits need not be proven with the same degree of certainty. In other words, the Claimant must prove that it has been deprived of profits that would have actually been earned. This requires proving that there is sufficient certainty that it had engaged or would have engaged in a profitmaking activity but for the Respondent’s wrongful act, and that such activity would have indeed been profitable.

With those principles in mind, the question thus is whether in this case (i) it is sufficiently certain that the Claimant would have made profits; and (ii) if yes, whether the Claimant has provided the Tribunal with a reasonable basis to assess such loss of profits. The two questions will be addressed in turn.”²⁸⁷

294. Claimant also relies on the tribunal in *Lemire v. Ukraine*, which held:

“The Tribunal agrees that it is a commonly accepted standard for awarding forward looking compensation that damages must not be speculative or uncertain, but proved with reasonable certainty; the level of certainty is unlikely, however, to be the same with respect to the conclusion that damages have been caused, and the precise quantification of such damages. Once causation has been established, and it has been proven that the in bonis party has indeed suffered a loss, less certainty is required in proof of the actual amount of damages; for this latter determination Claimant only needs to provide a basis upon which the Tribunal can, with reasonable confidence, estimate the extent of the loss.

...

²⁸⁷ ²⁸⁷ *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶¶ 873-876.

While the existence of damage is certain, calculating the precise amount of the compensation is fraught with much more difficulty, inherent in the very nature of the ‘but for’ hypothesis. Valuation is not an exact science. The Tribunal has no crystal ball and cannot claim to know what would have happened under a hypothesis of no breach; the best any tribunal can do is to make an informed and conscientious evaluation, taking into account all the relevant circumstances of the case, not unlike that made by anyone who assesses the value of a business on the basis of its likely future earnings.’²⁸⁸

295. The *Crystallex* tribunal also quoted the first of these paragraphs and added:

“The tribunal is of the view that the emphasis should be put on the phrase ‘with reasonable confidence’ which seems to strike a wholesome and pragmatic approach, prone to satisfy common law and civil law minds.

Other tribunals have come to similar conclusions. In SPP v. Egypt, for example, the tribunal noted that ‘it is well-settled that the fact that damages cannot be assessed with certainty is no reason not to award damages when a loss had been incurred’. And in Tecmed, the tribunal observed that ‘any difficulty in determining the compensation does not prevent the assessment of such compensation where the existence of damage is certain’.

Thus, an impossibility or even a considerable difficulty that would make it unconscionable to prove the amount (rather than the existence) of damages with absolute precision does not bar their recovery altogether. Arbitral tribunals have been prepared to award compensation on the basis of a reasonable approximation of the loss, where they felt confident about the fact of the loss itself. In the Tribunal’s view, this approach may be particularly warranted if the uncertainty in determining what exactly would have happened is the result of the other party’s wrongdoing.’²⁸⁹

296. On that basis, it appears to the Tribunal that the standards invoked by the Parties are in fact not too far apart. In fact, Dr. Ripinsky acknowledges this jurisprudence and draws the following conclusion from it:

“A number of investment tribunals have suggested that once the fact of the damage has been established, a claimant should not be required to prove the actual amount of damages with the same degree of certainty. In the DCF context, I take this to mean that uncertainties remain inherent in any DCF analysis, and the method can still be used despite the impossibility of producing a ‘scientifically precise’ result. After all, value established for a hypothetical transaction is not a fact, but rather an informed opinion of how much an asset is worth. However, for the DCF method to be accepted, the claimant must get over the ‘hump’ of demonstrating its appropriateness and reliability in the specific circumstances of the case.’²⁹⁰

²⁸⁸ *Joseph Charles Lemire v. Ukraine*, ICSID Case No. ARB/06/18, Award of 28 March 2011 [RLA-185], ¶¶ 246, 248.

²⁸⁹ *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶¶ 869-871.

²⁹⁰ Ripinsky I, ¶ 42.

297. There appears to be no dispute regarding the accuracy of Dr. Ripinsky's conclusion and the Tribunal agrees with it. Whether Claimant has demonstrated the appropriateness of the DCF method, and specifically of the modern DCF method, in the present case will be addressed in more detail below. At this point, it suffices to find that the standard of proof cannot be such as to exclude a valuation because the Tribunal is not "*certain*" that the result it produces is correct in terms of "*scientifically precise*." On the other hand, the Tribunal must be convinced that the valuation is appropriate in that it will produce a sufficiently reliable result.
298. Respondent points out that Dr. Ripinsky also noted in his expert report that "[i]n some investor-State disputes, tribunals have refused to grant compensation, despite finding a treaty breach, where the claimant had failed to prove that it had suffered a loss as a result of the respondent State's unlawful conduct or to provide a reasonable basis for the estimation of damages."²⁹¹ In the Tribunal's view, there is no dispute between the Parties that Claimant has to prove that it suffered a loss and that it has to provide a reasonable basis for the estimation of damages. The dispute therefore appears to concern not so much the standard of proof but rather whether the valuation method used by Claimant and its expert yields results that are not "*too speculative*" or "*too uncertain*" but rather enable the Tribunal to assess Claimant's damages "*with reasonable confidence*" and reach a "*reliable*" conclusion.
299. There is a dispute, however, as to whether the Tribunal may or even should take into account the extent to which any uncertainties in the valuation result from Respondent's breaches – because these breaches have prevented the project from going forward and eliminating uncertainties such as the terms of the Mineral Agreement and the terms of third-party financing. The *Crystallex* tribunal indicated that this might be a consideration to be taken into account. The tribunal in *Gemplus v. Mexico* even went further and explicitly held:

*"[T]he fact that this exercise is difficult is due directly to the Respondent's breaches of the two BITs which have made it almost impossible for the Claimants to show how the Concessionaire could or would have made use of that lost opportunity. As already decided by the Tribunal above, it would be wrong in principle to deprive or diminish the Claimants of the monetary value of that lost opportunity on lack of evidential grounds when that lack of evidence is directly attributable to the Respondent's own wrongs. This is not therefore a case where the burden of proof lay exclusively on the Claimants: and, in the Tribunal's view, it was also for the Respondent to prove the contrary. It did not do so."*²⁹²

²⁹¹ Ripinsky I, note 2.

²⁹² *Gemplus S.A., SLP S.A., and Gemplus Industrial S.A. de C.V. v. United Mexican States*, ICSID Case No. ARB(AF)/04/3, Award of 16 June 2010 [CA-104], ¶ 13-99.

300. Dr. Ripinsky, on the other hand, states in his expert report:

“[F]undamental uncertainties existing at the date of valuation cannot be resolved by a tribunal by predicting ‘how things would have evolved in the absence of the breach.’ Rather, the task of ascertaining the fair market value at a given date of valuation requires arbitrators to view these uncertainties as the part of the factual matrix existing as of that date. If these fundamental uncertainties cannot be resolved in favour of the claimant on the basis of the applicable standard of proof, this should preclude reliance on the DCF method.

[Note 48] The point is sometimes made that where a State is to blame for a project’s interruption, the claimant should be given the benefit of doubt in respect of any uncertainty in determining what exactly would have happened in the absence of a breach. This position does not seem to be methodologically correct from the point of view of the burden and standard of proof, nor does it respect the task of determining the FMV as of a certain date (i.e. on the basis of facts available as of that date).”²⁹³

301. In the Tribunal’s view, it is not sensible to discuss this point in the abstract. For the reasons set out below, the Tribunal considers that, in principle, the information and evidence presented by Claimant provide a reasonable and sufficient basis to determine the value of Claimant’s investment using an income-based valuation method. In other words, the Tribunal does not consider that there are “*fundamental uncertainties*” that would preclude the application of a DCF method or, more precisely, the application of the modern DCF method used by Prof. Davis. This does not yet mean that the Tribunal agrees with each of the individual assumptions and risk estimates made by Prof. Davis in the course of his valuation. Should the Tribunal reach the conclusion that certain risks or uncertainties have not been sufficiently accounted for, it will also assess whether, in that specific context, there is an evidentiary uncertainty which has been caused by Respondent and might therefore justify alleviating Claimant’s burden of proof.

302. In general, however, the Tribunal finds that these considerations may not serve to reverse the fundamental principle that Claimant bears the burden of proving its damage, including the quantum of its damage, and therefore also bears the consequences if and to the extent it is not able to meet this burden of proof.

d. Appropriate Valuation Method

303. Having set out the applicable legal standards in general, the Tribunal will now turn to the valuation methods presented by the Parties and assess whether it is appropriate to rely on any of these methods in the circumstances of the present case.

²⁹³ Ripinsky I, ¶ 76 and note 48.

304. Claimant has presented a valuation from its expert Prof. Davis, which has been referred to throughout these proceedings as the “*modern DCF*” method – a term that the Tribunal will therefore adopt in the following analysis. Respondent has relied on two sets of valuation experts: (i) Mr. Brailovsky and Prof. Wells who were instructed to discuss the appropriateness of a DCF valuation in general and the valuation presented by Prof. Davis in particular but did not present a valuation of their own of the Reko Diq project; and (ii) Dr. Burrows who valued the Reko Diq project based on the past transactions through which Antofagasta and Barrick acquired their (indirect) shares in Claimant in 2006.
305. Consequently, the Tribunal has two valuations before it, *i.e.*, the income-based modern DCF valuation performed by Prof. Davis and the past-transactions-based valuation performed by Dr. Burrows. The Tribunal further takes note of Respondent’s statement that “*the valuation submitted by Pakistan through the independent expert Dr. Burrows intends to challenge, and not to cure, the procedural and scientific defects of TCC’s case on quantum, which under applicable law should be dismissed by the Tribunal.*”²⁹⁴
306. On that basis, the Tribunal will first and foremost assess whether Claimant has established that it is appropriate to use a modern DCF valuation in the circumstances of the present case. If and to the extent the Tribunal follows Claimant and its expert on this point, it will further assess, once the Tribunal has drawn its own conclusion on the value of the Reko Diq project based on that method, whether there are reasonable grounds for any remaining deviation to the result produced by Dr. Burrows’ method.
307. As for the modern DCF method applied by Prof. Davis, there are two main aspects in dispute between the Parties: (i) whether it is appropriate in general to use an income-based DCF valuation for a development-stage mining project in the circumstances of Reko Diq; and (ii) whether it is appropriate to use the modern DCF method, which is in principle also a DCF valuation but, as explained by Prof. Davis, uses at-source pricing of risk and simulates certain project variables to incorporate managerial flexibility while then discounting cash flows at a risk-free rate.²⁹⁵
308. The Tribunal will address these two aspects in turn.

i. Whether It Is Appropriate to Value the Reko Diq Project Based on a Projection of Future Cash Flows

309. At the outset of its analysis regarding the appropriateness of using a DCF valuation in this case, the Tribunal notes that there is agreement between the Parties that this question cannot be answered in the abstract, *i.e.*, for any given development-stage project at a

²⁹⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 353.

²⁹⁵ Davis I, ¶¶ 83, 85.

certain defined stage. In response to Claimant's denial of a "*bright-line rule*" that Respondent allegedly invoked,²⁹⁶ Respondent agreed with the "*truism*" that "*the applicability of DCF methodology is decided on the facts of each case*" but argued that Claimant had failed to establish the facts leading to the applicability of a DCF analysis, *i.e.*, facts proving "*profitability or sufficient certainty of the viability of the project into the future.*"²⁹⁷

310. The Tribunal agrees with the Parties that the analysis which valuation method is appropriate to value a project can only be made on a case-by-case basis, taking into account all relevant circumstances of the case and the evidence that the Parties have brought before this Tribunal. As stated by the *Crystallex* tribunal:

*"[T]here is no one methodology best suited for determining the fair market value of the investment lost in every situation. Tribunals may consider any techniques or methods of valuation that are generally acceptable in the financial community, and whether a particular method is appropriate to utilize is based on the circumstances of each individual case. A tribunal will thus select the appropriate method basing its decision on the circumstances of each individual case, mainly because a value is less an actual fact than the expression of an opinion based on the set of facts before the expert, the appraiser or the tribunal."*²⁹⁸

311. The Tribunal agrees with this statement and can therefore assess no more and no less than whether it is appropriate to determine the value of the Reko Diq project as of 15 November 2011 based on a projection of the project's future cash flows. At the same time, the Tribunal still considers it useful to take guidance from the findings made by other tribunals faced with the question how to value a non-operational mining project. In their submissions, the Parties relied, *inter alia*, on four recent cases concerning non-operational mining projects which, as assessed by Dr. Ripinsky, "*are to some extent comparable to the Tethyan case in terms of their factual background*" as they were "*stopped due to government intervention before entering the exploitation stage or shortly thereafter.*"²⁹⁹

312. Claimant relies in particular on the findings made by the tribunals in *Gold Reserve v. Venezuela* and *Crystallex v. Venezuela*. In *Gold Reserve*, the tribunal held:

"Although the Brisas Project was never a functioning mine and therefore did not have a history of cashflow which would lend itself to the DCF model, the Tribunal accepts the explanation of both Dr Burrows (CRA) and Mr

²⁹⁶ Cf. *e.g.* Claimant's Quantum Reply, ¶ 77; Claimant's Quantum Post-Hearing Brief, ¶ 22.

²⁹⁷ Cf. Respondent's Rejoinder on Quantum, ¶¶ 83-84.

²⁹⁸ *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶ 886.

²⁹⁹ Ripinsky I, ¶ 59.

*Kaczmarek (Navigant) that a DCF method can be reliably used in the instant case because of the commodity nature of the product and detailed mining cashflow analysis previously performed. The Tribunal also notes that the experts agreed on the DCF model used, and it is only the inputs that are contested.*³⁰⁰

313. In that case, the claimant had also presented a comparables valuation which was contested by the respondent. In that context, the *Gold Reserve* tribunal added:

*“The Tribunal notes that the DCF method is a preferred method of valuation where sufficient data is available. This conclusion is supported by the CIMVal Guidelines ... to which both experts referred. In the present cases, many of the arguments in favour of a DCF approach (a commodity product for which data such as reserves and price are easily calculated) mitigates against introducing other methods such as comparable transactions or market capitalization, unless close comparables can be found. On several occasions in this Award, the Tribunal has rejected a comparable with other mines on the basis that many variables are specific to each mine (such as climatic and geological conditions) all of which have an impact on value. ... Although the Tribunal appreciates Claimant’s concern that the DCF model can be over-sensitive to changes in inputs, the Tribunal is not convinced that the comparables offered are sufficiently similar to enable them [sic] to be used in a weighted valuation calculation. Because of this uncertainty, the Tribunal prefers to use the DCF model only.”*³⁰¹

314. The tribunal did not, however, decide to ignore the comparables approach but used it as “a cross-reference as to the reasonableness of the DCF valuation.” It noted that “the comparables were in a close range, suggesting the DCF value was reasonably accurate” and also referred to other valuations from independent analysts, which it considered “useful references to ensure that the compensation awarded is reasonable.”³⁰²

315. Dr. Burrows, who had also appeared as the respondent’s expert in *Gold Reserve*, had presented a negative valuation of the project. The *Gold Reserve* tribunal did not consider this valuation convincing because “[t]his would essentially mean that the mine was completely uneconomic to operate – a highly unlikely proposition given the effort and expense to which *Gold Reserve* had committed to get the mine operational. The detailed feasibility study and various impact studies all demonstrated that the level of analysis that had gone into the mine was significant.” The tribunal further noted that the claimant’s valuation was consistent with other independent valuations and bore “reasonably proximity

³⁰⁰ *Gold Reserve Inc. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/09/1, Award of 22 September 2014 [CA-177], ¶ 830.

³⁰¹ *Gold Reserve Inc. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/09/1, Award of 22 September 2014 [CA-177], ¶ 831.

³⁰² *Gold Reserve Inc. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/09/1, Award of 22 September 2014 [CA-177], ¶ 832.

to the comparables methodologies.” The tribunal also considered it unlikely that the claimant would have proceeded with the venture if it had become uneconomic. In addition, it took note of the fact that financing had been arranged for the project, “*indicating that a convincing business case had been made to obtain the debt.*”³⁰³ On that basis, the tribunal decided to generally prefer the methodology and evidence advanced by the claimant’s expert.

316. In *Crystallex*, the tribunal found that the claimant had “*established the fact of future profitability, as it had completed the exploration phase, the size of the deposits had been established, the value can be determined based on market prices, and the costs are well known in the industry and can be estimated with a sufficient degree of certainty.*” The tribunal made reference to the feasibility studies produced by the claimant and noted that it saw “*no reason to cast into doubt the accuracy of the studies that those well-known consultants prepared contemporaneously for the Claimant throughout the years.*” It further held that “*gold, unlike most consumer products or even other commodities, is less subject to ordinary supply-demand dynamics or market fluctuations, and, especially in the case of open pit gold mining as in Las Cristinas, is an asset whose costs and future profits can be estimated with greater certainty.*” The tribunal therefore accepted that “*predicting future income from ascertained reserves to be extracted by the use of traditional mining techniques—as is the case of Las Cristinas—can be done with a significant degree of certainty, even without a record of past production.*”³⁰⁴

317. In a second step, the *Crystallex* tribunal assessed whether the claimant had provided it with a reasonable basis to assess the loss of profits and noted that the claimant had presented several forward-looking methodologies whereas the respondent had presented a backward-looking cost approach. It then held:

*“The Tribunal considers that in this case only forward-looking methodologies aimed at calculating lost profits are appropriate in order to determine the fair market value of Crystallex’s investment. By contrast, a backward-looking methodology such as the cost approach, while susceptible of being utilized in certain instances where there is no record of profitability and other methodologies would lead to excessively speculative and uncertain results, cannot be resorted to in this case. The cost approach method would not reflect the fair market value of the investment, as by definition it only assesses what has been expended into the project rather than what the market value of the investment is at the relevant time.”*³⁰⁵

³⁰³ *Gold Reserve Inc. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/09/1, Award of 22 September 2014 [CA-177], ¶¶ 830, ¶¶ 833-834.

³⁰⁴ *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶¶ 878-880.

³⁰⁵ *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶¶ 881-882.

318. The *Crystallex* tribunal considered that “[t]he appropriateness of choosing, at least for a case like this one, a method which aims at determining lost profits and, by contrast, of discarding methods that are purely based on the computation of sunk costs,” was confirmed by the “Standards and Guidelines for Valuation of Mineral Properties” issued by the Canadian Institute of Mining, Metallurgy and Petroleum (CIMVal), which it described as “important standards in the industry.” The tribunal referred to the definition of “development property” in the CIMVal Guidelines and noted that for these properties, the CIMVal Guidelines “advise in favor of the application of income- and market-based methodologies, and against the use of cost-based methodologies.”³⁰⁶ On that basis, the tribunal decided to consider the four methodologies presented by the claimant and decided to rely on a stock-market approach and a market multiples approach while discarding the other two valuation methodologies – none of which was a DCF methodology.³⁰⁷
319. Claimant further relied on the tribunal in *Rusoro v. Venezuela*, which noted that “[v]aluations based on the DCF method have become usual in investment arbitrations, whenever the fair market value of an enterprise must be established.” It agreed that “where the circumstances for its use are appropriate, forward looking DCF has advantages over other, more backwards looking valuation methods” and held that “DCF works properly if all, or at least a significant part, of the following criteria are met”:³⁰⁸
- The enterprise has an established historical record of financial performance;
 - There are reliable projections of its future cash flow, ideally in the form of a detailed business plan adopted in tempore insuspecto, prepared by the company’s officers and verified by an impartial expert;
 - The price at which the enterprise will be able to sell its products or services can be determined with reasonable certainty;
 - The business plan can be financed with self-generated cash, or, if additional cash is required, there must be no uncertainty regarding the availability of financing;

³⁰⁶ *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶¶ 883-884.

³⁰⁷ There is common ground that the “P/NAV method” presented by the claimant “resembled the conventional DCF approach.” Ripinsky I, ¶ 65; Claimant’s Quantum Reply, ¶ 87. While the *Crystallex* tribunal dismissed this method, it noted that “conceptually it would have not difficulties in accepting it as a method per se” but then dismissed it due to its disagreement with the valuation date selected by the claimant and its experts, *i.e.*, on grounds specific to the facts of the case. *Crystallex International Corporation v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶ 896.

³⁰⁸ *Rusoro Mining Limited v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/12/5, Award of 22 August 2016 [CA-361], ¶¶ 758-759.

- *It is possible to calculate a meaningful WACC, including a reasonable country risk premium, which fairly represents the political risk in the host country;*
- *The enterprise is active in a sector with low regulatory pressure, or, if the regulatory pressure is high, its scope and effects must be predictable: it should be possible to establish the impact of regulation on future cash flows with a minimum of certainty.*³⁰⁹

320. The *Rusoro* tribunal emphasized that DCF did not work in all circumstances and noted that “[i]f the estimation of those parameters is incorrect, the results will not represent the actual fair market value of the enterprise. Small adjustments in the estimation can yield significant divergences in the results.” It therefore considered it necessary that DCF valuations “be subjected to a ‘sanity check’ against other valuation methodologies.”³¹⁰

321. The *Rusoro* tribunal considered that neither of the parties’ experts had in fact presented a “real DCF valuation” and considered the absence of such a DCF valuation “not an oversight, but rather the result of the very special characteristics surrounding *Rusoro*, which make the use of DCF approach inappropriate.”³¹¹ The tribunal referred to the following circumstances: (i) the claimant lacked a proven record of financial performance; (ii) the price of gold was very volatile and the expropriation occurred when gold was of its two historic peaks, which made it difficult to recreate market expectations on the expropriation date; (iii) there was no certainty whether the claimant would have been able to secure the financing for the required investment projected in its business plan; (iv) the country risk advocated by the claimant’s expert was “clearly too low” and the WACC proposed by the respondent’s expert was considered too high; (v) the Venezuelan gold sector had suffered increasing regulatory pressure which made it impossible to predict “with any certainty” the impact on future cash flows; and (vi) the claimant’s mining rights had a definite term and while the DCF model assumed renewal, the tribunal had “significant doubts” whether that would be the case “given the uncertainty surrounding Venezuela.”³¹²

322. The *Rusoro* tribunal therefore concluded that the DCF valuation was “not an appropriate basis for calculating the ‘genuine value’ of *Rusoro*.”³¹³

³⁰⁹ *Rusoro Mining Limited v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/12/5, Award of 22 August 2016 [CA-361], ¶ 759.

³¹⁰ *Rusoro Mining Limited v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/12/5, Award of 22 August 2016 [CA-361], ¶ 760.

³¹¹ *Rusoro Mining Limited v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/12/5, Award of 22 August 2016 [CA-361], ¶ 785.

³¹² *Rusoro Mining Limited v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/12/5, Award of 22 August 2016 [CA-361], ¶ 785.

³¹³ *Rusoro Mining Limited v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/12/5, Award of 22 August 2016 [CA-361], ¶ 786.

323. In *Khan Resources v. Mongolia*, the tribunal was presented with three different methodologies by the parties' experts, including a DCF valuation advocated by the claimants. The tribunal first agreed with the claimants that "*in the case of a mine with proven reserves, the DCF method is often considered an appropriate methodology for calculating fair market value*" but then held that "*a number of additional factors and uncertainties*" made the use of the DCF method "*unattractive and speculative*" in the case before it.³¹⁴ The *Khan Resources* tribunal then specified that these "*uncertainties*" included: (i) how the project would have been financed; (ii) whether a strategic partner would have been brought in or whether the claimant would have been able to bring the project into production by itself; (iii) whether the claimant would have taken the project to production or sold it; (iv) when and how certain additional property would have been merged into the joint venture; and (v) the signing of various agreement such as an investment agreement and a new joint venture agreement "*to finalise the commercial terms*" of the project.³¹⁵
324. The *Khan Resources* tribunal did not agree with the respondent that these factors rendered the project worthless in the claimant's hands but held that "[t]he combination of these factors ... does mean that the level of certainty required for the DCF method to be used has not been attained." In particular, the tribunal considered it "*far from certain: (i) whether the mine would actually have reached production; (ii) if it did, on what terms the parties would have participated in the venture; and (iii) whether the Claimants would still have been involved in the Dornod Project at all.*" It therefore concluded that "*the DCF method is inappropriate and that any damages calculated through it would be too speculative.*"³¹⁶
325. The *Khan Resources* tribunal did not adopt any of the three methodologies presented by the parties' experts but considered that "*the true value of Khan's investment is better reflected by the offers made for the mine or for Khan Canada's shares in and around the relevant period than by the more traditional methodologies advanced by the Parties.*"³¹⁷
326. The Tribunal notes that the Parties also made repeated reference to the award rendered in *Bear Creek v. Peru*. In that case, the claimant had also presented a valuation calculated by the DCF method and the tribunal assessed whether "*having regard to the factual circumstances of this case, a willing buyer might have been found who would have paid*

³¹⁴ *Khan Resources Inc, Khan Resources BV and CAUC Holding Company Ltd v. Mongolia*, PCA Case No. 2011-09, Award on the Merits of 2 March 2015 [RLA-375], ¶ 391.

³¹⁵ *Khan Resources Inc, Khan Resources BV and CAUC Holding Company Ltd v. Mongolia*, PCA Case No. 2011-09, Award on the Merits of 2 March 2015 [RLA-375], ¶ 392.

³¹⁶ *Khan Resources Inc, Khan Resources BV and CAUC Holding Company Ltd v. Mongolia*, PCA Case No. 2011-09, Award on the Merits of 2 March 2015 [RLA-375], ¶ 393.

³¹⁷ *Khan Resources Inc, Khan Resources BV and CAUC Holding Company Ltd v. Mongolia*, PCA Case No. 2011-09, Award on the Merits of 2 March 2015 [RLA-375], ¶ 390.

a price calculated by the DCF method, as Claimant alleges.” It answered this question in the negative, stating:

“The Tribunal is not persuaded that Claimant has provided sufficient evidence in support of its claim that a hypothetical purchaser of the Santa Ana Project would have been able to obtain the necessary social license to be able to proceed with the Project, if it had been provided an opportunity to invest the necessary time and resources. Given the extent of the opposition, and the reasons for it, the Tribunal doubts that the Project could, in the short term at least, be considered to be viable by the time Supreme Decree 032 [i.e., the measure which the tribunal found to be in violation of the respondent’s obligations under the treaty] was adopted.

The Tribunal notes that the Santa Ana Project was still at an early stage and that it had not received many of the government approvals and environmental permits it needed to proceed. On the basis of the evidence before it, the Tribunal concludes that there was little prospect for the Project to obtain the necessary social license to allow it to proceed to operation, even assuming it had received all necessary environmental and other permits. The Tribunal notes that no similar projects operated in the same area, and there was no evidence to support a track record of successful operation or profitability in the future.”³¹⁸

327. The *Bear Creek* tribunal also made reference to the tribunal in *Vivendi v. Argentina*, which held:

“In the Tribunal’s view, the likelihood of lost profits must be sufficiently established by Claimants in order to be the basis of compensable damages. The Tribunal also recognises that in an appropriate case, a claimant might be able to establish the likelihood of lost profits with sufficient certainty even in the absence of a genuine going concern. For example, a claimant might be able to establish clearly that an investment, such as a concession, would have been profitable by presenting sufficient evidence of its expertise and proven record of profitability of concessions it (or indeed others) had operated in similar circumstances.”³¹⁹

328. The *Vivendi* tribunal found that the claimant had failed to establish “*with a sufficient degree of certainty*” that the concession in question would have been profitable because the claimant had “*never made a profit whilst it had operational control of the concession.*” It again noted that “*the absence of a history of demonstrated profitability does not absolutely preclude the use of DCF valuation methodology. But to overcome the hurdle of its absence, a claimant must lead convincing evidence of its ability to produce profits*

³¹⁸ *Bear Creek Mining Corporation v. Republic of Peru*, ICSID Case No. ARB/14/2, Award of 30 November 2017 [CA-432], ¶¶ 599-600.

³¹⁹ *Compañía de Aguas del Aconquija S.A. and Vivendi Universal v. Argentine Republic*, ICSID Case No. ARB/97/3, Award of 20 August 2007 [RLA-398], ¶ 8.3.4.

in the particular circumstances it faced.”³²⁰ It concluded that the evidence adduced by the claimants in this regard was deficient because in the absence of a record of demonstrated profitability of the project itself, the claimants would have been required “*to present a thoroughly prepared record of its (or others) successes, based on first hand experience (its own or that of qualified experts) or corporate records which establish on the balance of the probabilities it would have produced profits from the concession in question in the face of the particular risks involved, other than those of Treaty violation.*”³²¹

329. Respondent’s expert Dr. Ripinsky stated in his expert report that while, as a general rule, a DCF calculation requires a proven track record of performance, it “*appears to be acceptable where ... the claimant is able to establish with sufficient certainty the principal assumptions and parameters in its DCF model despite the absence of a track record.*”³²² He concluded from his review of recent awards concerning mining ventures that “*the application of the DCF method to a mining project at an early stage requires several important fundamentals to be in place as at the date of valuation, such as inter alia the existence of confirmed financing necessary for the project as well as clarity about the commercial terms of operation and a detailed (independently-verified) business plan.*” In addition, Dr. Ripinsky considered that “*technological, logistical, infrastructure, regulatory and other risks*” could also constitute “*fundamental uncertainties*” which generally preclude reliance on the DCF method.³²³
330. In the Tribunal’s view, a review of recent case law, including but not limited to the cases set out in more detail above, confirms that the question whether a DCF method (or a similar income-based valuation methodology) can be applied to value a project which has not yet become operational depends strongly on the circumstances of the individual case. The first key question is whether, based on the evidence before it, the Tribunal is convinced that in the absence of Respondent’s breaches, the project would have become operational and would also have become profitable. The second key question is whether the Tribunal is convinced that it can, with reasonable confidence, determine the amount of these profits based on the inputs provided by the Parties’ experts for this calculation. If the Tribunal reaches the conclusion that there are “*fundamental uncertainties*” due to which it is not convinced that the project would have reached the operational stage and would have been able to generate profits, it cannot apply the DCF method. If it reaches the conclusion that no such “*fundamental uncertainties*” preclude reliance on the DCF

³²⁰ *Compañía de Aguas del Aconquija S.A. and Vivendi Universal v. Argentine Republic*, ICSID Case No. ARB/97/3, Award of 20 August 2007 [RLA-398], ¶¶ 8.3.5, 8.3.7, 8.3.8.

³²¹ *Compañía de Aguas del Aconquija S.A. and Vivendi Universal v. Argentine Republic*, ICSID Case No. ARB/97/3, Award of 20 August 2007 [RLA-398], ¶¶ 8.3.8, 8.3.10.

³²² Ripinsky I, ¶¶ 8-9.

³²³ Ripinsky I, ¶¶ 10-11.

method but is not convinced by the inputs provided by the Parties' experts, it may conclude that it cannot apply the DCF method or it may conclude that certain deductions have to be made to account for additional risks or uncertainties faced by the project.

331. As for the first question, the Tribunal considers that for the reasons to be set out in more detail below, Claimant has established that if Respondent had not denied TCCP's Mining Lease Application in violation of Respondent's obligation under the Treaty, the Reko Diq project would have gone forward and become operational and profitable in due course. More specifically, the Tribunal is convinced that based on the Feasibility Study that Claimant delivered to the GOB on 26 August 2010 and the commitment shown by Claimant as well as its two owners, Antofagasta and Barrick, Claimant would have been able to obtain the necessary funds and would also have brought the necessary experience to successfully execute the project in Balochistan.
332. In particular, the Tribunal cannot follow Respondent's allegation that the Feasibility Study "*was a blueprint for another Mega Project failure.*"³²⁴ In the Tribunal's view, the fact that the Feasibility Study was produced at a time when Claimant and its owners were determined to proceed with the project and the fact that its owners combined their impressive experience in operating copper mines and in operating gold mines across the globe, had been sponsoring and overseeing the project during its exploration stage, and were willing to contribute large further amounts of equity into the project, are very strong indications that they believed that this project would become operational and profitable. The Feasibility Study itself was the result of several years of intensive work on the ground, which was overseen by both of Claimant's owners and in which numerous outside consultants and companies participated. To suggest that the team conducting the exploration work and compiling the Feasibility Study had no idea what they were doing is not credible, in particular considering that Antofagasta and Barrick were investing large amounts of equity as well as seconding their own personnel for the project.
333. This does not mean that the Tribunal intends to brush off the risks and issues pointed out by Respondent, in particular the risks associated with water, security and a social license to operate, or that the Tribunal necessarily follows each assumption made by Claimant and its expert on the costs associated with these risks. The Tribunal also takes note of a remaining uncertainty whether and, if so on what terms, Claimant would have concluded a Mineral Agreement with the Governments. However, the Tribunal considers it established that neither of these risks or uncertainties constitutes a "*fundamental uncertainty*" that would have stopped the project or rendered it unprofitable.
334. Consequently, the second question is whether the inputs for a DCF calculation presented by the Parties' experts provide the Tribunal with a reasonable basis to determine the future

³²⁴ Respondent's Post-Hearing Brief on Quantum, ¶ 108.

cash flows of Claimant's investment with a reasonable amount of confidence. In this regard, the Tribunal notes that while Respondent's experts have criticized numerous assumptions and inputs used by Prof. Davis, they have in most cases not provided the Tribunal with what they would consider adequate inputs and they have not performed their own DCF calculation. While they purported to convert Prof. Davis' analysis to a traditional DCF to demonstrate that the internal rate of return would be too low for an investor,³²⁵ the Tribunal is not convinced that this was an adequate conversion and could be used for comparison purposes.

335. As will be set out in more detail below, the Tribunal considers that certain adjustments have to be made to the inputs used by Prof. Davis in his calculation. In the Tribunal's view, however, none of these adjustments warrants the conclusion that the DCF method cannot produce a sufficiently reliable result. To the contrary, the Tribunal is convinced that in the particular circumstances of this case, it is appropriate to assume that Claimant's investment would have become profitable and to determine these future profits by using a DCF method.

ii. Whether It Is Appropriate to Value the Reko Diq Project Based on the Modern DCF Method Presented by Claimant

336. Having reached a conclusion on the appropriateness to determine the value of Claimant's investment by using a forward-looking DCF methodology, the Tribunal will now assess whether Claimant has also established that the Tribunal should use the modern DCF approach used by its expert Prof. Davis.

337. At the outset, the Tribunal notes that neither Party has presented a valuation based on a traditional DCF analysis conducted for the purposes of this arbitration with inputs as of the valuation date. Mr. Brailovsky and Prof. Wells merely referred to the "*conventional DCF calculations of the SNC-Lavalin analyses*" completed in 2010 and, without updating them to the valuation date, concluded on their basis that "*the project would not attract a rational private investor and therefore has a Fair Market Value of zero.*"³²⁶ In the Tribunal's view, the conclusion that the project did not have any value is simply not credible. The Feasibility Study and Expansion Pre-Feasibility Study had confirmed that Reko Diq contained enormous mineral resources and had further demonstrated how these could be extracted and processed to be sold on the metals markets. Contemporaneous statements made by Government officials as well as by Dr. Mubarakmand who led the GOB's own project demonstrate that the Governments shared the belief at the time that the mine was going to be very lucrative and attractive commercially. Based on the results of the Feasibility and Pre-Feasibility Studies, Claimant and its owners were willing to

³²⁵ Brailovsky/Wells II, Section VI.

³²⁶ Brailovsky/Wells I, ¶ 166.

commit substantial financial and personnel resources in order to bring this project into operation.

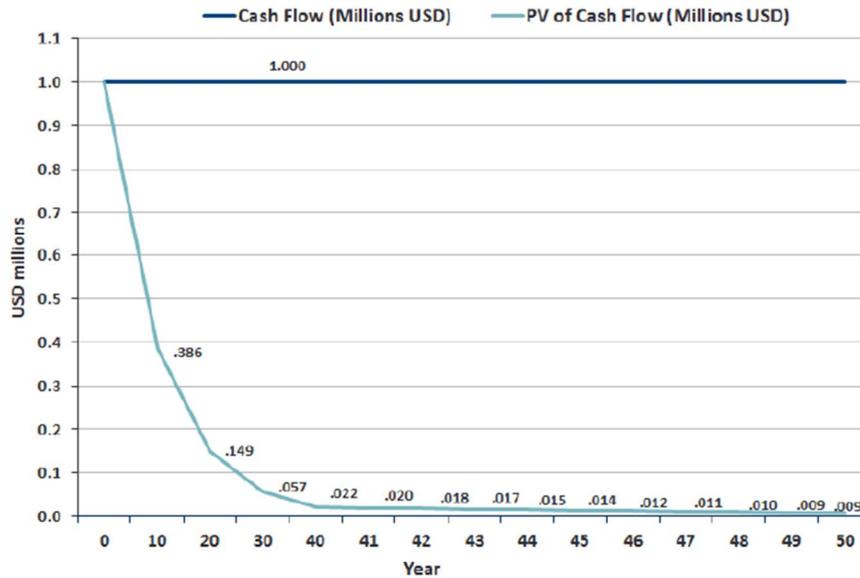
338. In the Tribunal's view, the only reliable indication of the result that a traditional DCF analysis might have produced if it had been performed is Prof. Davis' update of the calculation included in the Expansion Pre-Feasibility. According to Prof. Davis, his update of prices and costs to reflect conditions as of the valuation date yielded a net present value of USD 3.02 billion for Claimant's share of the project.³²⁷ By contrast, the modern DCF method he applied resulted in a net present value of USD 8.5 billion.³²⁸
339. The Tribunal does not consider it established that a traditional DCF calculation conducted for this arbitration would have necessarily produced the same result as the updated calculation from the Expansion Pre-Feasibility Study, which was performed for a different purpose and did not aim at calculating the fair market value of the project. However, given that the Tribunal has not been provided with a traditional DCF calculation, or any other income-based calculation for that matter, it will bear the result of this calculation in mind when verifying whether its conclusion on the value of Claimant's investment is reasonable and reconcilable with other indications of value at the time.
340. As for the modern DCF valuation presented by Claimant, the Tribunal takes note of Prof. Davis' explanation as to why he considers that the modern DCF method is superior to the traditional DCF method specifically for long-life projects in the mining sector. In his view, there are "*four main shortcomings of the traditional DCF method when applied to calculating the fair market valuation of mining projects*": (i) there is no market-based information for the main price and cost drivers of the project for 50 years or more into the future; (ii) there is no reasonable way of knowing how the market would discount the risk in each cash flow for a specific mining project but the standard approach uses market signals from the industry as a whole and uses a constant risk-adjusted discount rate which compounds over the years even though the risk of long-life mining projects is more or less constant over time; (iii) the method underestimates the project's tax cash flows and therefore overestimates net cash flows; and (iv) there is no simulation accounting for the possibility of the project's managers to respond to changing conditions by making appropriate operational decisions.³²⁹
341. In particular with regard to the second alleged shortcoming, Prof. Davis illustrated the effect of using a risk-adjusted, compounding discount rate for a project that expects to receive cash flows over 50 years into the future as follows:

³²⁷ Davis II, ¶ 302.

³²⁸ Davis II, Table 5.

³²⁹ Davis I, ¶¶ 71-80.

**Figure 13. Present Value of a Fixed Cash Flow
When Discounted at a Constant 10% Discount Rate**



Year	0	10	20	30	40	41	42	43	44	45	46	47	48	49	50
Cash Flow (Millions USD)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Discount Factor	1.000	0.386	0.149	0.057	0.022	0.020	0.018	0.017	0.015	0.014	0.012	0.011	0.010	0.009	0.009
PV of Cash Flow (Millions USD)	1.000	0.386	0.149	0.057	0.022	0.020	0.018	0.017	0.015	0.014	0.012	0.011	0.010	0.009	0.009
Cumulative Cash Flows for Years 41-50 (USD):						10,000,000									
Cumulative PV of Cash Flows for Years 41-50 (USD):						135,764									

342. Prof. Davis then explained the advantages of the modern DCF method as follows:

“The modern DCF method overcomes these limitations in cash flow estimation and cash flow risk discounting through two innovations. First, it uses forward market transactions as a signal of market participants’ expectations about future mining prices and costs along with their risk preferences over the uncertainty in those prices and costs. Second, it simulates over a wide range of possible cash flow outcomes in order to correctly capture the varying impacts of taxes and managerial actions on the project’s expected net cash flows. The use of forward markets to assess project cash flow risk is the most profound change, doing away with the overall, exogenously imposed and often highly contentious project level discount rate. In this sense it is a true market-based approach that provides a market asset valuation, exactly what is desired for a FMV.”³³⁰

343. In short, Prof. Davis stated that he applied at-source pricing of risk using forward markets, thereby avoiding the use of a constant risk-adjusted discount rate, and simulated key project variables to capture the impact of taxes and of active management decisions on

³³⁰ Davis I, ¶ 82.

cash flows and thereby project value. As he considers to have included all relevant risks in the cash flows themselves, he discounts the cash flows at the risk-free rate.³³¹

344. Respondent's experts Mr. Brailovsky and Prof. Wells recognized that "*there are elements of the model that are useful, like the probability distributions of several key indicators.*" In their view, however, the model conceals the "*fragility*" of the project because it uses an average of all simulations and ignores, for example, the significant probability of a negative NPV.³³² They also question whether the model actually performs a risk adjustment at source and deny that the projections made by Prof. Davis based on futures prices actually result in risk-adjusted prices and argue that these are in fact higher than non-adjusted price forecasts made by Consensus Economics. On that basis, they also consider it inappropriate to discount the calculated cash flows based on a risk-free rate.³³³ In their view, the lack of adequate risk adjustments is confirmed by a comparison to the studies conducted by SNC Lavalin, in particular the Expansion Pre-Feasibility Study, which undisputedly does not contain at-source risk adjustments.³³⁴ Following further explanation, Mr. Brailovsky and Prof. Wells conclude that "*the valuation presented by Claimant as 'modern' is really very little more than the traditional DCF approach with an inflated price of output and a discount rate equal to the risk-free rate.*"³³⁵
345. It appears to the Tribunal that the main issue in dispute between the Parties' experts is whether the modern DCF method accurately accounts for all the risks associated with a project and whether it is therefore reasonable to discount the risk-adjusted cash flows only for the time value of money, *i.e.*, by using a risk-free rate.
346. Prof. Davis explained that the modern DCF model permits to distinguish between: (i) systematic risks, such as production quantities and copper, gold and oil prices which may go up but may also go down; and (ii) asymmetric risks, such as a terrorist attack on the project which may affect the project without any upside potential. According to Prof. Davis, the modern DCF method accounts for asymmetric risks by adjusting the cash flow components affected by these risks such that they reflect the statistically expected outcome, *e.g.*, a certain probability that a terrorist attack will occur. As for systematic risk, he explained that production quantities in mines generally do not require an adjustment for uncertainty and that for copper and gold prices, the modern DCF can resort to "*very good market signals as to how the market values such risks.*"³³⁶

³³¹ Davis I, ¶ 83.

³³² Brailovsky/Wells I, ¶¶ 76-80.

³³³ Brailovsky/Wells I, ¶¶ 82-84; Brailovsky/Wells II, ¶¶ 58-59.

³³⁴ Brailovsky/Wells I, ¶ 87 and Figure 1; Brailovsky/Wells II, ¶ 59.

³³⁵ Brailovsky/Wells I, ¶ 175.

³³⁶ Davis II, ¶¶ 40-48. Prof. Davis also referred to a third category of risk, *i.e.*, unsystematic risk, but explained that it is a "*fundamental principle of valuation*" that diversification eliminates the need to adjust discount rates for

347. In response to Respondent's argument that the modern DCF method is not used in the mining industry, Prof. Davis referred to a letter sent by the Special Committee of the Canadian Institute of Mining, Metallurgy and Petroleum on Valuation of Mineral Properties (CIMVal) to the International Valuation Standards Council in response to certain questions the latter had raised in a discussion paper in 2012.³³⁷ The Tribunal considers it common ground that CIMVal, which is comprised of experts in mineral project valuation, and that the Standards and Guidelines it issues, reflect international best practices.
348. The Tribunal attaches importance to the CIMVal opinion because it is good evidence of the valuation methodology likely in practice to have been used by an actual buyer in the limited market for large-scale mining enterprises at the relevant time. The Tribunal would observe that it is not engaged in applying rules of valuation claimed to be derived from decisions in other cases. Nor is it concerned with what an expert, however eminent, considers would have been the best method of valuation. Its task is to make the best estimation of what, on the assumption that Respondent had honored its Treaty obligations, would actually have happened if Reko Diq had been offered for sale in the open market. If in practice a buyer was most likely to have adopted the methodology recommended in the CIMVal opinion, it is irrelevant that an expert considers that some other methodology would have been better. The Tribunal therefore considers it worth reviewing the CIMVal opinion on the modern DCF approach in more detail.
349. As for general valuation methods to be used, CIMVal confirmed that for "*Reserves undergoing development*," it most commonly uses or encounters the income approach. For "*Reserves and resources subject to exploration*", it distinguished between early stage exploration properties and more advanced stage exploration properties "*where there is at least a preliminary information on mine design, technical feasibility, and geological information on structure, material amount and metal concentration of the deposit.*"³³⁸ In the Tribunal's view, the Reko Diq project would satisfy at least the definition of an advanced stage exploration property, for which CIMVal most commonly uses or encounters market or income approaches.
350. CIMVal then described two types of income-based approaches: (i) a "*standard*" DCF approach; and (ii) a "*Certainty-Equivalent*" DCF approach, which corresponds to what Prof. Davis has labelled the "*modern DCF*" approach:

unsystematic risks. Davis II, ¶ 45. This category of risks did not form the subject of dispute between the Parties' experts.

³³⁷ Exhibit CE-1483, p. 1.

³³⁸ Exhibit CE-1483, pp. 4-5.

“We generally use the income approach where there is sufficient information available to estimate future cash flows generated by a metals-related investment. ...

An income-based valuation framework is applied across all of these asset-types in a manner that conforms to generally accepted valuation principles and, depending on the situation, is consistent with valuation principles in accounting guidelines such as IFRS. The Discounted Cash Flow (‘DCF’) method is used to adjust cash flow for risk and timing. However, these adjustments may be applied in one of two means. The first follows a standard DCF adjustment where net cash flow is adjusted for risk and time through a discounting process that relies on an aggregate discount rate. The second is a Certainty Equivalent (‘CeQ DCF’) approach where a risk-adjusted net cash flow is calculated by applying a targeted risk adjustment to particular cash flow component (e.g., a pure copper risk adjustment applied to a copper based revenue stream). This risk-adjusted net cash flow is then adjusted for the time value of money and possibly a residual risk adjustment for uncertainties not explicitly accounted in the cash flow model. ... We may then augment our cash flow model by modelling metal price and other uncertainties with a numerical technique (e.g., lattice techniques or simulation) to correct for biases created in a cash flow estimate by contingent cash flow structures the result of risk management, management flexibility, financing and taxation considerations.

We note that the CeQ DCF approach was not discussed in the Exposure Draft of the IVSC Technical Information Paper titled ‘The Discounted Cash Flow (DCF) Method - Real Property and Business Valuations’ even though this method is a recognized DCF method for fair value estimates under accounting guidelines and well supported in valuation and finance theory literature. CeQ DCF is one of the approaches described in IFRS 13. We would highlight that the structure of the CeQ DCF approach is comparable to derivative valuation methods used to value many financial assets and is used for select types of real assets such as natural resource projects.”³³⁹

351. Following a description of other approaches, CIMVal concluded:

“Our experience has been that all of these methods provide valuation results that are supportable when applied with professionalism and discipline. We generally do not use a particular method in isolation and generally confirm the results from one approach with the results from a second approach.

We commonly use DCF and comparable transactions (market approach) for producing reserves, reserves undergoing development and for reserves subject to exploration (whatever that means). For resources, we generally use comparable transactions and for exploration properties without reserves or resources, we use comparable transactions and the cost approach. As a

³³⁹ Exhibit CE-1483, pp. 5-6.

valuator, these methods make the most sense and provide reasonable valuations that seem to reflect the market.”³⁴⁰

352. In the context of a more detailed description of its practice in using inputs for a DCF calculation, CIMVal noted that “[v]ery long-life base metal asset may require that long-term cash flows be explicitly modeled with a CeQ DCF approach because of price reversion in base metal prices (i.e. the tendency of metal price to revert to a long-term equilibrium level). This approach may be used if in the particular situation a standard DCF model with aggregate risk adjustments to the net cash flow has difficulty recognizing the explicit risk characteristics of a cash flow stream.”³⁴¹

353. As for the use of forward price curves that Prof. Davis used to derive price inputs for his model, CIMVal stated:

“We believe that in appropriate circumstances a commodity price forecast may be derived from its forward price curve. A forward price is the price at which two parties agree to sell or buy a set amount of commodity at a specific time in the future. The forward price is considered a risk-adjusted expected price since a party choosing to buy or sell a commodity in the future would first need to estimate what the spot price might be and then adjust this estimated price for variance around the forecast (i.e., applying a risk adjustment). The risk adjustment is used to back out a forecast commodity price from a forward curve based on the Capital Asset Pricing Model (‘CAPM’).”³⁴²

354. CIMVal noted that “some mining professionals oppose the use of forward curves in metal price forecasts. This opposition is often supported by citing concerns about liquidity, incomplete forward curves, or the observation that a forward price is a mathematical calculation.” It explained, however, that “these reasons do not prevent the use of forward curves in generating a price forecast since they would also invalidate the use of derivative methods when generating cash flows and estimating value in a wide range of valuation problems.” It noted that the decision on which information should be used is made on the facts and circumstances of the valuation problem. It further confirmed that “[m]etal price forecasts based on the forward curve may be extended beyond the publicly quoted prices based on the characteristics of the metal (base metal or precious metal) and the market characteristics of the forward curve.”³⁴³

355. In the Tribunal’s view, the statements made by CIMVal in its detailed response to the International Valuation Standards Council are a strong indication that, contrary to Respondent’s allegation, the certainty-equivalent or modern DCF method applied by Prof. Davis is a recognized valuation method which is used in the industry for valuing

³⁴⁰ Exhibit CE-1483, p. 6.

³⁴¹ Exhibit CE-1483, pp. 7-8.

³⁴² Exhibit CE-1483, p. 8.

³⁴³ Exhibit CE-1483, p. 8.

mining properties in the appropriate circumstances. The Tribunal also considers that the explanation provided by CIMVal confirms Prof. Davis' statement as to why the application of the modern DCF method is reasonable and preferable over a traditional DCF method for the valuation of the Reko Diq project in the present circumstances. The Feasibility Study envisaged a 56-year life of the mine.³⁴⁴ As indicated in Prof. Davis' illustration of cash flows calculated under the traditional DCF method, cash flows to be generated forty years into the future would have almost no net present value if they were discounted by a constant, compounding discount rate incorporating all types of risk that may affect the project. This issue, *i.e.*, that this treatment of risk does not capture the actual amount of risk because cash flows actually do not become more risky over time but the risk level remains more or less constant over the life of the mine because base metal prices tend to revert to a long-term equilibrium level, was specifically identified by CIMVal as one of the reasons that "*may require*" the use of a certainty-equivalent or modern DCF approach as it was applied by Prof. Davis in the present case.

356. From the Tribunal's perspective, it further makes sense to distinguish between different types of risk and adjust each cash flow component directly for the risks that affect this particular cash flow. While this approach may be associated with some uncertainties, *e.g.*, regarding the projection of future metals prices, CIMVal pointed out that these uncertainties also affect the traditional DCF method and therefore do not justify rejecting this method or the use of risk-adjusted prices. In the Tribunal's view, any remaining uncertainties associated with the adjustment of risks at source are controllable by making reasonable, and perhaps conservative, assumptions and they are preferable to applying a discount rate that results in almost no net present value for cash flows that would be generated in the second half of the mine's life.

357. In this regard, the Tribunal also takes note of Prof. Davis' oral testimony in response to the question whether the approach he had presented would actually have been used in the market at the relevant time, *i.e.*, at the valuation date. Mr. Davis responded that it is a known problem in the industry that the traditional income approach produces results which the valuer knows to be wrong and that the discount rate is therefore lowered or the result multiplied if the number is biased low or the other way around if the number is biased high. He explained that the industry had a demand for valuing an asset of whose value they had an idea but did not have a tool to get to that value.³⁴⁵ Prof. Davis concluded his answer by stating:

"So, I believe these market participants get to their \$8.5 billion just in this case by looking at, perhaps, the traditional and perhaps, the modern. The

³⁴⁴ Exhibit CE-97 / RE-576/1, p. 1-2 and Table 1.2.

³⁴⁵ Transcript Hearing on Quantum, p. 2371 line 8 to p. 2372 line 14.

modern just is a more direct, I would say, an accurate way of getting to that number without having to do these little fixes... -- as opposed to the traditional."³⁴⁶

358. While Respondent takes the position that this testimony confirms that the modern DCF approach permits Claimant to arrive at a predetermined value, the Tribunal considers that the opposite is in fact the case. Prof. Davis explained that the methodology he uses has been developed precisely in order to avoid the practical "fixes" that are sometimes used the industry in order to arrive at a value within the range of what they consider reasonable. Specifically in the present case, the method does away with the need to "fix" the fact that a compounding risk-adjusted discount rate eliminates any net present value of cash flows in the second half of the mine's life by instead using a scientific approach to adjust the risk at source.
359. The Tribunal is aware of Respondent's argument, which appears to be undisputed by Claimant, that the certainty-equivalent or modern DCF approach has so far not been adopted by any investment arbitration tribunal in determining the amount of damages owed to a claimant that suffered an expropriation of a mining project. It further appears to be undisputed that there was only one case in which a modern DCF approach was presented by one of the parties, *i.e.*, by the respondent in *Bear Creek v. Peru*. In that case, it was presented as a comparison to the traditional DCF calculation presented by the claimant. As the tribunal in that case did not consider it appropriate to value the claimant's investment based on an income-based methodology, it did not express an opinion on the modern DCF approach.
360. In any event, however, the Tribunal considers that the absence of investment treaty jurisprudence – affirmative or negative – does not in itself constitute a valid ground for rejecting a valuation method if the Tribunal is otherwise convinced that it is sound to apply it in the present case. As valuation practices for mineral properties develop in the industry itself, the assessment of damages may likewise evolve in investment treaty arbitration. As correctly pointed out by Claimant, the use of the traditional DCF method was even rejected in early jurisprudence but then became more and more common and established for the assessment of damages in investment treaty arbitration. The Tribunal also recalls that the appropriate valuation method can only be selected in the circumstances of each individual case and based on the submissions and evidence brought before the respective tribunal.
361. Based on its review of the evidentiary record, the Tribunal concludes that it is appropriate to value Claimant's investment in the Reko Diq project by using the modern DCF approach presented by Claimant and its expert Prof. Davis. This does not yet mean that it

³⁴⁶ Transcript Hearing on Quantum, p. 2372 line 16 to p. 2373 line 2.

also agrees with Prof. Davis that each of the risk adjustments he has made is sufficient to account for the risks and uncertainties raised by Respondent. These aspects will be addressed in more detail below.

362. The Tribunal will also assess whether Prof. Davis has used reasonable inputs to account for systematic risks, in particular regarding the development of copper and gold prices. The Tribunal notes that CIMVal generally supports the use of forward curves, including their extension beyond publicly quoted prices. The Tribunal therefore does not follow Respondent's general rejection of using forward curves as a basis for projecting risk-adjusted prices. However, the Tribunal will assess whether it is established that the risk adjustment made by Prof. Davis is sufficient. In that context, the Tribunal will also address the comparison drawn by Respondent's experts to the DCF calculation in the Feasibility Study and Expansion Pre-Feasibility Study which undisputedly used non-adjusted prices.

363. In addition, the Tribunal will address the argument raised by Respondent and its expert that it was incorrect for Prof. Davis to use a risk-free rate to discount the cash flows because these cash flows are not, or at least not fully, adjusted for risk. In this regard, the Tribunal also takes note of CIMVal's explanation in the context of selecting discount rates for valuing reserves and resources that the certainty-equivalent DCF approach "*does not make use of an aggregate discount rate though an implied aggregate discount rate can be derived*" but instead "*uses targeted risk-adjustments for select cash flow components. These adjustments are done within the CAPM framework. Market related uncertainties such as metal and energy prices are risk-adjusted with the CAPM while project-specific uncertainties may be modelled directly with no risk-adjustment.*"³⁴⁷ At the same time, CIMVal stated:

*"A residual risk adjustment may be necessary to adjust previously risk-adjusted cash flows for risk not explicitly recognized in the model before a final adjustment for the time value of money. The residual risk adjustment is similar in nature to a Credit Valuation Adjustment applied in derivative valuation for counter-party risk."*³⁴⁸

364. As confirmed by CIMVal, the Tribunal agrees with Prof. Davis that it is, in principle, consistent to use a risk-free rate which discounts cash flows only for the time value of money, if they have already been fully adjusted for risk. However, in line with the explanation provided by CIMVal, the Tribunal will assess whether it may be necessary to apply a residual risk adjustment for risk not explicitly or not sufficiently recognized in Prof. Davis' model.

³⁴⁷ Exhibit CE-1483, pp. 10-11.

³⁴⁸ Exhibit CE-1483, p. 11.

365. Finally, the Tribunal maintains and considers its opinion confirmed by CIMVal, which explained that generally a valuation method should not be used in isolation but should be confirmed by the results of a second approach. As already noted above, the Tribunal has not been presented with many alternatives for this purpose. It will nevertheless verify at the end of its analysis whether the conclusion it has reached based on the modern DCF approach used by Prof. Davis is reconcilable with the other valuations and/or indications of value of the project that have been brought before this Tribunal.

C. Impact of the Risks and Issues Raised by Respondent on the Feasibility of the Project and/or the Value of Claimant's Investment

366. Having determined the relevant legal standards, the Tribunal will now assess whether Claimant has established that it would have concluded a Mineral Agreement with the Federal and Provincial Governments and, if so, the terms on which such an agreement would likely have been concluded. The Tribunal will further examine whether Claimant has established the feasibility of the project and address the various risks and issues raised by Respondent in this last phase of the arbitration proceedings. As the Tribunal has decided, in principle, to follow the valuation method relied on by Prof. Davis, it will also assess whether Prof. Davis has appropriately accounted for each of these risks in his valuation of the project.

367. The Tribunal will address each of these issues in turn.

1. Whether Claimant Has Established That It Would Have Concluded a Mineral Agreement with the Governments on the Terms Assumed in the Valuation

368. First, the Tribunal will assess whether Claimant has established that it would have concluded a Mineral Agreement with the Provincial and Federal Governments and, if so, whether this Agreement would have been concluded on the terms that Prof. Davis was instructed to assume in his valuation.

a. Summary of Claimant's Position

369. Claimant takes the position that if the Governments had continued to negotiate in good faith, the parties would have entered into a "*mutually beneficial and commercially reasonable*" Mineral Agreement and the question remained only on what terms.³⁴⁹ According to Claimant, an agreement would most likely have been reached in 2009 but, in any event, "*almost certainly*" after Claimant had secured the mining lease because, as found by the Tribunal, it would have been in "*a far better bargaining position as holder of the mining lease over the area than it was before*" and there would have been "*a mutual*

³⁴⁹ Claimant's Quantum Memorial, ¶ 48; Claimant's Quantum Post-Hearing Brief, ¶¶ 229, 235.

interest to achieve agreement on the remaining issues.”³⁵⁰ Claimant further claims that the fiscal terms included in Prof. Davis’ model are “*a fair basis for estimating the terms that would have applied to the Reko Diq project*” in the absence of Balochistan’s unlawful decision “*not to go ahead with the proposed Mineral and Shareholders agreements with TCCP.*”³⁵¹

370. Claimant notes that before the takeover decision, the parties made progress in the Mineral Agreement negotiations and all three parties were committed to reaching “*a mutually agreeable deal.*” Claimant points out that “*Pakistan’s key negotiator,*” Mr. Khokhar, stated in March 2009 that “*about 85% work on [the draft Mineral Agreement] has been completed.*”³⁵² Claimant also rejects the allegation that TCCA backed away from negotiations in October 2008, which it considers to be contradicted by the contemporaneous record, and points to a number of proposals, which it continued to make in 2009, such as: (i) an enhanced sliding-scale royalty; (ii) “*a custom suite of tax concessions*” instead of the EPZ regime; (iii) restructuring of Balochistan’s interest as a net profit interest; (iv) payment of USD 1 million towards a feasibility study for Balochistan’s proposed smelter; and (v) a Social Investment Plan involving an investment of USD 100 million.³⁵³
371. Claimant adds that that while it continued to engage with the Governments and make updated proposals until October 2010, the Governments had decided to develop their own project and, as the Tribunal already found, after the takeover decision, “*no actual negotiations took place but only high-level meetings in which Claimant was assured that there was no competing project.*”³⁵⁴ According to Claimant, “[t]he documentary record thus leaves no doubt that the failure of the negotiations is directly attributable to Balochistan’s illegal takeover decision.”³⁵⁵
372. Claimant rejects the argument that it impaired the negotiations through “*its own heavy-handed actions*” or that it asked federal officials to force the GOB into an agreement or that it sought to “*push the GoB aside.*” It also denies that the concessions it was seeking were aimed at eliminating the application of the 2002 BM Rules. In addition, Claimant rejects the allegation that it had abandoned the negotiations or did not expect a Mineral

³⁵⁰ Claimant’s Quantum Memorial, ¶ 58, quoting from Draft Decision on Jurisdiction and Liability, ¶ 1235 (Decision on Jurisdiction and Liability, ¶ 1239).

³⁵¹ Claimant’s Quantum Reply, ¶ 156, quoting from **Exhibit CE-31**, p. 16 (emphasis in original).

³⁵² Claimant’s Quantum Memorial, ¶ 47; Claimant’s Quantum Reply, ¶ 157, quoting from **Exhibit CE-338**.

³⁵³ Claimant’s Quantum Reply, ¶ 158.

³⁵⁴ Claimant’s Quantum Reply, ¶¶ 159-161, quoting from Decision on Jurisdiction and Liability, ¶ 1148.

³⁵⁵ Claimant’s Quantum Reply, ¶ 162.

Agreement given the uncertainty recognized in the Feasibility Study, arguing that this risk assessment was made after Balochistan had already decided to take over Reko Diq.³⁵⁶

373. Claimant argues that at the time the negotiations were abandoned due to the takeover decision of the GOB, the parties had already reached agreement “*on the most fundamental issue, namely that the fiscal regime could and would be stabilized.*” Claimant bases this argument on contemporaneous statements made by the Steering Committee for the Development of Reko Diq Gold-Copper Project (the “**Steering Committee**”) as well as by Mr. Khokhar and contends that “[t]here is no evidence that Balochistan ever changed its position on stability following that agreement.”³⁵⁷ According to Claimant, entering into a stability agreement would also have been consistent with assurances received by Claimant from “*the highest levels of Government*” as well as the Governments’ history and policy of entering into similar agreements with other investors.³⁵⁸
374. Claimant also submits that its proposals were based on the understanding that the Governments intended to further modernize their regulatory regime and notes that the amendments it had proposed in the negotiations were in fact implemented in the 2013 National Mineral Policy which declared that mineral agreements should have “*overriding effect in case anything contained therein is inconsistent with any law or rules subsequently amended*” and provided that “[t]he existing Mineral Rules will be amended to remove any conflict/overlapping with or other effect on, and to give effect to, the rights and obligations of the mining company under the mineral agreement in line with best international practices.”³⁵⁹ Claimant points to the Tribunal’s previous finding that in the negotiations, Claimant desired “*to correct a ‘defect’ in the 2002 BM Rules,*” which was then “*identified and corrected ... in [the] 2013 NMP.*”³⁶⁰
375. According to Claimant, stabilization of the fiscal regime “*was its primary objective and was far more important than any single concession.*” Claimant argues that once it had secured stability, it was willing to compromise on specific tax and royalty rates and would therefore have reached a “*mutually beneficial agreement*” with the Governments.³⁶¹
376. Claimant adds that once it would have received a Mining Lease, the Governments would have had “*a strong incentive*” to negotiate and refers to the Tribunal’s finding in its

³⁵⁶ Claimant’s Quantum Reply, ¶¶ 163-167.

³⁵⁷ Claimant’s Quantum Post-Hearing Brief, ¶¶ 230-231, quoting from **Exhibit RE-717**, ¶ 4(i) and **Exhibit CE-942**, pp. 10, 3. See also Claimant’s Quantum Memorial, ¶¶ 47, 59, quoting from **Exhibits RE-64**, p. 2 and **RE-145**, p. 2

³⁵⁸ Claimant’s Quantum Memorial, ¶¶ 49-52

³⁵⁹ Claimant’s Quantum Memorial, ¶ 54; Claimant’s Quantum Post-Hearing Brief, ¶ 231, quoting from **Exhibit CE-416**, ¶ 7.8.2.

³⁶⁰ Claimant’s Quantum Reply, ¶ 165, quoting from Decision on Jurisdiction and Liability, ¶ 961.

³⁶¹ Claimant’s Quantum Post-Hearing Brief, ¶ 232.

Decision on Jurisdiction and Liability in this regard.³⁶² Claimant further refers to its financial expert Mr. Pingle who testified that “[t]he involvement of the Development Finance Institutions and the Export Credit Agencies ... facilitates resolutions of some of the outstanding issues ... like the tax regime.”³⁶³ In Claimant’s view, the absence of a Mineral Agreement on the valuation date would therefore not have been fatal to the project.³⁶⁴

377. Claimant rejects the argument that under rule 46(2) of the 2002 BM Rules, its right to negotiate a mineral agreement would have expired three months after the issuance of the Mining Lease. It argues that the three-month period starts only once the Mineral Agreement is “*present[ed] for signature,*” regardless of when the Mining Lease is issued.³⁶⁵
378. As for the fiscal terms of the Mineral Agreement that its expert Prof. Davis used in its model, Claimant contends that these were the terms on which the Governments and TCC would likely have agreed but for the Governments’ takeover and abandonment of negotiations: (i) a 2% provincial royalty; (ii) EPZ status for the first 15 years followed by the normal tax regime; (iii) extension of TCCP’s mining lease for the life of the mine; and (iv) participation by Balochistan through a 25% Net Profit Interest. Claimant argues that these terms are supported by the progress that the parties had already made in the negotiations and the concessions granted to other projects in Balochistan.³⁶⁶
379. According to Claimant, the parties had already agreed in the negotiations that the mining lease would be renewed for the life of the mine. Claimant refers to Balochistan’s proposal to constrain its discretion under the 2002 BM Rules such that a second term “*shall not be unreasonably withheld.*”³⁶⁷ In Claimant’s view, the GOB gave no indication that the first term would be shorter than thirty years and that it would not extend the lease for the life of the project “*absent good reason,*” thereby creating a presumption in favor of renewal.³⁶⁸ It claims that in subsequent face-to-face negotiations, Balochistan “*went a step further*” and agreed to renew the mining lease for the life of the mine as confirmed by contemporaneous correspondence and negotiation minutes as well as the witness

³⁶² Claimant’s Quantum Post-Hearing Brief, ¶ 233, quoting from Decision on Jurisdiction and Liability, ¶ 1239.

³⁶³ Claimant’s Quantum Post-Hearing Brief, ¶ 234, quoting from Transcript Hearing on Quantum (Day 7), pp. 2126-2127. See also Claimant’s Quantum Reply, quoting from Pingle, ¶¶ 216, 213.

³⁶⁴ Claimant’s Quantum Reply, ¶ 169.

³⁶⁵ Claimant’s Quantum Reply, ¶ 168, quoting from **Exhibit RE-1**, rule 46(2).

³⁶⁶ Claimant’s Quantum Post-Hearing Brief, ¶¶ 236-237.

³⁶⁷ Claimant’s Quantum Reply, ¶ 190; Claimant’s Quantum Post-Hearing Brief, ¶¶ 238-239, quoting from **Exhibit CE-226**, clause 14.2.1(iii).

³⁶⁸ Claimant’s Quantum Reply, ¶¶ 191-193.

testimony of Ms. Boggs.³⁶⁹ In addition, Claimant refers to the GOB's obligation under the CHEJVA to provide "*appropriate administrative support as required for the obtaining all leases ... being necessary for the conduct of Joint Venture Activities*" and considers that a refusal to renew the Mining Lease would also have been contrary to the GOB's contractual obligations as well as to Claimant's legitimate expectation that the license would be renewed.³⁷⁰ Claimant further submits that mining lease renewal is common in the mining industry because a lack of security of tenure would disincentivize the lease holder from making further investments and the bidding process for a new operator can be time-consuming and costly – without any guarantee of finding a suitable candidate willing to enter into an agreement more favorable to the Government. According to Claimant, Governments therefore generally allow investors the option for renewal.³⁷¹ Claimant further argues that it would have been "*entirely reasonable*" for Balochistan to agree to the renewal "*to ensure an uninterrupted flow of revenue to the Province from the project.*"³⁷²

380. Claimant further considers it likely that the Reko Diq project would have received EPZ status "*or its functional equivalent,*" at least during the "*initial capital-intensive*" years of the project. Claimant emphasizes that each of the other mining projects in the region had received EPZ status: the Tanjeel project proposed by Mincor Resources NL ("**Mincor**") in 2004; the Duddar and Saindak projects in 2001 and 2004, respectively (both extended beyond their initial ten-year term); and Balochistan's competing Reko Diq project. Claimant rejects the argument that it abandoned its request for EPZ status in negotiations and argues that it was willing to explore alternatives but continued to believe that it would receive "*certain of the benefits of an EPZ regime.*"³⁷³ According to Claimant, the final package of concessions could have been "*a custom suite of modifications to the normal tax regime rather than an EPZ designation,*" but maintains that the "*combined tax regime*" assumed by Prof. Davis is "*a reasonable approximation*" of the fiscal terms on which the parties would likely have agreed.³⁷⁴ Claimant further argues that if Balochistan had remained "*a true partner to TCC,*" it would have advocated for EPZ status because it stood to gain from it, as Balochistan itself argued in its submissions before the

³⁶⁹ Claimant's Quantum Post-Hearing Brief, ¶ 239, quoting from **Exhibits CE-238**, p. 3 and **CE-942**, p. 13; Claimant's Quantum Memorial, ¶ 72; Claimant's Quantum Reply, ¶ 194, quoting from Boggs V, ¶ 48.

³⁷⁰ Claimant's Quantum Memorial, ¶¶ 73, 76, quoting from **Exhibit CE-1**, clause 24.6.2.

³⁷¹ Claimant's Quantum Reply, ¶ 195, quoting from Boggs V, ¶¶ 49-50.

³⁷² Claimant's Quantum Post-Hearing Brief, ¶ 240, quoting from Boggs V, ¶ 49. See also Claimant's Quantum Memorial, ¶ 74, quoting from Boggs V, ¶ 50.

³⁷³ Claimant's Quantum Post-Hearing Brief, ¶¶ 241-243, quoting from **Exhibit RE-145**, p. 3; Claimant's Quantum Memorial, ¶¶ 66-68; Claimant's Quantum Reply, ¶¶ 176, 178.

³⁷⁴ Claimant's Quantum Reply, ¶ 777.

Balochistan High Court.³⁷⁵ As for Pakistan, Claimant points out that the Federal Government was interested in encouraging foreign direct investment in the extractive industry as well as in improving relations with Balochistan. In addition, it would have received significant tax revenues after the expiration of the EPZ term – according to Prof. Davis’ calculations nearly 30% of the project’s cash flows. Furthermore, Claimant considers that the EPZ regime was specifically intended for projects like the Reko Diq project, which it considers to be “*ideal candidate for EPZ status*” as it “*promised to provide employment and a boost to Pakistan’s exports.*”³⁷⁶ Claimant also submits that granting EPZ status would have been consistent with specific assurances it received from the highest levels of the GOP.³⁷⁷

381. Finally, Claimant claims that the parties would most likely have agreed on a stabilization of the provincial royalty at a rate of 2%. In Claimant’s view, Mr. Khokhar confirmed during the Hearing on Quantum that while the royalty rate was raised to 5% in 2009, the Duddar project continued to pay 2% because Balochistan was “*getting something good*” in exchange.³⁷⁸ According to Claimant, the offer it made to Balochistan in the negotiations, *i.e.*, to replace its equity interest under the CHEJVA by a Net Profit Interest while capping the royalty at 2%, was “*expressly modeled on the arrangement that existed between Balochistan and Duddar,*” and if Balochistan had been acting in good faith, it would have agreed to this offer.³⁷⁹ Claimant claims that, like its earlier sliding scale proposal which was made before the parties turned to restructuring Balochistan’s interest, its net profit interest (“NPI”) proposal was “*a good deal for Balochistan*” because the Net Profit Interest would have increased its economic return, eliminated the financial risks associated with its equity interest under the CHEJVA and provided it with advance minimum payments from the outset of production. It further points out that Balochistan could have rejected the proposal and opted not to participate in the project, thereby receiving only an “*enhanced royalty*” of 5%, which would have diminished its revenue from nearly USD 5 billion to less than USD 2.2 billion.³⁸⁰ Claimant also notes that, like all of its proposals, the NPI proposal was “*up for negotiation*” and in case some of its terms were unacceptable to Balochistan, it could have requested adjustments. In

³⁷⁵ Claimant’s Quantum Memorial, ¶ 70; Claimant’s Quantum Reply, ¶ 179; Claimant’s Quantum Post-Hearing Brief, ¶ 244, quoting from **Exhibit CE-212**, p. 12, ¶ 13.

³⁷⁶ Claimant’s Quantum Memorial, ¶¶ 68, 71; Claimant’s Quantum Reply, ¶ 180; Claimant’s Quantum Post-Hearing Brief, ¶¶ 245-246, referring to Davis II, Table 5.

³⁷⁷ Claimant’s Quantum Memorial, ¶ 69.

³⁷⁸ Claimant’s Quantum Post-Hearing Brief, ¶¶ 247-248, quoting from Transcript Hearing on Quantum (Day 3), p. 667.

³⁷⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 249. See also Claimant’s Quantum Reply, ¶ 181, referring to “[c]omparison of existing, Duddar and TCC proposal” in **Exhibit C-236**, p. 8, which refers to a “*Cap at 2%*” for the provincial royalty.

³⁸⁰ Claimant’s Quantum Post-Hearing Brief, ¶¶ 251-252, referring to Davis II, Table 10; Claimant’s Quantum Memorial, ¶¶ 62-64.

Claimant's view, it is therefore reasonable to assume that Balochistan would either have accepted the proposal or, "*at the very least, responded to it with a reasonable counter-proposal.*"³⁸¹

382. In response to Respondent's additional challenge to the manner in which Claimant has calculated the royalty, Claimant refers to rule 102 of the 2002 BM Rules which provides that royalty shall be charged on "the fair market value of any mineral" which is in turn defined as "*the sale price ... determined by reference to the first point at which [the mineral] was disposed of [in a sale at arm's length], without allowing for any deductions from the gross amount so determined.*"³⁸² According to Claimant, this corresponds to the net smelter return used as a basis by Prof. Davis, which is calculated as a percentage of the price paid by the smelter at the Port of Gwadar which reflects the smelter's transportation costs but none of Claimant's costs.³⁸³ Claimant also points to the definition of "*Sales Proceeds*" in the drafts of the Mineral Agreement exchanged by both sides.³⁸⁴
383. Claimant concludes that it is for the Tribunal to determine what the outcome of the Mineral Agreement negotiations would have been and points to a series of sensitivity analyses conducted by Prof. Davis that include alternative fiscal regimes and a non-renewal of the Mining Lease.³⁸⁵ Claimant maintains, however, that it would be inconsistent with the Tribunal's finding that the Mineral Agreement negotiations failed as a direct consequence of Balochistan's unlawful takeover decision if the Tribunal were now to conclude that no agreement would have been reached.³⁸⁶
384. In addition, Claimant argues that any uncertainty regarding the fiscal terms should be resolved in favor of TCCA because it is due to the Government's unlawful conduct and, in addition, Respondent's "*procedural misconduct regarding these very issues, in particular Pakistan's deliberate defiance of the Tribunal's disclosure orders*" regarding documents concerning the Saindak and Duddar mines. Claimant maintains its request for appropriate adverse inferences and adds that, even without specifically drawing these inferences, the Tribunal "*should at the very least take into account Pakistan's misconduct and its thwarting of the evidentiary process when it evaluates the record and determines what fiscal terms the parties would have agreed but for Pakistan's and Balochistan's unlawful acts.*"³⁸⁷

³⁸¹ Claimant's Quantum Reply, ¶¶ 174-175.

³⁸² Claimant's Quantum Reply, ¶ 186, quoting from **Exhibit RE-1**, rule 102.

³⁸³ Claimant's Quantum Reply, ¶ 186.

³⁸⁴ Claimant's Quantum Reply, ¶ 187, quoting from **Exhibits CE-216**, Article 17.1 and **CE-226**, Article 17.1 and quoting from the definition of "*Sales Proceeds*" as being "*calculated after deducting all costs incurred in connection with the sale and excluding any octroi, sales or other indirect Taxes relating thereto.*"

³⁸⁵ Claimant's Quantum Reply, ¶¶ 201-203; Claimant's Quantum Post-Hearing Brief, ¶¶ 253-255, referring to Davis II, Tables 10 and 11.

³⁸⁶ Claimant's Quantum Post-Hearing Brief, ¶ 256.

³⁸⁷ Claimant's Quantum Post-Hearing Brief, ¶¶ 257-260, 170. See also Claimant's Quantum Reply, ¶¶ 182-183.

b. Summary of Respondent's Position

385. Respondent emphasizes that the Tribunal has not made any finding that Claimant had a legitimate expectation to conclude a Mineral Agreement and argues that there was no specific commitment to this effect nor were the Governments under a legal obligation to conclude a Mineral Agreement. Respondent submits that rule 9 of the 2002 BM Rules prohibited the parties from entering into a mineral agreement inconsistent with “*any other law*” and argues that Claimant therefore could not expect to gain exemptions from legal requirements such as permitting or approvals. In addition, Respondent claims that by raising unreasonable demands, Claimant “*undermined any ability to reach a deal on a mineral agreement*” and “*created the problems it now bemoans.*”³⁸⁸
386. Respondent further takes the position that “[g]iven the lengthy history or stalled negotiations and distant positions, the most likely outcome would be that no mineral agreement would have been agreed whatsoever.” It notes that a Mineral Agreement was not necessary to operate a mine in Balochistan and submits that it was within the discretion of both Governments, independently from one another, whether to grant certain benefits in return for benefits to the State.³⁸⁹ At the same time, Respondent contends that the absence of a finding that a Mineral Agreement would have been concluded would render the value of Claimant’s plan to mine Reko Diq speculative.³⁹⁰
387. Respondent argues that at the relevant time, Claimant was aware of the risk that no Mineral Agreement would be concluded and categorized the “*Inability to Negotiate Mineral Agreement*” as a “*high risk*” with a likelihood of 0.375 in the risk register of the Feasibility Study, which would have resulted in “*NO PROJECT.*” According to Respondent, this shows that the failure to obtain a Mineral Agreement would not only have made the project less valuable but rather “*could doom the entire project.*”³⁹¹
388. As for the terms put forward by Claimant, Respondent submits that: (i) Pakistan would not have agreed to a royalty rate below the minimum of 5% required by law; (ii) Pakistan never agreed to grant EPZ status and Claimant abandoned this request during negotiations; (iii) the parties “*were nowhere close to agreeing to the overall fiscal regime*”; and (iv) the Governments “*roundly rejected*” a provision providing for an

³⁸⁸ Respondent’s Counter-Memorial on Quantum, ¶¶ 135, 144, quoting from **Exhibit RE-1**, rule 9(5); Respondent’s Post-Hearing Brief of Quantum, ¶¶ 21-22.

³⁸⁹ Respondent’s Post-Hearing Brief of Quantum, ¶¶ 20-25; Respondent’s Counter-Memorial on Quantum, ¶¶ 133-134; Respondent’s Rejoinder on Quantum, ¶ 109.

³⁹⁰ Respondent’s Counter-Memorial on Quantum, ¶ 130.

³⁹¹ Respondent’s Counter-Memorial on Quantum, ¶ 136; Respondent’s Rejoinder on Quantum, ¶ 110; Respondent’s Post-Hearing Brief of Quantum, ¶ 26, quoting from **Exhibits RE-576-20.01**, p. 22 and **RE-576-30**, p. 30-13.

automatic renewal of the 30-year mining lease.³⁹² In addition, Respondent submits that the Governments focused on Claimant presenting a value addition in the form of downstream processing facilities. According to Respondent, the terms of a Mineral Agreement – if one had been concluded at all – would have been “*far more favorable to Pakistan.*”³⁹³

389. In this regard, Respondent emphasizes that the Governments were not willing to accept whatever terms Claimant suggested but they “*wanted a fair deal, and they were willing to walk away from the table if TCC would not give it to them.*” According to Respondent, the Governments were also conscious of creating precedents for other investors that would request similar exemptions or concessions if these were granted to Claimant.³⁹⁴ Further, Respondent emphasizes that the differences between the parties arose already in 2008, *i.e.*, before the alleged takeover decision taken by the GOB.³⁹⁵
390. Respondent submits that the 5% royalty rate was codified in June 2009 and Barrick acknowledged in its annual report of 2009 that Claimant would have had to pay this rate by law. In Respondent’s view, this shows that both Pakistan and Claimant expected that it would have to pay the 5% rate.³⁹⁶ Respondent submits that other companies were also “*assessed the 5% rate*” and Claimant failed to show that Saindak paid any lower rate while Respondent showed that it paid the 5% rate. Similarly, Respondent considers that it provided information on the royalty rate paid by Duddar.³⁹⁷ Respondent also considers it confirmed by Ms. Boggs’ testimony as well as contemporaneous meeting minutes that no agreement had been reached on the application of a 2% royalty rate and that Claimant never expected that it would pay less than the legal rate.³⁹⁸ Respondent further maintains that the Governments “*were unwilling to accept anything below a 5% royalty*” which, according to Respondent, represented the floor rather than the ceiling of their position because a higher royalty rate was necessary to “*defuse political unrest and resistance to the project in Balochistan.*” In this regard, Respondent points to Mr. Lehri’s proposal in October 2008 that the royalty rate increase from 5% during the first ten years to 5.5% for the next ten years and ultimately 6% for the remainder of the project.³⁹⁹ According to

³⁹² Respondent’s Post-Hearing Brief of Quantum, ¶ 27.

³⁹³ Respondent’s Counter-Memorial on Quantum, ¶ 149; Respondent’s Post-Hearing Brief of Quantum, ¶ 29.

³⁹⁴ Respondent’s Counter-Memorial on Quantum, ¶ 139.

³⁹⁵ Respondent’s Counter-Memorial on Quantum, ¶ 148.

³⁹⁶ Respondent’s Rejoinder on Quantum, ¶ 116; Respondent’s Post-Hearing Brief of Quantum, ¶ 31, *referring to Exhibit RE-141*.

³⁹⁷ Respondent’s Counter-Memorial on Quantum, ¶ 141; Respondent’s Rejoinder on Quantum, ¶¶ 112-113, *referring to Exhibits RE-582 and RE-714*; Respondent’s Post-Hearing Brief of Quantum, ¶ 32.

³⁹⁸ Respondent’s Post-Hearing Brief of Quantum, ¶¶ 33-34, *quoting from* Transcript Hearing on Quantum (Day 2), p. 455 lines 11-13, p. 466 lines 19-20 and p. 424 lines 3-12 *and Exhibit CE-942*.

³⁹⁹ Respondent’s Counter-Memorial on Quantum, ¶ 156, Respondent’s Rejoinder on Quantum, ¶ 115; Respondent’s Post-Hearing Brief of Quantum, ¶ 35, *quoting from Exhibit CE-942*, p. 3.

Respondent, Claimant was aware at the time that there was no room for its NPI proposal including a 2% royalty rate because it internally acknowledged a need “*to refocus away from the 25% and 2%.*”⁴⁰⁰ Respondent also points to Ms. Boggs’ testimony that she “*assumed that we would probably end up with something between what we had originally proposed, 2 percent, what they had proposed, 5 percent and a sliding scale*” but maintains that the offer of a sliding-scale royalty came from Claimant and was never accepted by the Governments.⁴⁰¹ Respondent notes that according to Claimant’s contemporaneous estimate, the difference between the 2% and 5% royalties amounts to USD 37.5 million annually and, according to Respondent, thus to USD 2.1 billion over a 56-year life of the mine.⁴⁰² In Respondent’s view, these royalties were necessary for the GOB to receive any money from the Reko Diq project within a reasonable timeframe, taking into account its obligation to make a 25% contribution to the funds of the project under the CHEJVA as a Participating Party and a lack of participation in the project’s future cash flows as a Non-Participating Party.⁴⁰³

391. In addition, Respondent contends that Claimant’s expert Prof. Davis wrongly calculated the royalties by applying the royalty rate to revenues net of smelter charges. According to Respondent, this contradicts rule 102(1) of the 2002 BM Rules, which provides that royalties are to be calculated based on the mineral’s “*fair market value*” which is in turn defined in rule 102(2) as the sale in an arms-length transaction, a price in the mineral agreement or on the international market. Respondent rejects the argument that net smelter return is consistent with “*fair market value*” and points to rule 102(4), which provides that the calculation does not allow “*for any deductions of the gross amount so determined.*” Respondent considers its understanding confirmed by the reports of its taxation expert Dr. Haq as well as the Feasibility Study which refers to a “*2% royalty on gross revenues by the Government of Balochistan.*”⁴⁰⁴
392. Respondent further rejects the argument that it would have benefitted from Claimant’s NPI proposal and refers to “*millions of dollars in revenue*” that it would forfeit by granting Claimant free surface rights as well as “*unpredictable losses and risks that might attend the extended commencement period that TCC would impose*” and future losses from the tax exemptions sought by Claimant. Also taking into account that Claimant was requesting an extension of the mining lease for the life of the mine, free surface rights and

⁴⁰⁰ Respondent’s Rejoinder on Quantum, ¶ 114; Respondent’s Post-Hearing Brief of Quantum, ¶ 45, *quoting from Exhibit RE-366*, p. 15.

⁴⁰¹ Respondent’s Rejoinder on Quantum, ¶ 114; Respondent’s Post-Hearing Brief of Quantum, ¶¶ 36-37 and note 59, *quoting from* Transcript Hearing on Quantum (Day 2), p. 476 lines 17-20.

⁴⁰² Respondent’s Post-Hearing Brief of Quantum, ¶ 38, *referring to Exhibit CE-942*, p. 6.

⁴⁰³ Respondent’s Counter-Memorial on Quantum, ¶¶ 158-160.

⁴⁰⁴ Respondent’s Counter-Memorial on Quantum, ¶¶ 288-289, *quoting from Exhibit RE-1*, rule 102 and *Exhibit RE-576-27* and *referring to* Haq I, ¶ 16; Respondent’s Rejoinder on Quantum, ¶ 363, *referring to* Haq II, ¶ 6.

a 2% royalty rate, Respondent considers that there was “*no basis for Pakistan to accept the NPI Proposal.*”⁴⁰⁵ According to Respondent, the NPI proposal would have provided the GOB with less revenues than the CHEVJA structure with a 5% royalty and, while “*eliminating some risk to the GoB, it would also require relinquishing further control over Reko Diq as well as any dividends it would have received as a shareholder under the Mining Venture.*”⁴⁰⁶

393. Respondent further submits that the GOP had informed Claimant early in the negotiations that its request would not likely not be accepted by the relevant departments and stood firm in its position not to agree to Claimant’s “*unreasonable demands,*” which would have resulted in a loss of “*millions of dollars*” for Pakistan.⁴⁰⁷ Respondent contends that when Claimant was advised that “*the EPZ regime is no longer politically viable,*” it dropped its request and instead followed up with its “*NPI*” proposal.⁴⁰⁸ Respondent refers to the oral testimony of Mr. Khokhar according to whom they “*convinced [TCC] to pay the normal tax ... and they dropped the issue of EPZ*” and who did not recall discussing any alternatives with TCC.⁴⁰⁹ Respondent also notes that Claimant never filed an application for EPZ status and argues that it failed to clarify “*how its mythical EPZ zone would work*” but rather assumed that it would receive “*some general, undefined concession*” which makes the entire calculation uncertain and speculative. According to Respondent, Claimant’s “*mega-project*” could not be compared to other projects such as Saindak and Duddar which Respondent describes as “*failing projects*” which were supported in the aim to train locals within Balochistan and improve the relationship to China as they were operated by China Metallurgical Group Corporation (“**MCC**”).⁴¹⁰ Respondent adds that so far Pakistan had not accepted any of Claimant’s proposals regarding the tax regime and argues that there is no evidence that Claimant expected to succeed on EPZ or any other concrete tax benefits.⁴¹¹

394. In response to Claimant’s argument that 85% of the issues had already been agreed, Respondent refers to Mr. Khokhar’s testimony that the remaining 15% were no less important and that while some issues could be solved in the fall of 2008, “*there were also remaining certain terms which we could not resolve*” which included the fiscal regime and stability, royalty rate, stamp duty exemptions and amendments to the 2002 BM

⁴⁰⁵ Respondent’s Rejoinder on Quantum, ¶¶ 121-123. See also Respondent’s Counter-Memorial on Quantum, ¶¶ 165-173.

⁴⁰⁶ Respondent’s Counter-Memorial on Quantum, ¶¶ 167, 172.

⁴⁰⁷ Respondent’s Counter-Memorial on Quantum, ¶¶ 163-164.

⁴⁰⁸ Respondent’s Post-Hearing Brief of Quantum, ¶ 39, quoting from **Exhibit RE-145**, p. 3.

⁴⁰⁹ Respondent’s Post-Hearing Brief of Quantum, ¶¶ 39, 42, quoting from Transcript Hearing on Quantum (Day 3), p. 688 lines 17-19 and referring to p. 711 line 22 to p. 712 line 6.

⁴¹⁰ Respondent’s Rejoinder on Quantum, ¶¶ 118-119; Respondent’s Post-Hearing Brief of Quantum, ¶¶ 40-42, 46; Respondent’s Counter-Memorial on Quantum, ¶ 141.

⁴¹¹ Respondent’s Rejoinder on Quantum, ¶ 120.

Rules.⁴¹² Respondent also points to the testimony of Ms. Boggs who confirmed that the fiscal terms had not yet been agreed and that they were using the terms they had proposed for the purposes of the Feasibility Study even though “*those terms had not yet been agreed by the Government.*”⁴¹³

395. Respondent further rejects the argument that the parties had agreed on a renewal of the mining lease and claims that, instead, the parties had agreed that the matter was to be decided independently by the Licensing Authority under the 2002 BM Rules. Respondent notes that it repeatedly rejected Claimant’s request for an automatic renewal and questions Ms. Boggs’ testimony that mining leases are commonly renewed in the industry, noting that there is no such history in Pakistan and that other mining leases in the area have much shorter terms and are subject to substantial changes upon renewal.⁴¹⁴ In addition, Respondent considers it a “*leap of faith*” to assume that the mine would have been operational in thirty years and that Balochistan would have wanted to renew the mining lease, given the “*extraordinary shortcomings*” in the Feasibility Study, the “*hazards of TCCA’s operations on the surrounding areas*” and the history of its owners’ projects which included “*some of the most prominent disasters and scandals in the modern mining world.*”⁴¹⁵
396. Respondent also argues that, as a matter of law, a valuation should not assume renewal of a lease when there is discretion on the part of the State and refers to various cases in which the tribunals considered the extension “*far too contingent, uncertain and unproven*” or that it was conditional upon the fulfillment of numerous substantive and procedural steps.⁴¹⁶
397. Finally, Respondent claims that in fact Claimant was the one abandoning the negotiations when copper prices collapsed in October 2008 and failed to provide critical information while engaging in dilatory tactics and submitting proposals which had already been rejected.⁴¹⁷ Respondent further claims that when the negotiations stalled in 2009,

⁴¹² Respondent’s Post-Hearing Brief of Quantum, ¶¶ 44-45, *quoting from* Transcript Hearing on Quantum (Day 3), p. 587 lines 13-17 and p. 590 lines 6-7 *and referring to* p. 594 lines 1-4. *See also* Respondent’s Rejoinder on Quantum, ¶¶ 160-161, *quoting from* Khokhar IV, ¶ 6.

⁴¹³ Respondent’s Post-Hearing Brief of Quantum, ¶ 45, *quoting from* Transcript Hearing on Quantum (Day 2), p. 472 lines 11-17. *See also* Respondent’s Counter-Memorial on Quantum, ¶ 153.

⁴¹⁴ Respondent’s Rejoinder on Quantum, ¶ 126; Respondent’s Post-Hearing Brief of Quantum, ¶¶ 47-50, *referring to* Boggs V, ¶¶ 49-50. *See also* Respondent’s Counter-Memorial on Quantum, ¶¶ 182-183.

⁴¹⁵ Respondent’s Rejoinder on Quantum, ¶¶ 128-129.

⁴¹⁶ Respondent’s Counter-Memorial on Quantum, ¶¶ 184-186, *quoting from* *Gemplus, S.A., et al. v. Mexico*, ICSID Case Nos. ARB(AF)/04/3 and ARB(AF)/04/4, Award of 16 June 2010 [CA-104], ¶¶ 12-49 *and referring to* *Burlington Resources, Inc. v. Republic of Ecuador*, ICSID Case NO. ARB/08/5, Award of 7 February 2017 [CA-356], ¶¶ 277, 278 *and* *CMS Gas Transmission Company v. The Republic of Argentina*, ICSID Case No. ARB/01/8 Award of 12 May 2005 [CA-15], ¶ 198.

⁴¹⁷ Respondent’s Counter-Memorial on Quantum, ¶¶ 151-152; Respondent’s Rejoinder on Quantum, ¶¶ 136-138.

Claimant “enacted the ‘Heavy Hand’ initiative to apply ‘Political Leverage’ and ‘unwanted federal pressure’ on GoB officials in order to push through its version of the mineral agreement.”⁴¹⁸ Respondent notes that the Advocacy Review Briefing, which it describes as “the founding documents of the Heavy Hand,” refers to a “strategy [for] engaging ‘political’ wings vs. militant wings” and considers it confirmed that Claimant intended to contact militants and make use of an adversarial conflict between Balochi nationalists in order to compel the GOB to “capitulate to TCC’s demands.”⁴¹⁹ According to Respondent, Claimant thereby not only acted contrary to its earlier undertaking that it would “abstain from political activity whatsoever affecting the sovereignty or security of Pakistan” but also beyond the exercise of political influence given that Claimant considered approaching a known terrorist suspect.⁴²⁰ Respondent also refers to Claimant’s attempts to secure a meeting with Chief Minister Raisani which did not, however, assist it in obtaining a Mineral Agreement because, as noted by Claimant’s representative at the time, “his expectations are very high and the project may not be robust enough to accommodate.”⁴²¹

398. Respondent further considers that the fiscal provisions included by Claimant in the Feasibility Study “torpedoed months of negotiation efforts and goodwill” because the Feasibility Study disregarded Respondent’s position by assuming EPZ status and a 2% royalty rate and ignored the Governments’ proposal for value-addition up to the stage of metal refining. Respondent refers to Mr. Khokhar who testified that after the Feasibility Study had been submitted, “any chance of reaching an agreement on the remaining terms of the mineral agreement diminished” because “TCC had no respect for the decisions made by the Parties through a mutually agreed process of negotiations and proceeded to include the terms that most benefited itself.”⁴²² Respondent also contends that Claimant even used assumptions of concessions which it had already abandoned such as EPZ status or did not expect to receive from the Governments such as the 2% royalty.⁴²³
399. Respondent asserts that a likely option was that Claimant would not have achieved a Mineral Agreement. Respondent contends that Claimant abandoned negotiations and refers to Mr. Khokhar’s testimony that Claimant’s CEO Mr. van Borries advised him in October 2010 that Claimant was “no longer interested in a mineral agreement” but only

⁴¹⁸ Respondent’s Rejoinder on Quantum, ¶¶ 142-143; Respondent’s Post-Hearing Brief of Quantum, ¶ 51, quoting from Exhibits RE-359, p. 4 and RE-398, p. 1. See also Respondent’s Counter-Memorial on Quantum, ¶¶ 189-191.

⁴¹⁹ Respondent’s Post-Hearing Brief of Quantum, ¶¶ 52-56, quoting from Exhibit RE-359, p. 12.

⁴²⁰ Respondent’s Rejoinder on Quantum, ¶¶ 140-148, quoting from Exhibit RE-342.

⁴²¹ Respondent’s Rejoinder on Quantum, ¶¶ 149-153, quoting from Exhibit RE-393.

⁴²² Respondent’s Rejoinder on Quantum, ¶¶ 154-156, quoting from Khokhar III, ¶ 47.

⁴²³ Respondent’s Counter-Memorial on Quantum, ¶¶ 177-180.

a mining lease.⁴²⁴ According to Respondent, Claimant did not expect a Mineral Agreement and “*knew the effect would be catastrophic.*”⁴²⁵

400. Finally, Respondent contends that, contrary to Claimant’s argument and the Tribunal’s finding, obtaining a mining lease would not have improved Claimant’s bargaining power because the Government “*had little to gain from changing the tax and royalty structure*” and Claimant had “*the obligation to construct the mine and live up to the numbers in its IMD FS.*”⁴²⁶ Respondent further refers to rule 46(2) of the 2002 BM Rules pursuant to which an investor’s right to negotiate a mineral agreement expires three months after the approval of the mining lease. Respondent rejects Claimant’s interpretation that the three-month period starts to run only from the submission of a mineral agreement to the provincial authorities and maintains that the provision aims to drive the company to begin construction which does not require a mineral agreement and therefore does not permit for any further delays. In Respondent’s view, the mining lease would therefore have strengthened Pakistan’s position and Claimant failed to show that it would have been able to reach agreement on the Mineral Agreement and obtain the relevant approvals within “*the dwindling time left to it.*”⁴²⁷

c. Tribunal’s Analysis

401. The Tribunal notes that the Parties are in dispute as to: (i) whether a Mineral Agreement would have been concluded at all; and, if so (ii) the commercial terms on which the parties would have agreed. The Tribunal will address these two aspects in turn.

i. Whether the Parties Would Have Concluded a Mineral Agreement

402. At the outset of its analysis of whether Claimant has established that the Parties would have concluded a Mineral Agreement at all, the Tribunal notes that it is undisputed that a Mineral Agreement was not a strictly necessary requirement for constructing and operating the mine. However, as demonstrated, *inter alia*, by Claimant’s contemporaneous evaluation in the Feasibility Study of the risk that no mineral agreement would be concluded,⁴²⁸ it was considered highly desirable and relevant to reach an agreement on the commercial terms and in particular the fiscal regime that would apply to the project. Consequently, the Tribunal also considers it common ground that the

⁴²⁴ Respondent’s Rejoinder on Quantum, ¶ 159; Respondent’s Post-Hearing Brief of Quantum, ¶ 57, *quoting from* Khokhar III, ¶ 48.

⁴²⁵ Respondent’s Post-Hearing Brief of Quantum, ¶ 58.

⁴²⁶ Respondent’s Counter-Memorial on Quantum, ¶ 174.

⁴²⁷ Respondent’s Counter-Memorial on Quantum, ¶ 175; Respondent’s Rejoinder on Quantum, ¶¶ 130-134; Respondent’s Post-Hearing Brief of Quantum, ¶¶ 59-61, *quoting from* Exhibit RE-1, rule 46(2).

⁴²⁸ In Chapter 30 of the Feasibility Study entitled “*Risk*”, Claimant identified as a risk with the highest risk rating “*H5*” the “*Inability to negotiate Mineral Agreement as a result of political circumstances at Federal and/or Provincial level resulting in NO PROJECT.*” Exhibit RE-576-30, p. 30-13.

question whether a Mineral Agreement would have been concluded or, from the perspective of a willing buyer in November 2011, whether it was likely that a Mineral Agreement would be concluded following the approval of TCCP's Mining Lease Application is relevant to determining the value of the project as of the valuation date.

403. The Tribunal recalls its finding in the Decision on Jurisdiction and Liability that while the Mineral Agreement negotiations "*had apparently stalled before the Mining Lease Application was filed, the parties may well have decided to revive them after the grant of the mining lease, given that Claimant would then have been the only one allowed to conduct mining operations in the area.*" The Tribunal found that "[t]here would thus have been a mutual interest to achieve agreement on the remaining issues" and considered that "*Claimant would have been in a far better bargaining position as holder of the mining lease over the area than it was before, in particular once it became clear that the Governments considered that Claimant did not have a right to convert its exploration license into a mining lease.*"⁴²⁹
404. Respondent disputes this finding and refers to rule 46(2) of the 2002 BM Rules, which provides:
- "If the mineral Agreement in case of L.S.M and the lease deed in case of Small Scale Mining is not executed within three months of the communication of the approval of the application for a mining lease and the presentation of the mineral agreement / lease deed for signature, the right of the applicant to such lease shall be deemed to have lapsed unless the licensing authority is satisfied that the delay in execution was not caused by the applicant or was due to circumstances beyond the applicant's control."*⁴³⁰
405. In Respondent's view, granting the mining lease would in fact have weakened Claimant's position because its right to negotiate a mineral agreement would have expired three months after receiving the mining lease. In the Tribunal's view, this position is not supported by the wording of the provision nor the economic intent of agreeing on a mineral agreement. As pointed out by Claimant, rule 46(2) refers to a time period of three months starting from "*the communication of the approval of the application for a mining lease and the presentation of the mineral agreement ... for signature.*" In addition, the provision refers to a lapse of "*the right of the application to such lease,*" *i.e.*, the mining lease, rather than a lapse of the right to negotiate a mineral agreement. The Tribunal is therefore not convinced that rule 46, which bears the heading "*Duration of mining lease,*" was intended to place a time limit on the negotiations of a mineral agreement. It rather appears that the intention was to provide for a timeframe within which the Mineral Agreement, once negotiated and presented for signature, would have to be executed.

⁴²⁹ Decision on Jurisdiction and Liability, ¶ 1239.

⁴³⁰ Exhibit RE-1, rule 46(2).

406. In addition, pursuant to rule 9 of the 2002 BM Rules, a mineral agreement can be concluded to address various matters relating to mineral operations as the Government or the parties to the agreement may consider necessary. There is no indication that such a mineral agreement would have to be negotiated and concluded before or shortly after the mining lease is granted and that it would in turn not be possible to negotiate and conclude a mineral agreement providing for certain terms regarding mineral operations at any point thereafter.
407. Respondent further argues that the Governments would have little interest to make any concessions regarding the tax and royalty structure and that Claimant would have been under an obligation to realize the project regardless of any concessions to be made. In the Tribunal's view, this argument is detached from reality. Claimant and its owners as well as possible third-party financing institutions would have had to commit large amounts of money into the project and it is plausible that they would have done so only if they were able to reach some form of agreement on the fiscal terms that would apply to the project and thus to make a reasonably reliable projection regarding the future profitability of the mine. In addition, the Governments would also have had an interest to provide the project sponsors with some form of security or stability regarding the fiscal regime in order to ensure that the project would be developed with all the monetary and non-monetary benefits that this would bring to Balochistan and Pakistan.
408. The Tribunal wishes to emphasize that is not assuming that the Governments were under a legal obligation to conclude a Mineral Agreement or that they did not have any discretion as to the terms that they would negotiate with Claimant. However, as the Tribunal already held in the Decision on Jurisdiction and Liability and as it maintains in this Award, it would have been in the mutual interest of the negotiating parties to reach an agreement in order to ensure that the project would in fact be financed, constructed and become operational.
409. Respondent points out that the negotiations had stalled before TCCP filed the Mining Lease Application and claims that this was due to Claimant's unreasonable demands and its own delaying tactics when copper prices fell in 2008. It also claims that Claimant in fact informed Respondent after it had submitted the Feasibility Study to the GOB that it was no longer interested in a Mineral Agreement. As for the latter allegation, the Tribunal notes that it is based exclusively on the witness testimony of Mr. Khokhar who testified that he recalled that "*in a meeting taking place in October 2010 in [his] office, Mr. Gerhard von Borries, Chief Executive of TCC, stated, 'we are no longer interested in a mineral agreement, We are only interested in a mining lease. Forget the mineral*

agreement.” Mr. Khokhar further stated that he understood this message to have been conveyed to other Governments officials as well.⁴³¹

410. While it is true that Claimant did not present Mr. von Borries as a witness in these proceedings, the Tribunal considers that Mr. Khokhar’s testimony is contradicted by the contemporaneous record which shows that Claimant was still pursuing a Mineral Agreement. As pointed out by Claimant, Mr. von Borries himself sent a letter to the Chief Secretary, Mr. Lehri, on 4 October 2010 containing a revised offer regarding the Reko Diq project, which included, *inter alia*, a term sheet for the Mineral Agreement “*for further discussion.*”⁴³² In addition, on 5 October 2010, the Chairman of Claimant’s Board of Directors wrote to Chief Minister Raisani where he also presented Claimant’s new offer and explicitly stated that they “*trust[ed] this letter now sets the stage for full discussions and agreement on the proposed Project and Mineral Agreements, on which this offer is contingent.*”⁴³³
411. The Tribunal further notes that the negotiations had stalled already in 2009 and it is not convinced that this was caused by Claimant not pursuing the negotiations or raising demands that made any further negotiations pointless. As for the first point, the Tribunal again considers Respondent’s allegation contradicted by the record which demonstrates that Claimant was continuously making efforts to reach an agreement on the outstanding negotiation items and was presenting various new proposals for the Governments to consider. As to the second point, the Tribunal has not been provided with any indication that the Government were considering further negotiations pointless at the time.
412. In this regard, the Tribunal also takes note of Claimant’s statement in its Post-Hearing Brief that its primary objective was to reach stabilization of the fiscal regime and that, once that was obtained, it was willing to “*compromise on the specifics of the tax and royalty in order to secure the stability it had been promised.*”⁴³⁴ In the Tribunal’s view, this willingness to consider a compromise, which is confirmed by the contemporaneous proposals and efforts made by Claimant towards the Governments, shows two things. On the one hand, it was likely that the parties would have reached some form of agreement on the fiscal terms that would apply to the project. On the other hand, Claimant would likely not have insisted on each of the fiscal terms which it had proposed and which, in the absence of any agreement by the time the Feasibility Study was delivered to the GOB, it had also included as a basis for its evaluation of the project in the Feasibility Study and the Expansion Pre-Feasibility Study. This second point will be addressed in more detail below in determining the fiscal terms on which the parties would most likely have agreed.

⁴³¹ Khokhar III, ¶ 48.

⁴³² **Exhibit RE-58(X)(b)**, pp. 61, 66.

⁴³³ **Exhibit CE-257**, p. 3.

⁴³⁴ Claimant’s Post-Hearing Brief, ¶ 232.

413. As for the question who may have been responsible for the stalling of the negotiations in 2009, the Tribunal also recalls that the present assessment is based on a but-for scenario in which Respondent had not breached its obligations under the Treaty. Respondent is correct in pointing out that the Tribunal did not have to express an opinion in the Decision on Jurisdiction and Liability as to whether the Governments' conduct in the Mineral Agreement negotiations in itself or together with other actions impugned by Claimant amounted to a breach of Respondent's Treaty obligations. However, the Tribunal did find that the Licensing Authority denied TCCP's Mining Lease Application because the GOB had decided to develop its own mining project rather than to continue collaborating with Claimant.⁴³⁵ The minutes of the GOB cabinet meeting on 24 December 2009 explicitly state that the agenda item "*Taking over of Rekodiq Copper & Gold Project from TCCP by the Government of Balochistan*" was approved in principle and that it was "*further decided not to go ahead with the proposed Mineral and Shareholder agreements with TCCP.*"⁴³⁶ In the Tribunal's view, this is a strong indication that the GOB's decision to take over the project was directly linked to the fact that there were no actual negotiations after this cabinet meeting but only high-level meetings in which assurances were given to Claimant which turned out to be false.⁴³⁷
414. On that basis, the Tribunal agrees with Claimant that the Tribunal's but-for assessment must eliminate the fact that the GOB had decided not to go ahead with the Mineral Agreement negotiations because it had decided to take over the project and develop its own project instead. For the same reason, the high risk rating assigned by Claimant in the Feasibility Study delivered in August 2010 to the risk that it would not be able to conclude a Mineral Agreement with the GOB and GOP, which was based on the actual situation in which negotiations had stalled due to the GOB's decision not to go ahead with them, cannot form the basis for the Tribunal's but-for assessment of the likeliness that a Mineral Agreement would be concluded in the absence of Respondent's Treaty breaches.
415. While the Tribunal does not wish to go as far as finding that a Mineral Agreement would already have been concluded as of the valuation date, it maintains the view that if the GOB had not decided to take over the project from Claimant, it would have continued to negotiate with Claimant and an agreement would likely have been reached between the negotiating parties, including the GOB, regarding the terms and in particular the fiscal regime that would apply to the project.
416. In this regard, the Tribunal also notes that Claimant's financing expert Mr. Pingle stated in his expert report that fiscal stability agreements are rarely "*pre-agreed,*" *i.e.*, concluded before financing is secured for the project, but they are usually among the last items

⁴³⁵ Cf. Decision on Jurisdiction and Liability, ¶ 1264.

⁴³⁶ Exhibit CE-31, p. 16 (emphasis in original).

⁴³⁷ Cf. Decision on Jurisdiction and Liability, ¶¶ 1144-1159.

agreed at the request and insistence of financing institutions willing to provide funds for the project. He added that “[t]here is a point in almost every large project when the foreign governmental institutions meet with the host government, without private parties present. At that point, the foreign governmental institutions lay out their minimum requirements for them to make their loans or investments. It makes a significant difference to a host government when it realizes that massive FDI and a loan package worth billions of US\$ turn on its unwillingness to agree to standard documentation.”⁴³⁸

417. The Tribunal finds this statement convincing and considers that it supports its finding that a Mineral Agreement providing in particular for fiscal stability would have been concluded after the mining lease was granted to TCCP.

ii. The Commercial Terms on Which the Parties Would Likely Have Agreed in the Mineral Agreement

418. As a second step, the Tribunal will assess the commercial terms and in particular the fiscal regime on which the parties would likely have agreed for the project in the Mineral Agreement.

419. In this regard, the dispute between the Parties concerns four issues: (i) the royalty rate, including the base for calculating the royalties; (ii) EPZ status or a “*functional equivalent*” of tax concessions vs. normal tax regime; (iii) renewal of the mining lease after the first 30-year term; and (iv) participation of Balochistan through a 25% Net Profit Interest vs. participation or non-participation as provided in the CHEJVA.

420. The Tribunal understands that Claimant’s offer in May 2009 to restructure the GOB’s interest in the project as a net profit interest was made subject to certain conditions regarding royalties and taxes as well as surface rights. In particular, Claimant’s offer at the time was “*available only with 2% royalty*.”⁴³⁹ It further appears to the Tribunal that, with all other fiscal terms being equal, a Net Profit Interest would undisputedly have been more beneficial to the GOB than the initial 25% equity interest under the CHEJVA, in particular during the first decade of mining operations.⁴⁴⁰ In the Tribunal’s view, it is therefore appropriate to discuss the nature of the GOB’s interest not in isolation but together with the question of the royalty rate on which the parties would likely have agreed.

(a) The Royalty Rate and Claimant’s Net Profit Interest Offer

421. The first issue concerns the questions on which royalty rate the parties would have agreed. While Claimant has instructed its expert Prof. Davis to assume a 2% royalty rate,

⁴³⁸ Pingle, ¶ 213.

⁴³⁹ Exhibit CE-236, pp. 5-6.

⁴⁴⁰ Cf. Exhibit CE-236, p. 6.

Respondent maintains that the GOB would not have accepted anything below the statutory rate of 5%.

422. Claimant initially submitted that the amendment to the 2002 BM Rules of 17 July 2009 by which the statutory royalty rate was increased from 2% to 5% for both copper and gold never came into effect and referred to its witness Ms. Boggs, who testified that there was opposition to the increase from the local mining community and that they discovered that the notification had never been gazetted.⁴⁴¹ However, as pointed out by Respondent, Ms. Boggs' recollection is contradicted by Barrick's annual report for 2009 which reported for the Reko Diq project a royalty of "5% N[et] S[melter] R[eturn]."⁴⁴² Claimant did not pursue this argument any further but focuses on the argument that other mining projects in the region were not paying the statutory rate but had agreed with the GOB on lower royalty rates. In particular, Claimant considers it confirmed by Mr. Khokhar's testimony at the Hearing on Quantum that the owner of the Duddar project continued to pay a 2% royalty rate after the rate was raised in 2009 and further requests adverse inferences regarding Respondent's refusal to produce documents regarding the agreements reached with the owners of the Duddar and Saindak projects.
423. While the Tribunal agrees with Claimant that Mr. Khokhar's oral testimony indicates that the Duddar project may have continued to pay a 2% royalty⁴⁴³ and that Respondent's decision not to produce the mineral agreement with Saindak despite the Tribunal's orders indicates that Saindak may also have paid less than the 5% statutory rate, the Tribunal is not convinced that this in itself establishes that Claimant would also have agreed on a 2% royalty with the GOB. It is undisputed between the Parties that the Reko Diq project was not comparable to these projects in terms of size or profitability. According to Mr. Khokhar, the Duddar project had been shelved because it was not economical and it was then revived. He added that "[m]aybe Government have compensated ... to revive this Project, make this Project economically healthy, the Government may have given certain concessions."⁴⁴⁴ According to Claimant's own position, based on the sensitivity analyses provided by Prof. Davis, the viability of the Reko Diq project did not depend on an agreement on a 2% royalty rate and Claimant itself states that it was willing to consider a compromise if it obtained the desired stability for the fiscal regime that would apply to the project.
424. As Respondent pointed out, there is no indication in the record that the GOB had expressed a willingness to accept a rate lower than 5%. As recorded in the meeting

⁴⁴¹ **Exhibit RE-579**, p. 4; Claimant's Quantum Memorial, ¶ 61, referring to Boggs V, ¶ 46.

⁴⁴² **Exhibit RE-141**.

⁴⁴³ Transcript Hearing on Quantum (Day 3), pp. 664-668.

⁴⁴⁴ Transcript Hearing on Quantum (Day 3), pp. 666-667.

minutes of the negotiation committee on 22 October 2008, Chief Secretary Lehri had even proposed a rate increasing from 5 to 6% over the life of the mine.⁴⁴⁵ Ms. Boggs also confirmed in her oral testimony that the parties had not agreed on the royalty rate to be applied to the project.⁴⁴⁶ She further testified that she “*assumed that we would probably end up with something between what we had originally proposed, 2 percent, what they had proposed, 5 percent, and a sliding scale.*”⁴⁴⁷ According to Ms. Boggs, the request for a sliding scale had come from the Government, and she “*thought we would arrive at something that we would be able to tie to the various economic periods of the Project so that increases in the Royalty wouldn’t affect the viability of the Project.*”⁴⁴⁸ In those circumstances, the Tribunal is not convinced by the evidence in the record that the parties would have agreed on a royalty rate of 2%.

425. While Respondent denies that the proposal for a sliding scale came from the Government, the meeting minutes of 20 November 2008 show that Chief Secretary Lehri had understood that a royalty rate increasing over the life of the mine could make economic sense. In addition, the Tribunal notes that as of May 2009, Claimant was combining its request for a 2% royalty rate with an offer to restructure the GOB’s interest as a net profit interest, which would be more beneficial to the GOB than its equity interest under the CHEJVA particularly in the first decade of mining operations.⁴⁴⁹ In the Tribunal’s view, this does not suffice as evidence that the GOB would have agreed on the 2% royalty rate. However, the Tribunal considers it reasonable to assume that in return for an arrangement under which the GOB would not have been required to make any equity contributions and would have received guaranteed annual minimal payments during the initial payback period,⁴⁵⁰ the GOB would have agreed to a lower royalty rate during this period. At the same time, the GOB may well have maintained its request for a higher royalty rate in subsequent years and the Tribunal therefore considers it likely that the parties would have agreed on a sliding scale.
426. As testified by Ms. Boggs and confirmed by the contemporaneous documents, Claimant proposed in October 2008 that the royalty rate would start at 2.5% for the first decade, increase to 3% for the second decade and not exceed 4% for the time thereafter.⁴⁵¹ Ms. Boggs also testified that they “*never received confirmation from Balochistan that this scale was acceptable.*”⁴⁵² To the contrary, pursuant to the record note prepared by the

⁴⁴⁵ **Exhibit CE-942**, p. 3.

⁴⁴⁶ Transcript Hearing on Quantum (Day 2), p. 455 lines 11-13, p. 466 lines 19-20.

⁴⁴⁷ Transcript Hearing on Quantum (Day 2), p. 476 lines 17-20.

⁴⁴⁸ Transcript Hearing on Quantum (Day 2), p. 476 line 21 to p. 477 line 3.

⁴⁴⁹ Cf. **Exhibit CE-236**, p. 6.

⁴⁵⁰ **Exhibit CE-236**, p. 4.

⁴⁵¹ Boggs V, ¶ 43; **Exhibit RE-64**, p. 1.

⁴⁵² Boggy V, ¶ 43.

Ministry of Petroleum and Natural Resources of the GOP on the October 2008 negotiations, “[t]he GOB team showed reservation towards the proposal floated by the TCC team.”⁴⁵³ However, this offer was made before Claimant proposed to restructure the GOB’s interest in the project as a net profit interest. For the reasons set out above, the Tribunal considers it reasonable to assume that if taken together, the proposal of a sliding scale increasing from 2% to 4% over the life of the mine and the net profit interest proposal would have been acceptable to the GOB.

427. According to the sensitivity analysis provided by Prof. Davis, the impact of assuming a time-varying royalty as proposed by Claimant in October 2008 while retaining the net profit interest proposal results in a reduction of the value of Claimant’s share in the project of USD 287 million.⁴⁵⁴
428. Finally, the Tribunal notes that Respondent disputed Prof. Davis’ calculation of royalties which is based on the net smelter return. Respondent relies on rule 102 of the 2002 BM Rules, which provides in relevant part:

- “(1) *Subject to this Part, royalty shall be charged on the fair market value of any mineral specified in Part I of the Third Schedule ... at the rate specified in Part II ... or at such other rate as may be notified by the Government from time to time in the Official Gazette.*
- (2) *For the purposes of sub-rule (1), the fair market value of a mineral or group of minerals is –*
- (a) *where the mineral or group of minerals is disposed of in a sale at arm’s length, the sale price;*
- ...
- (4) *For the purposes of this Rule, the fair market value, in respect of any mineral or group of minerals which has been disposed of, shall be determined by reference to the first point at which it was disposed of, without allowing for any deductions from the gross amount so determined.”*⁴⁵⁵

429. Claimant takes the position that the net smelter return is consistent with the fair market value royalty calculation under rule 102 and explains that net smelter return corresponds to the sale price paid by the smelter to Claimant, which reflects the costs incurred by the smelter for transportation from the port to the smelter but none of Claimant’s costs. Respondent does not dispute that Prof. Davis has applied the sale price paid by the smelter but relies on its taxation expert Dr. Haq who takes the view that “NSR does not reflect

⁴⁵³ Exhibit RE-77, p. 4.

⁴⁵⁴ Davis II, Table 8.

⁴⁵⁵ Exhibit RE-1, rule 102.

‘fair market value’ as defined under the BM Rules, since NSR includes certain deductions to account for ‘costs incurred by the smelter’ (i.e. buyer).”⁴⁵⁶

430. In the Tribunal’s view, Prof. Davis has correctly used the sale price paid by the smelter to Claimant as the base for calculating royalties. As stated in Barrick’s annual report for 2009 on which Respondent relies in the context of the royalty rate, “[t]he primary type of royalty is a net smelter return (NSR) royalty. Under this type of royalty we pay the holder an amount calculated as the royalty percentage multiplied by the value of gold production at market gold prices less third-party smelting, refining and transportation costs.” For Reko Diq, the report records “5% NSR.”⁴⁵⁷ The definition in Barrick’s annual report confirms Claimant’s explanation that the term “net” does not mean that any costs incurred by the mining company are actually deducted from the market price but rather that it refers to costs incurred by a third party for smelting, refining and transporting the concentrate. These third-party costs are naturally reflected in the sale price paid by that third party to the mining company. In the Tribunal’s view, this type of royalty is consistent with rule 102 of the 2002 BM Rules, which defines “fair market value” primarily based on the sale price in an arms-length transaction which reflects the costs incurred by the buyer in that transaction. In particular, rule 102(4), which does not allow for any deductions from the gross amount, refers to the fair market value determined at the first point at which the concentrate was disposed of and, thus, to the (gross) sale price that a third party pays to the mining company.
431. Consequently, the Tribunal concludes that Prof. Davis has correctly applied the royalty rate to the net smelter return, i.e., the sale price that Claimant would have received from the smelter at Port Gwadar.

(b) EPZ Status or a “Functional Equivalent” of Tax Concessions vs. the Normal Tax Regime

432. The second point in dispute between the Parties concerns the question whether the Reko Diq project would have received EPZ status or a “functional equivalent” of tax concessions for the first fifteen years followed by the normal tax regime for the remainder of the life of the mine, as alleged by Claimant, or whether it would have been subject to the normal tax regime from the start of operations, as alleged by Respondent.
433. It is undisputed that Respondent was not under a legal obligation to grant EPZ status, i.e., declare the area to an “export processing zone,” or similar tax concessions to the Reko Diq project. Claimant rather argues that EPZ status was specifically intended for projects such as Reko Diq, “which promised to provide employment and a boost to Pakistan’s

⁴⁵⁶ Haq II, ¶ 5.

⁴⁵⁷ Exhibit RE-141.

exports,”⁴⁵⁸ and claims that all other substantial mining projects in the region had also been granted EPZ status.

434. Respondent, on the other hand, points out that Claimant itself noted in a letter to Mr. Khokhar dated 29 January 2009 that “*the EPZ regime is no longer politically viable*”⁴⁵⁹ and considers that Claimant thereby dropped its request for EPZ status. However, as Claimant points out, it stated in the same sentence of that letter that they were advised by the Negotiating Committee that “*certain benefits of an EPZ regime would be available to us under the normal tax regime, such as import tax and duty exemptions.*”⁴⁶⁰ In addition, the net profit interest proposal made by Claimant in May 2009 was also made conditional upon receiving exemptions from stamp duties, local taxes as well as sales taxes.⁴⁶¹
435. The Tribunal notes that Claimant’s position is that while it would not necessarily have succeeded in obtaining EPZ status for the Reko Diq project, it is reasonable to assume that it would have received a “*functional equivalent, at least during the initial capital-intensive years of the project.*”⁴⁶² Claimant further argues that “[w]hile it is conceivable that the final package of concessions agreed between the parties would have been a custom suite of modifications to the normal tax regime rather than an EPZ designation, the ‘combined tax regime’—fifteen years of the EPZ regime followed by the normal tax regime for the remaining decades of the mine’s life—is a reasonable approximation of the applicable fiscal terms for purposes of assessing TCCA’s damages.”⁴⁶³
436. The Tribunal considers that, when taking into account that Claimant’s initial Tanjeel project at Reko Diq, the Saindak project, the Duddar project and the GOB’s own Reko Diq project had received EPZ status, which was destined for the type of investment that Claimant intended to bring to Pakistan, it is reasonable to assume that Claimant’s Reko Diq project would either also have been granted EPZ status or would have received similar tax concessions from the Government during the first years in which the large amount of capital investments had to be made.
437. The Tribunal finds further support for this finding in the fact that the GOB was a partner in the project and would have received, under the net profit interest proposal, 25% of the project’s net profits after the payback of investment (until that time, it would have received annual minimum payments).⁴⁶⁴ Consequently, the GOB, which was moreover required under the CHEJVA to provide administrative support and perform all reasonable

⁴⁵⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 245.

⁴⁵⁹ **Exhibit RE-145**, p. 3.

⁴⁶⁰ **Exhibit RE-145**, p. 3.

⁴⁶¹ **Exhibit CE-236**, p. 5.

⁴⁶² Claimant’s Quantum Post-Hearing Brief, ¶ 241.

⁴⁶³ Claimant’s Quantum Reply, ¶ 177.

⁴⁶⁴ **Exhibit CE-236**, p. 4.

acts to give effect to the purposes of the CHEJVA and the interests of the Joint Venture,⁴⁶⁵ would have had a strong interest to obtain EPZ status or (equivalent tax concessions) for the Reko Diq project. That this was in fact the case before the GOB decided to take over the Reko Diq project for itself, is confirmed by the GOB's submission before the Balochistan High Court in 2007 in which it argued that "[t]he fact that the Reko Diq area has been declared as an Export Processing Zone ('EPZ') is beneficial to the Province of Balochistan and will increase its potential to make more money from the project."⁴⁶⁶

438. In the Tribunal's view, the GOB's support for obtaining EPZ status or equivalent tax concessions would also have been in line with the Tribunal's finding in the Decision on Jurisdiction and Liability that the assurances provided to Claimant and its owners by officials at various levels of both Governments contributed to the legitimate expectation that both Governments would support and facilitate Claimant's investment.⁴⁶⁷ According to the testimony of Claimant's witnesses Mr. Luksic and Ms. Boggs in the liability phase of these proceedings, which remained undisputed by Respondent, these assurances also referred to tax benefits that the project would obtain from the Governments in return for their investment in the country. Mr. Luksic specifically testified in his first witness statement that in a meeting with Prime Minister Aziz in January 2006, *i.e.*, shortly before Antofagasta acquired shares in Claimant, the Prime Minister "*recommended that TCC seek an EPZ ('Export Processing Zone') for the Project.*" Mr. Luksic further referred to a meeting with President Musharraf in April 2006 in which "*the President also assured as of the Government's support for obtaining an EPZ status for the Project and for concluding a Mineral Agreement.*"⁴⁶⁸ The Pakistani press reported on both of these meetings and the assurances provided by the Prime Minister and the President to Claimant's future owners on these occasions.⁴⁶⁹
439. Finally, the Tribunal notes that Claimant has not instructed Prof. Davis to assume that EPZ status would be granted for the life of the mine but rather only for the first fifteen years of the project and that the project would then be subject to the normal tax regime thereafter. As demonstrated by the sensitivity analysis performed by Prof. Davis on this point, granting EPZ status for the first fifteen years of the project would still have provided the Federal State with 29.6% of the project's total cash flows (compared to 42.6% if no EPZ status were granted). At the same time, the additional profits that would have gone to Claimant and the GOB would also have benefitted the GOB, increasing its

⁴⁶⁵ See in more detail on this point Decision on Jurisdiction and Liability, ¶¶ 944-947.

⁴⁶⁶ **Exhibit CE-212**, p. 12.

⁴⁶⁷ *Cf.* Decision on Jurisdiction and Liability, ¶¶ 955, 958.

⁴⁶⁸ Luksic I, ¶¶ 8, 13.

⁴⁶⁹ **Exhibits CE-95, CE-246, CE-317 and CE-318.**

share of the profits from 22.4% under the normal tax regime to 26.1% under EPZ status (*i.e.*, on Claimant's calculation, a difference of USD 740 million).⁴⁷⁰

440. The Tribunal therefore concludes that it was likely that the GOP would have granted EPZ status or similar tax concessions to the Reko Diq project for the first fifteen years of the project, as it has been assumed by Prof. Davis.

(c) Renewal of the Mining Lease for the Life of the Mine

441. Finally, the Tribunal will address the dispute between the Parties as to whether the Mineral Agreement would have included a provision pursuant to which the mining lease, which would have been granted for an initial term of 30 years, would have been renewed for the life of the mine.

442. As pointed out by Respondent, rules 46(1) and 50(3) of the 2002 BM Rules provide as follows:

“46. Duration of mining lease. (1) *Subject to these rules, a mining lease shall be valid for an initial term of mining lease shall not be less than ten years and shall not exceed thirty years but the lease may contain a clause permitting renewals at the discretion of the licensing authority or Government for further period not exceeding thirty years at a time on such terms and in such form as may be in force on the day on which the renewal is sanctioned.*

...

50. Application for renewal of mining lease. ...

(3) *[O]n application duly made, the lease may be renewed in accordance with Rule 48(1)(b) with or without a variation of the conditions of the lease.*”⁴⁷¹

443. Respondent further points to the testimony of Mr. Khokhar, who testified that “[t]he issue of granting or renewing mining leases was not a focus of the negotiations as this matter was to be decided independently by the Licensing Authority as per provisions of the BM Rules.” Mr. Khokhar further stated while the issue was not within the competence of the GOP, he “expressly recall[ed] telling TCC during the negotiations that they should not expect anything automatic, but should follow our laws and procedures in Pakistan.” Mr. Khokhar further referred to the Governments’ counterproposal for a Mineral Agreement dated 7 August 2008 which in his view “disagreed with TCC’s proposal to secure an automatic mining lease and restored the primacy of the BM Rules” and “shows that the issue of whether or not TCC would obtain a mining lease was, in our view, not a valid topic of discussion during the negotiations.”⁴⁷²

⁴⁷⁰ Davis II, Table 9.

⁴⁷¹ **Exhibit RE-1**, rules 46(1) and 50(3).

⁴⁷² Khokhar II, ¶¶ 17-19. Mr. Khokhar confirmed this testimony in Khokhar III, ¶ 32.

444. The Governments' counterproposal referred to by Mr. Khokhar indeed did not accept the provision proposed by Claimant in its initial draft of 9 July 2007, which had provided, *inter alia*, that a Mining Lease "*shall ... (ii) be for a period of 30 (thirty) years; and (iii) be renewable for a further period of 30 (thirty) years at the request of the holder thereof, but otherwise such Mining Lease shall be on the terms and conditions set out in the BMR.*"⁴⁷³ The Governments' draft instead provided that the Mining Lease "*shall ... (ii) be for a period not exceeding 30 (thirty) years; and (iii) be renewable for a further period according to Article 86 BMR at the request of the holder thereof, but otherwise such Mining Lease shall be on the terms and conditions set out in the BMR approval of which shall not be unreasonably withheld.*"⁴⁷⁴
445. In the Tribunal's view, the Governments' draft confirms Mr. Khokhar's testimony that the GOB did not accept at that time that the Mining Lease should be renewed without any qualification merely "*at the request of the holder*" but instead introduced a reference to the provision in the 2002 BM Rules on the duration and renewal of the mining lease. On the other hand, the GOB proposed to add that the approval of the renewal "*shall not be unreasonably withheld.*" In the Tribunal's view, this proposal does not accord with Mr. Khokhar's testimony that the question of renewal was "*not a valid topic of discussion*" but instead indicates that the GOB was willing to provide some form of assurance to Claimant that the mining lease would be renewed if there was no valid ground for refusing to do so.
446. In this regard, the Tribunal also recalls that the GOB was required under clause 7.2(a) the CHEJVA to provide "*appropriate administrative support as required for the obtaining of all leases, licenses, claims, permits or other authorities of any kind whatsoever being necessary for the conduct of the Joint Venture Activities.*"⁴⁷⁵ Clauses 24.6.2 and 24.6.3 further provided that "[t]he Parties shall be just and faithful to one another and will not do or omit to be done anything whereby the interests of the Joint Venture contemplated herein as a whole are prejudiced" and that "[e]ach Party shall execute all necessary additional documents and do all such acts as shall be reasonably required to give effect to the purposes of this Agreement."⁴⁷⁶ In its Decision on Jurisdiction and Liability, the Tribunal held that "[p]ursuant to these provisions, the GOB was under an obligation to

⁴⁷³ **Exhibit CE-216**, clause 14.2.1(ii) and (iii).

⁴⁷⁴ **Exhibit CE-226**, clause 14.2.1(ii) and (iii). As rule 86 contains provisions regarding the duration and renewal of a mining lease but is part of Part IV "*Special Provisions Relating to Small Scale Mining*" and it is otherwise undisputed between the Parties that the Reko Diq project would be subject to the regular provisions in Part III "*Mineral Titles and Mineral Concessions,*" the Tribunal considers it reasonable to assume that this reference was made by mistake and not specifically intended to deviate from the provisions on duration and renewal of mining leases under rules 46 and 50 quoted above.

⁴⁷⁵ **Exhibit CE-1**, clause 7.2(a).

⁴⁷⁶ **Exhibit CE-1**, clauses 24.6.2 and 24.6.3.

*provide administrative support in procuring the required licenses and permits and to perform all reasonable acts to give effect to the purposes of the CHEJVA and the interests of the Joint Venture as a whole, i.e., to the exploration and exploitation of the mineral resources at Reko Diq.”*⁴⁷⁷

447. The Tribunal does not wish to go as far as Claimant’s suggestion that a refusal to renew the mining lease would in any circumstances have “*prejudiced*” the interests of the Joint Venture and therefore have been contrary to the GOB’s obligations under the CHEJVA. However, the Tribunal does agree that the GOB’s contractual obligations are relevant in determining whether it is reasonable to assume that a willing buyer in this but-for assessment would have factored in the expectation that the mining lease would be renewed.
448. Claimant takes the position that the GOB had in fact already agreed in the negotiations that the mining lease would be renewed for the life of the mine. It relies on a letter sent by Ms. Boggs to Chief Secretary Lehri in on 10 August 2009 in which she explained the benefits as well as the conditions of the net profit interest proposal Claimant had made in May 2009 and summarized the points on which they had agreed with the Steering Committee, including, “*that Mining lease will be extended for the life of the mine on same terms and conditions.*”⁴⁷⁸ Ms. Boggs further testified in this regard that while the initial draft had provided for discretion of the Government, “*it was clear from subsequent negotiations that this was not, indeed, a major point of contention and that Balochistan was willing to agree to renew the license.*”⁴⁷⁹ She added:

“Balochistan’s willingness to agree to extend the mining lease term was unsurprising. If the project was successful, as we expected it would be, and if we determined, at the end of the initial thirty-year term that we wanted to continue mining, it would be in Balochistan’s interest to renew our license to ensure an uninterrupted flow of revenue to the Province from the project. The Government also had good reason to provide us with security of tenure for the entire life of mine. Our intention was to be at Reko Diq for a long time—long beyond the initial mine development. We planned to make a series of expansions, including the one described in our Expansion Pre-Feasibility Study, and we also planned to do further exploration within our mining lease area. We had already identified several additional targets that we wanted to explore and I remember that Tim Livesey and his team were itching to do more drilling. Because drilling is expensive, we stopped drilling once we had sufficient resources to support the initial mine development feasibility study but we expected to resume after the mine was operational. By agreeing to extend the mining lease for the life of the mine, the Government was signaling

⁴⁷⁷ Decision on Jurisdiction and Liability, ¶ 947.

⁴⁷⁸ Exhibit CE-238, p. 3.

⁴⁷⁹ Boggs V, ¶ 48.

to us that we would have security of tenure over any deposits we discovered through additional exploration. Because the Government stood to gain from the exploitation of these additional deposits, it was in their interest to ensure we had every incentive to continue drilling.”⁴⁸⁰

449. Mr. Khokhar, on the other hand, maintained in his testimony that “*the mining lease renewal was not a focus of the negotiations, because it was an issue to be decided by the Licensing Authority independently under the BMR 2002*” but at the same time that he explained to Claimant that “*they should not expect automatic renewal and that any renewal would need to follow the existing laws and procedures.*”⁴⁸¹
450. The Tribunal notes that there appears to be common ground between the Parties’ witnesses to the extent that the issue of mining lease renewal did not form one of the major points of contention during the negotiations, but they fundamentally disagree as to the conclusion or agreement reached by the parties on that point. In the Tribunal’s view, it is not plausible to assume that Claimant accepted without any major discussion that the matter would be entirely within the discretion of the Licensing Authority, without any form of assurance that Claimant would be entitled to continue operating the mine after the initial 30-year term.
451. Ms. Boggs’ summary in her letter to Chief Secretary Lehri in August 2009 of the points on which the parties had reached agreement indicates the contrary and Respondent did not point to any contemporaneous evidence in the record that the GOB disagreed with that summary. Claimant further pointed to the minutes of the Negotiation Committee meeting on 15 October 2008 according to which “*TCC has requested in regards to assurances as to its mining title and access*” and Mr. Roberts and Mr. Chaudry, who are referred to as participants from Pakistan’s side with Mr, Chaudry being the Chairman of the Negotiating Committee, “*do not think this is a problem and these rights should be incorporated into the overall agreement.*”⁴⁸²
452. Based on the evidence in the record, the Tribunal considers it likely that the GOB would have agreed on a provision in the Mineral Agreement pursuant to which the Mining Lease would be renewed after its initial 30-year term. As pointed out by Ms. Boggs, it would also have been in the interest of the GOB that the mine would continue to operate without interruption and provide it with revenues from its 25% interest in the project and the royalties it would be collecting. Likewise, it would have been in the GOB’s interest to provide Claimant with security in return for Claimant’s continued commitment to further develop and expand the mine as exploration activities continued in parallel to the

⁴⁸⁰ Boggs V, ¶ 49.

⁴⁸¹ Khokhar III, ¶ 32.

⁴⁸² Exhibit CE-942, p. 13.

construction and operation of the initial mine. In this regard, the Tribunal also takes note of Ms. Boggs' further testimony:

“Even in the absence of an explicit written agreement from Balochistan to renew our lease, however, I believe we would have been able to secure a lease renewal. In my experience, governments always renew mining leases unless there has been a major rift in their relationship with the investor, such as an environmental disaster or serious mismanagement. If a project is going well, it is clearly in the government’s interest to renew the lease. With some very few exceptions, governments, particularly those without a long history of domestic mining, do not have the capacity to run large mines like this one and they therefore have no choice but to partner with a major mining company and there are just not that many of them. The bidding process to find a new partner is time-consuming and potentially very costly and there is no guarantee that the government will be able to reach an agreement that is more favorable than the one they already have in place with the original investor.”⁴⁸³

453. While the Tribunal considers this testimony plausible and therefore agrees with Claimant that it is reasonable to assume in the present but-for assessment that the GOB would have agreed to renewing the Mining Lease after its initial 30-year term, the Tribunal is not entirely convinced that the GOB would have agreed to a completely unconditional renewal, *i.e.*, a renewal without retaining any possibility to re-negotiate any of the terms to account for, *e.g.*, a change of circumstances.
454. In any event, the Tribunal considers it plausible that a willing buyer valuing the project in November 2011 would have factored in a certain risk that the GOB might not agree to a completely unconditional renewal and/or that the Mining Lease might not be renewed, or at least not on the exact same terms, thirty years into the future. For that reason, the Tribunal finds that the valuation of Claimant’s investment in this arbitration may not simply assume that the Mining Lease would be renewed, without making any deductions for an inherent risk that the renewal of the Lease by the provincial Government might not be forthcoming as originally planned.
455. In this regard, the Tribunal also agrees with Respondent that, contrary to Claimant’s suggestion in its Quantum Memorial which it did not pursue further in its subsequent submissions,⁴⁸⁴ the Tribunal did not make a finding that Respondent had created a legitimate expectation on Claimant’s part that it would be entitled to a renewal of the Mining Lease for the life of the mine without any changes to the commercial terms that would apply to the project for 56 years into the future. In particular, the Tribunal does not agree with Claimant’s argument that a finding made by the tribunal in *CME v. Czech*

⁴⁸³ Boggs V, ¶¶ 49-50.

⁴⁸⁴ Cf. Claimant’s Quantum Memorial, ¶ 67

*Republic that the “possibility of non-renewal of the [broadcasting] license ... must be disregarded as a matter of fact” because “generally, broadcasting licenses in Europe are renewed as a matter of ordinary administrative practice”*⁴⁸⁵ would be transferrable to the present case. It is undisputed between the Parties that the Reko Diq project would have been the first mining project of this scale in Pakistan. Consequently, there can be no general practice in Pakistan to renew a mining lease for a project such as Reko Diq “*as a matter of ordinary administrative practice.*”

456. As noted above, Ms. Boggs’ testimony that mining leases are commonly renewed in the industry because most governments do not have the capacity to run large mines and because they have no guarantee of finding an alternative operator with whom they would be able to reach a more favorable agreement is perfectly plausible. In the Tribunal’s view, this does not eliminate, however, the risk that the Government might request an adjustment of the commercial terms in return for renewing the Mining Lease or might even refuse to renew the Mining Lease based on certain legitimate policy considerations that could not be known in November 2011. In the Tribunal’s view, it further cannot be assumed that any request for re-negotiations or the refusal to renew, regardless of the reasons for such refusal, would necessarily have to be deemed a breach of Respondent’s obligations under the Treaty that must be assumed away for the purposes of this but-for assessment.
457. Therefore, the Tribunal concludes that: (i) a willing buyer would have included the value associated with a mining lease renewal in its valuation because it was likely that the GOB would have agreed on such a provision in the Mineral Agreement; but (ii) the buyer would also have factored in the risk that the GOB might not have agreed on an unconditional renewal or that, in any event, the mining lease might not be renewed or at least not be renewed on the same terms thirty years into the future. In the Tribunal’s view, this finding, *i.e.*, that a buyer would have accounted for the value but would also have accounted for the risk that this value might not materialize, is also supported by the significant value that Claimant’s expert Prof. Davis calculated for the renewal.
458. According to the sensitivity analysis provided by Prof. Davis, the impact of an assumption that the Mining Lease would not be renewed would lower the value of Claimant’s share in the project by USD 2.978 million.⁴⁸⁶ For the reasons set out above, the Tribunal considers it most likely that a willing buyer would have factored in a risk of 25% that the value of the renewal would not materialize or that the renewal would not be on the same commercial terms and thus would have been prepared to pay 75% of that value, which therefore represents the fair market value of the renewal for the present but-for

⁴⁸⁵ *CME Czech Republic B.V. (Netherlands) v. Czech Republic*, UNCITRAL Final Award of 14 March 2003 [CA-129], ¶ 605.

⁴⁸⁶ Davis II, Table 7.

assessment. Consequently, the Tribunal concludes that the amount requested by Claimant must be reduced by 25% of the difference between the value including the renewal and the value excluding the renewal, *i.e.*, by USD 744.5 million.

(d) Conclusion

459. In conclusion, the Tribunal finds that it is most likely that Claimant and the Governments would have reached an agreement on the terms of a Mineral Agreement. It further finds that those terms would most likely have included: (i) a sliding scale increasing from 2% to 4% over the life of the mine, on the basis that the GOB's interest in the project would have been restructured to a 25% net profit interest; (ii) EPZ status or similar tax concessions for the first fifteen years of the project while returning to the normal tax regime for the remainder of the mine's life; and (iii) a provision regarding the renewal of the Mining Lease. As for the renewal, the Tribunal finds, however, that a willing buyer would have factored in the risk that the value of the renewal would not materialize or that the renewal would not be on the same commercial terms and would thus have been prepared to pay 75% of the value associated with a renewal of the Mining Lease.
460. On that basis and based on the sensitivity analyses provided by Prof. Davis, the Tribunal concludes that the amount requested by Claimant as damages must be reduced by: (i) USD 287 million to account for the assumption that the parties would not have agreed on a 2% royalty but rather a sliding scale of royalties increasing from 2.5% to 4% over the life of the mine; and (ii) USD 744.5 million to account for the assumption that a buyer would have factored in a risk of 25% that the Mining Lease might not be renewed or might not be renewed on the same terms.⁴⁸⁷

2. Whether Claimant Has Established the Estimation and Classification of the Resources Reported in the Feasibility Study

461. Second, the Tribunal will address the question whether Claimant has established the accuracy of the estimation and classification of the resources that were reported in the Feasibility Study and also formed the basis of Prof. Davis' calculation of the project's future cash flows.

a. Summary of Claimant's Position

462. Claimant submits that TCC conducted multiple drilling campaigns extending over 350,000 meters and thereby established that Reko Diq had proven and probable reserves (the reserve base reflecting measured and indicated resources) of nearly 13 million tonnes of copper and nearly 23 million ounces of gold, which as of 2011 made it the sixteenth

⁴⁸⁷ Davis II, Tables 8 and 7.

- largest copper deposit in the world.⁴⁸⁸ Claimant adds that an additional 1,759,309,557 ore tonnes of inferred resources had been identified but were not assigned any value by Prof. Davis even though a willing buyer would have expected to be able to mine a significant portion of those inferred resources during the life of the mine.⁴⁸⁹
463. Claimant argues that neither of Respondent's criticisms on geology and metallurgy affects the value of the project because they are factually incorrect and "*reveal a profound lack of understanding about mining practices in general and the Reko Diq project in particular.*"⁴⁹⁰
464. Claimant maintains that its resource estimate is "*highly reliable*" and refers to its geology expert, Mr. Mario Rossi, who concluded that TCC's resource estimate "*was conducted professionally and in accordance with widely accepted industry practices. It provides a reliable estimate of Reko Diq's resources, an estimate of the kind that buyers and sellers regularly use when transacting in mining properties.*"⁴⁹¹ Claimant considers that neither Respondent nor its experts have challenged the result of Mr. Rossi's "*targeted due diligence specifically for this arbitration*" which "*independently corroborated TCC's work*" and notes that Respondent's experts have not offered any alternative resource estimate. In Claimant's view, Respondent's case on geology does not concern resource estimation but only the classification of those resources and TCC's compliance with reporting standards.⁴⁹²
465. Claimant contends that the classification of Reko Diq's resources into the relevant levels of geological confidence, *i.e.*, measured, indicated and inferred resources, followed sound industry practice and was done "[w]ith no incentive other than getting it right." Claimant submits that its owners had initially adopted different methods, with Barrick applying the geometric method reflecting the current industry standard and Antofagasta applying the less common and more complex probabilistic method; they then called on Mr. Rossi to propose a common methodology for TCC. Mr. Rossi advised them to adopt "*a rigorous version of the tried-and-tested geometric method, using a separate probabilistic check*" which improved on the model that had been used by Barrick and implemented a probabilistic view of the classification so obtained, in line with the most advanced industry standards.⁴⁹³ Claimant further points out that this methodology was also endorsed in a contemporaneous independent audit by the consultant Behre Dolbear, which noted that "[t]he Rossi scheme, moving from probabilistic to geometric methods,

⁴⁸⁸ Claimant's Quantum Post-Hearing Brief, ¶¶ 34-35; Claimant's Quantum Reply, ¶ 430.

⁴⁸⁹ Claimant's Quantum Reply, ¶ 430.

⁴⁹⁰ Claimant's Quantum Post-Hearing Brief, ¶ 36.

⁴⁹¹ Claimant's Quantum Post-Hearing Brief, ¶ 37, quoting from Rossi, ¶ 15.

⁴⁹² Claimant's Quantum Post-Hearing Brief, ¶¶ 38-39; Claimant's Quantum Reply, ¶ 443.

⁴⁹³ Claimant's Quantum Reply, ¶¶ 433-439; Claimant's Quantum Post-Hearing Brief, ¶ 40.

has enforced a focus on continuity in grade and geology. The precepts and steps to be implemented are endorsed."⁴⁹⁴

466. In response to the argument of Respondent's expert, Prof. Dagdelen, that Mr. Rossi's method led to a result that "*is 41.5% higher than the Measured and Indicated tonnes estimated by Antofagasta's geologists,*" Claimant notes that he failed to take into account Antofagasta's results yielded by the probabilistic method under an expansion scenario, which were in fact higher than the results yielded by Mr. Rossi's method used in the Feasibility Study.⁴⁹⁵ Claimant also points out that the results were lower than those produced by Barrick's initial classification of measured and indicated resources.⁴⁹⁶
467. Claimant further rejects the argument that Mr. Rossi's method would be "*highly unusual and unprecedented,*" noting that Prof. Dagdelen agreed with Mr. Rossi that the geometric method is the leading classification method used by about 95% of the industry and conceded that "*probably zero*" mining companies follow the probabilistic technique.⁴⁹⁷ Claimant points out that Prof. Dagdelen did not identify any reason why TCC should have adopted a probabilistic method but merely referred to "*the advantages that Mario [Rossi] came up with.*"⁴⁹⁸ Claimant notes that Mr. Rossi also described risks and shortcomings of this method which makes it less robust than the geometric method but suitable as a check.⁴⁹⁹ According to Claimant, Prof. Dagdelen does not have the relevant professional expertise on resource estimation because, unlike Mr. Rossi, he has not worked as a Qualified Person (QP) on any of the world's 10 largest copper mines and could not identify any copper porphyry deposit on which he worked as a QP.⁵⁰⁰
468. Claimant also contends that, even though considering it "*strictly irrelevant to Reko Diq's market value*" whether formal reporting requirements were met, TCC and its owners complied with the applicable reporting standards. While the Canadian reporting standard NI 43-101 does not apply to the private Australian company TCC, Claimant argues that in any event it contains language in its Section 5.3 pursuant to which producing issuers, such as Barrick and Antofagasta, are exempted from the requirement that an independent QP approve technical reports (not the feasibility study itself, which usually remains

⁴⁹⁴ Claimant's Quantum Reply, ¶ 441, quoting from **Exhibit CE-1331**, p. 25; Claimant's Quantum Post-Hearing Brief, ¶ 40.

⁴⁹⁵ Claimant's Quantum Post-Hearing Brief, ¶ 41, quoting from Respondent's Counter-Memorial on Quantum, ¶ 211; Dagdelen/Owen I, ¶ 170.

⁴⁹⁶ Claimant's Quantum Reply, ¶ 442.

⁴⁹⁷ Claimant's Quantum Post-Hearing Brief, ¶ 42, quoting from Transcript Hearing on Quantum (Day 3), p. 915. See also Claimant's Quantum Reply, ¶ 438.

⁴⁹⁸ Claimant's Quantum Post-Hearing Brief, ¶ 43, quoting from Transcript Hearing on Quantum (Day 3), p. 925.

⁴⁹⁹ Claimant's Quantum Post-Hearing Brief, ¶ 43, referring to Rossi, ¶ 56 and Transcript Hearing on Quantum (Day 3), pp. 727-730.

⁵⁰⁰ Claimant's Quantum Post-Hearing Brief, ¶ 44.

confidential because it contains trade secrets and commercially sensitive information) which were instead reviewed and signed off by QPs employed by both companies.⁵⁰¹

b. Summary of Respondent's Position

469. Respondent submits that in order to determine the value of the copper and gold beneath the surface at Reko Diq, Claimant must achieve a level of certainty that it would be able and economically feasible to turn the rock into recoverable metal. Respondent emphasizes that if any of the issues that might arise poses a cost that is too high for the mineral to be economically extracted, the resources cannot be classified as anything more than inferred and do not have any economic value; they can never become reserves.⁵⁰²
470. Respondent agrees with Claimant regarding the classification of resources into inferred, indicated and measured resources and adds that inferred resources, which cannot be ascribed any value, can only be moved to a category of increased certainty based on studies evaluating all relevant factors if these studies show that “*at the time of reporting, that extraction of the metals from the deposit can be economically justified.*”⁵⁰³ According to Respondent, Claimant made “*unwarranted assumptions that moved resources into more valuable categories*” and while it may have been able to measure the total size of the ore bodies, “*it did not have the drilling to show that it could classify the resources as indicated or measured on the scale claimed by TCC.*”⁵⁰⁴
471. Respondent notes that Claimant's owners initially performed independent analyses of Claimant's drilling, which reached “*far different conclusion[s].*” According to Respondent, the model applied by Antofagasta based on statistical assumptions is a “*newer model*” but “*tends to produce more accurate results*” than the “*block model*” applied by Barrick; it resulted on a “*much more conservative figures with a lower economic value.*” According to Respondent, the third-party consultant hired by the owners, Mr. Rossi, “*essentially selected the best parts of both methodologies, even though the methodologies depart from different premises, and decided to move a large portion of the inferred resources into the indicated category and add more resources to the inferred category.*” Respondent considers that there is not scientific support for this method and its conclusion is not sufficient for NI 43-101 regulations.⁵⁰⁵
472. Respondent submits that Claimant's claims must fail because it has failed to maintain the information underlying the database to create the resource model or method to interpret it and because Mr. Rossi's classification of the resources “*lacks significant indicia of*

⁵⁰¹ Claimant's Quantum Post-Hearing Brief, ¶ 45; Claimant's Quantum Reply, ¶¶ 444-448.

⁵⁰² Respondent's Counter-Memorial on Quantum, ¶ 193.

⁵⁰³ Respondent's Counter-Memorial on Quantum, ¶ 196, quoting from Dagdelen/Owen I, p. 25.

⁵⁰⁴ Respondent's Counter-Memorial on Quantum, ¶ 198.

⁵⁰⁵ Respondent's Counter-Memorial on Quantum, ¶¶ 211-214.

reliability.” In addition, Respondent considers that there is no dispute regarding the amount of metallurgical sampling in testing and maintains that the deposits are not sufficiently certain “*to merit the scant sampling and testing done.*” In Respondent’s view, Claimant’s “*excuses*” regarding the lack of a signature by a QP further show that a buyer would not have trusted in a feasibility study that Claimant’s owners would not stand behind.⁵⁰⁶ According to Respondent, “*the entirety of the resource model and its calculations are uncertain and speculative.*”⁵⁰⁷

473. Respondent argues that since 2006 the size and grade of the resource at Reko Diq have deteriorated “[w]ith almost every update.” According to Respondent, Claimant’s drilling campaign revealed “*a low-grade copper deposit that continued the drop in quality.*” Respondent also points out that the audit conducted by Behre Dolbear in September 2009 mentions a reduced size of the resource.⁵⁰⁸
474. According to Respondent, Claimant has failed to show that its resource model is trustworthy given that: (i) it has not provided an independent analysis that admitted flaws were fixed; (ii) it did not rebut Prof. Dagdelen’s findings regarding the flaws in the database underlying the resource model; and (iii) Mr. Rossi’s method and its application are “*completely unreliable.*”⁵⁰⁹
475. Respondent claims that Prof. Dagdelen identified “*several key flaws in the drill hole database*” for Tanjeel, H-13 and also the Feasibility Study, such as “*grade-related issues*” and “*information gaps*” in the alterations and lithologies as well as collar coordinates.⁵¹⁰ According to Respondent, the audit referred to by Claimant in response to this criticism does not address any corrective measures for Tanjeel and H-13.⁵¹¹ Respondent also refers to Prof. Dagdelen’s review of the project records in Islamabad which in its view revealed missing information and made it impossible to confirm or recreate data.⁵¹²
476. Respondent further contends that it is doubtful whether Claimant used the method devised by Mr. Rossi, given that he was not aware whether it was applied, there was no QP making a decision regarding the appropriate classification method, and Claimant’s final resource calculation was “*far better*” than the results predicted by Mr. Rossi.⁵¹³ In addition, Respondent argues that the results yielded by his method are unreliable because “*none of*

⁵⁰⁶ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 70-72.

⁵⁰⁷ Respondent’s Rejoinder on Quantum, ¶ 168.

⁵⁰⁸ Respondent’s Post-Hearing Brief on Quantum, ¶ 73; Respondent’s Rejoinder on Quantum, ¶¶ 178-179, referring to **Exhibit CE-1331**, p. 7.

⁵⁰⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 75.

⁵¹⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 76, quoting from Dagdelen/Owen I, ¶¶ 157, 162.

⁵¹¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 77, referring to **Exhibit C-1331**, p. 7.

⁵¹² Respondent’s Post-Hearing Brief on Quantum, ¶ 77.

⁵¹³ Respondent’s Post-Hearing Brief on Quantum, ¶ 78; Respondent’s Rejoinder on Quantum, ¶ 181.

the key conclusions in his memorandum proved true.” Respondent considers it irrelevant whether the method produces identical results at 110,000 tonnes and 220,000 tonnes of production per day and maintains that it is “*highly unusual*” that the resource calculations of Antofagasta and Barrick were so far apart. According to Respondent, the fact that Mr. Rossi’s method yielded results “*roughly similar to Barrick’s resource calculation*” shows that Barrick was “*controlling the process and pushing for unscientific conclusions.*”⁵¹⁴

477. Respondent submits that, unlike Mr. Rossi who was recruited to review his own work in the past, Prof. Dagdelen, is “*a QP with no prior interest in the project*” and he has identified several criticisms of Mr. Rossi’s method which was never adopted by an independent QP.⁵¹⁵
478. Respondent submits that by contrast to the Feasibility Study which Claimant kept confidential, a feasibility study compliant with with NI 43-101 regulations is made available to the public person and signed by a QP.⁵¹⁶ Respondent maintains that Claimant’s Feasibility Study had to be signed by an independent QP, in compliance with the relevant reporting standard NI 43-101, arguing that the statement of resources came from a joint venture where one partner is not a “*producing issuer*” for purposes of Canadian law. Respondent also argues that Barrick has filed technical reports signed by a QP for every resource calculation since 2009; however, there was no resource calculation done at feasibility level which would have included all available information. Respondent claims that Claimant failed to show that its Board of Directors or either of its owner had “*signed off*” on the Feasibility Study.⁵¹⁷
479. Respondent contends that the audit conducted by Behre Dolbear was done at pre-feasibility stage and “*does not look at the resource model in the IMD FS from the perspective of the heightened accuracy requirements*” at feasibility level.⁵¹⁸ Respondent also points to statements in the audit that data from an additional 63 drill holes had to be integrated “*before the figures can be accepted for input to feasibility studies*” and “*other deposits also need to be re-estimated over the coming months.*”⁵¹⁹ Respondent notes that Mr. Rossi does not make reference to adding data from these additional drill holes or re-estimation of other deposits and therefore concludes that Claimant “*did not do the work to take its resource estimation from the pre-feasibility stage to the feasibility stage.*”⁵²⁰

⁵¹⁴ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 78-80.

⁵¹⁵ Respondent’s Rejoinder on Quantum, ¶¶ 181-185.

⁵¹⁶ Respondent’s Counter-Memorial on Quantum, ¶ 216.

⁵¹⁷ Respondent’s Counter-Memorial on Quantum, ¶ 216; Respondent’s Rejoinder on Quantum, ¶¶ 186-189; Respondent’s Post-Hearing Brief on Quantum, ¶¶ 104-106.

⁵¹⁸ Respondent’s Rejoinder on Quantum, ¶¶ 190-192; Respondent’s Post-Hearing Brief on Quantum, ¶ 74.

⁵¹⁹ Respondent’s Rejoinder on Quantum, ¶ 193, quoting from **Exhibit CE-1331**, p. 7.

⁵²⁰ Respondent’s Rejoinder on Quantum, ¶ 193.

c. Tribunal's Analysis

480. At the outset of its analysis on whether Claimant has established the accuracy of the estimation and classification of the mineral resources reported in the Feasibility Study, the Tribunal notes that the estimation and classification performed for the Feasibility Study was not conducted for the purposes of a damages valuation in contentious proceedings but rather for the purposes of determining whether the resources available could form the basis of successful mining operations at Reko Diq. As a general matter, the Tribunal therefore does not consider it plausible that Claimant and its owners would apply a “*haphazard resource estimation technique to inflate the value of the mine*,” as Respondent alleges.⁵²¹ Why would these companies and their employees as well as the independent consultant they instructed to devise a method for estimating and classifying resources be interested in “*inflating*” the value of a mine that they intended to build and operate? In the Tribunal’s view, these general considerations should be borne in mind when evaluating the criticisms raised by Respondent and its experts in these arbitration proceedings.
481. As a further preliminary matter, the Tribunal understands that a distinction must be drawn between: (i) “*resource estimation*” which aims at determining the tonnage and grade (concentration) of metal in a deposit; and (ii) “*resource classification*” which describes the level of confidence in the predicted resources, with the commonly used categories being measured resources (high level of confidence), indicated (reasonable level of confidence) and inferred resources (low level of confidence).⁵²² While the Parties take different views as to whether inferred resources can be attributed some economic value, Prof. Davis has not attributed any value to the inferred resources for Reko Diq in his valuation,⁵²³ which means that there is no need to express an opinion on this point.
482. While Respondent initially argued that Claimant applied “*improper resource estimation techniques*” in the Feasibility Study,⁵²⁴ Respondent clarified in its subsequent submissions that its objection relates to the “*resource model*” devised by Mr. Rossi and whether it was (correctly) applied in the Feasibility Study.⁵²⁵ As explained by Mr. Rossi in his expert report, this model did not concern the estimation of the resource available at Reko Diq but rather its classification into the categories of confidence.⁵²⁶ It therefore appears that Respondent’s challenge does not aim at the resource estimate as such or how

⁵²¹ Respondent’s Counter-Memorial on Quantum, ¶ 211.

⁵²² Cf. Rossi, ¶¶ 45-49.

⁵²³ Cf. Davis I, ¶¶ 23-25.

⁵²⁴ Cf. Respondent’s Counter-Memorial on Quantum, ¶¶ 211 *et seq.*

⁵²⁵ Cf. Respondent’s Rejoinder on Quantum, ¶¶ 166 *et seq.*; Respondent’s Post-Hearing Brief on Quantum, ¶¶ 73 *et seq.*

⁵²⁶ Cf. Rossi, ¶ 62.

it was obtained. The Tribunal is aware that this may not be entirely correct as Respondent has challenged Claimant's approach to determining the geo-metallurgical domains of the ore body which are also relevant in the estimation of the overall available resource.⁵²⁷ However, as the Parties have addressed this issue in the context of the question whether Claimant has conducted adequate metallurgical sampling and testing to determine the economical extractability of the metals, the Tribunal will also analyze this aspect in that context. For the present purposes, it suffices to note that, as will be set out in detail below, the Tribunal is convinced that Claimant's approach to determining the geo-metallurgical domains was sound and in accordance with industry practice.

483. At the same time, Respondent's challenge to the classification of the resources is relevant to the present analysis of Claimant's damages because, as Prof. Davis explained, only the two categories reflecting a high or reasonable level of confidence, *i.e.*, measured and indicated resources, are taken into account in his valuation. Consequently, the Tribunal must be convinced that the classification of the resources in the Feasibility Study was reasonable and in line with what a willing buyer would have accepted in November 2011.
484. It is undisputed between the Parties that Barrick and Antofagasta initially applied different methods to classify the resources at Reko Diq and that these methods produced deviating results. In a Memorandum dated March 2009, Mr. Rossi of GeoSystems International (GSI), who was consulted by Claimant to determine the best approach to classifying the resources, noted that the different resource classification methods applied by Barrick and Antofagasta "*have resulted in very different proportions and tonnages of measured, indicated and inferred material for these deposits,*" which he depicted in the following table:⁵²⁸

Table 1: Initial Resource Classification of H14 and H15, based on Barrick's and AMSA's method.

	Cutoff Cueq725	Barrick methodology				AMSA's classification based on 100 KT/d			
		MT	Cueq725 (%)	Cut (%)	Au (ppm)	MT	Cueq725 (%)	Cut (%)	Au (ppm)
Measured	0.3	93	0.668	0.519	0.302	881	0.681	0.532	0.301
Indicated	0.3	2,315	0.653	0.510	0.289	657	0.644	0.506	0.278
M+Ind	0.3	2,408	0.654	0.511	0.289	1,539	0.665	0.521	0.291
Inferred	0.3	364	0.659	0.506	0.311	2,578	0.645	0.496	0.301
MII	0.3	2,772	0.654	0.510	0.292	4,116	0.653	0.506	0.297
Unclass	0.3	1,344	0.651	0.498	0.307				
MII+U	0.3	4,116	0.653	0.506	0.297	4,116	0.653	0.506	0.297
	Cutoff Cueq725	Barrick methodology				AMSA's classification based on 200 KT/d			
		MT	Cueq725 (%)	Cut (%)	Au (ppm)	MT	Cueq725 (%)	Cut (%)	Au (ppm)
Measured	0.3	93	0.668	0.519	0.302	1,406	0.668	0.523	0.293
Indicated	0.3	2,315	0.653	0.510	0.289	964	0.626	0.494	0.268
M+Ind	0.3	2,408	0.654	0.511	0.289	2,370	0.651	0.511	0.283
Inferred	0.3	364	0.659	0.506	0.311	1,746	0.654	0.498	0.317
MII	0.3	2,772	0.654	0.510	0.292	4,116	0.653	0.506	0.297
Unclass	0.3	1,344	0.651	0.498	0.307				
MII+U	0.3	4,116	0.653	0.506	0.297	4,116	0.653	0.506	0.297

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⁵²⁷ Cf. Rossi, ¶ 45 lit. c.

⁵²⁸ Exhibit RE-576-3.08, Table 1.

485. Mr. Rossi noted that Antofagasta's method depended on the production rate, which he considered "*difficult to reconcile with mining engineer's standard practices*" and "*better suited for advanced projects, when the production rate is not variable.*"⁵²⁹ Following a description of the geometric method applied by Barrick and the probabilistic method applied by Antofagasta, Mr. Rossi considered:

*"Both methods have advantages and disadvantages, and both methods (as are all resource classification methods) are inescapably subjective. Although well understood by most people, the reader is reminded that we should not believe there is an 'objective' or 'true' classification method; the best we can aspire for is reasonableness and consistency."*⁵³⁰

486. Mr. Rossi discussed the advantages and disadvantages of probabilistic and geometric methods and examined the results of sensitivity analyses conducted on each method and then proposed an alternative method:

"GSI proposes a method based on a combination of geological and grade continuity, data density, and understanding of the deposit. The method is in essence an attempt to gain the advantages of the two concepts originally proposed by the JV partners. It is geometric in the definition of the resource categories, but with a probabilistic check to assess whether the original definitions of measured, indicated, and inferred result in an acceptable level of confidence.

*Most of these steps were completed in Santiago, with the exception of the final smoothing and the probabilistic characterization of the classified resources (see below). Also, [Antofagasta] stated that there were further drill holes that could be added into the database (not currently available) which should be considered before the final classification runs were completed."*⁵³¹

487. Mr. Rossi then presented a step-by-step plan of his proposed method and concluded that "[a]fter completion of the initial resource classification using the proposed method, it is expected that total resources for H14 and H15 will be split approximately evenly into Measured, Indicated, and Inferred." He further expected that the total measured plus indicated resources would drop from 2.37 billion tonnes to about 2 billion.⁵³²

488. Respondent argues that it is uncertain whether the method proposed by Mr. Rossi in March 2009 was implemented by Claimant, given that the results produced by its method were higher than those predicted by Mr. Rossi in the conclusions of his memorandum. During the Hearing on Quantum, Mr. Rossi testified that he did not know at the time whether Claimant would follow his recommendation but that based on a due diligence

⁵²⁹ Exhibit RE-576-3.08, pp. 2, 6.

⁵³⁰ Exhibit RE-576-3.08, p. 6.

⁵³¹ Exhibit RE-576-3.08, p. 9.

⁵³² Exhibit RE-576-3.08, p. 12.

that he was asked to perform for this arbitration, he stated that “*I know that they followed the recommendations in the main points that I made, and I know that they also made modifications to the parameters I had originally proposed, which I found appropriate during my due diligence last year.*” He added that “*these [modifications] were minor in the context and actually affected only the Measure for some grade domains.*”⁵³³ In response to the question whether his expectation that the measured and indicated resources would drop to 2 billion tonnes corresponds to the actual results reported in the Feasibility Study, Mr. Rossi acknowledged that this was not the case. He added that “*remember that this was an exercise based on a different model that had not yet been prepared*” and emphasized that there had also been a “*significant number of tonnage in the unclassified category*” and clarified that his expectation of a drop in resources had referred to an expected reclassification of resources.⁵³⁴

489. The Tribunal considers Mr. Rossi’s testimony credible. Based on his due diligence of the resource classification work for the Feasibility Study, Mr. Rossi confirmed that Claimant had implemented the method he had proposed with certain minor modifications that he considered appropriate. The Tribunal does not have any reason to believe that, contrary to Mr. Rossi’s testimony, Claimant significantly deviated from the recommendations given by Mr. Rossi in March 2009. Neither of Respondent’s experts has testified to this effect. In the Tribunal’s view, the fact that certain of Mr. Rossi’s expectations did not materialize does not indicate that Claimant did not follow his proposed method; neither does it indicate that Mr. Rossi’s method is generally unreliable, as Respondent also alleges. As Mr. Rossi testified, the model he was proposing had not yet been prepared and he was therefore only providing expectations. His expectations were further based on the data available as of March 2009, *i.e.*, more than a year before the Feasibility Study was completed. It is undisputed that during this time period, Claimant continued its drilling program and continued to receive updated data that would then be incorporated into the resource classification model. Mr. Rossi noted already in his March 2009 memorandum that Antofagasta had stated that “*there were further drill holes that could be added into the database (not currently available) which should be considered before the final classification runs were completed.*”⁵³⁵
490. Consequently, the Tribunal considers that the remaining issue to be addressed is whether the resource classification method devised by Mr. Rossi, as implemented by Claimant in the Feasibility Study, produced accurate results on which a willing buyer would have based its valuation of the Reko Diq project. In this regard, the Tribunal takes note of the

⁵³³ Transcript Hearing on Quantum (Day 3), p. 743 lines 8-16.

⁵³⁴ Transcript Hearing on Quantum (Day 3), p. 747 line 12 to p. 748 line 8.

⁵³⁵ **Exhibit RE-576-3.08**, p. 9.

following statement in Mr. Rossi's expert report regarding the choice of a method for classifying resources:

*“There is no single right answer, and the appropriate method must be decided by the CP. International standards, which I discuss in more detail below, give significant leeway to the CP to make these decisions and do not prescribe rigid criteria or precise implementation methods to be used at the time of resource classification. A common misconception is that resource classification provides an objective measure of the confidence with which a mineral resource estimate has been obtained. In fact, resource classification is simply the expression of an experienced and competent opinion, that of the CP. The CP's good judgment is crucial. For this reason, the JORC Code (and other, similar standards) stipulate that [a] ‘Competent Person’ must have a minimum of five years’ experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which that person is undertaking.”*⁵³⁶

491. Mr. Rossi emphasized in his report that he was never asked to act as a Competent Person (CP) for Claimant or any of its owners but that he was rather asked to advise their own CPs on what would be the most reasonable approach for the classification of the resources at Reko Diq.⁵³⁷ According to Respondent, the absence of a resource estimation at feasibility level signed by an independent QP/CP, who exercised the “*good judgment*” referred to by Mr. Rossi, means that Claimant's classification of resources lacks the necessary validation and is therefore unreliable.
492. The Parties are in dispute as to whether the Canadian reporting standards NI 43-101 on which Respondent relies with regard to the requirement of an independent QP signing off on technical reports applies to the resource estimate included in the Feasibility Study and, if so, whether an exemption applies to the independence requirement because Claimant's owners are producing issuers. In the Tribunal's view, however, the decisive question is whether, as described by Mr. Rossi in the excerpt quoted above, “*an experienced and competent opinion*” was given and “*good judgment*” was exercised by a person with the necessary experience to determine the appropriate resource classification method for Reko Diq.
493. The Tribunal understands Mr. Rossi's testimony to mean that he was not the one making the judgment call that he described above. Barrick's and Antofagasta's teams had the necessary experience themselves but given the debate among them regarding the appropriate classification method, they sought advice from a third party and decided to act on that advice with certain minor modifications. As pointed out by Claimant, Barrick's and Antofagasta's annual reports for 2011 reported on Reko Diq's resource estimate and

⁵³⁶ Rossi, ¶ 57.

⁵³⁷ Rossi, ¶ 79.

included references to their respective QP/CPs.⁵³⁸ This was also noted by Prof. Davis in his second report.⁵³⁹

494. Against this background, the Tribunal considers it reasonable to conclude that a Competent Person from each of Claimant's owners made the judgment call referred to by Mr. Rossi and reached the conclusion that the method devised by Mr. Rossi was appropriate for Reko Diq.

495. The Tribunal further notes that as part of his due diligence conducted for this arbitration, Mr. Rossi also applied an alternative method, defining alternative geological domains and applying different statistical parameters to estimate grades, to estimate and classify the resources at Reko Diq and concluded that this method confirmed the reliability of Claimant's resource estimation, including the classification as measured and indicated resources. Specifically, his alternative method resulted in an estimate of measured and indicated resources that was roughly 0.8% higher than Claimant's estimate. In his opinion, both methods are "*scientifically sound and could be adopted by a CP to estimate Reko Diq's resources*" and he explained that close estimates yielded by the two alternative methods confirm that the underlying data is sufficient and accurate.⁵⁴⁰

496. Claimant also points out that the method proposed by Mr. Rossi in March 2009 formed part of an audit by the mining industry consultant Behre Dolbear in September 2009 on which both Parties relied in various parts of their submissions. On resource classification, the audit report notes:

*"The Rossi scheme, moving from probabilistic to geometric methods, has enforced a focus on continuity in grade and geology. The precepts and steps to be implemented are endorsed."*⁵⁴¹

497. Respondent points out that the audit was conducted in September 2009 and therefore did not pertain to the final resource estimate included in the Feasibility Study in 2010. The Tribunal agrees with Respondent to the extent that the audit does not confirm the correct implementation of Mr. Rossi's proposed method by Claimant in the Feasibility Study. It

⁵³⁸ Exhibits CE-1040, pp. 183, 188 and CE-1023, pp. 146, 149. Antofagasta's 2011 annual report specifically notes: "*The information on ore reserves and mineral resources was prepared by or under the supervision of Competent Persons as defined in the JORC Code. The Competent Persons have sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are undertaking. The Competent Persons consent to the inclusion in this report of the matters based on their information in the form and context in which it appears. The Competent Person for Exploration Results and Mineral Resources is Orlando Rojas (MAusIMM), Assistant Manager of Mineral Resource Evaluation for Antofagasta Minerals S.A.. The Competent Person for Ore Reserves is Murray Canfield (P.Eng. Ontario), Technical Manager Operations for Antofagasta Minerals S.A.*"

⁵³⁹ Davis II, ¶ 216.

⁵⁴⁰ Rossi, ¶¶ 21, 70-75.

⁵⁴¹ Exhibit CE-1331, p. 28.

confirms, however, that the auditor endorsed the method as such and contradicts Respondent's allegation that the method was "*haphazard*" or "*scientifically bogus*."⁵⁴²

498. In addition, the Tribunal considers it noteworthy that while Prof. Dagdelen has criticized the method proposed by Mr. Rossi, he has not specified which classification method should have been applied nor has he provided an alternative resource estimate or classification. The Tribunal is also not convinced by Prof. Dagdelen's opinion that Mr. Rossi's method was "*highly unusual and unprecedented*" because a resource classification method cannot be "*somehow modified or amalgamated with other methods*."⁵⁴³ Mr. Rossi clarified in his report that he did not amalgamate the two methods but rather proposed to apply a geometric method and then perform a separate probabilistic check to test the robustness of the initial geometric classification.⁵⁴⁴ Prof. Dagdelen did not dispute or address this explanation in his second report.
499. During the Hearing on Quantum, Prof. Dagdelen confirmed that he considered it "*unusual*" to have a probabilistic check on a geometric method and that he had not seen this being done in his experience. He stated that "*95 percent of the companies use geometric method, and probably not many of them—probably zero—follow it by the probabilistic technique*." Prof. Dagdelen first confirmed Mr. Rossi's testimony that 95% of companies use the geometric method rather than probabilistic methods but then testified that Claimant should have used the probabilistic method because he considered Antofagasta "*a very experienced copper mining company*" and one should "*pay attention*" to the method proposed by its geologist.⁵⁴⁵
500. Based on Prof. Dagdelen's oral testimony, the Tribunal considers it agreed between the Parties' experts that a geometric method as Mr. Rossi proposed to use as a primary classification method is commonly used in the mining industry and would therefore also have been considered sound and in line with industry practice by a buyer. The Tribunal is further not convinced by Prof. Dagdelen's suggestion that it would be less reasonable to perform an additional, probabilistic check on the result obtained by the primary classification method. In particular taking into account that Prof. Dagdelen agreed that it was important to give consideration to Antofagasta's probabilistic approach given its experience in copper mining, the Tribunal fails to see how a probabilistic check validating the geometric approach should render the classification less reliable than an isolated geometric approach or an isolated probabilistic approach.
501. On that basis, the Tribunal concludes that Claimant has established that the estimation and classification of the resources reported in the Feasibility Study, which formed the

⁵⁴² Cf. Respondent's Counter-Memorial on Quantum, ¶¶ 211, 214.

⁵⁴³ Dagdelen/Owen I, ¶ 171.

⁵⁴⁴ Rossi, ¶ 81.

⁵⁴⁵ Transcript Hearing on Quantum (Day 3), p. 915 line 1 to p. 917 line 9.

basis for Prof. Davis' valuation of Claimant's damage, is in accordance with industry practice and corresponded to an exercise of "*good judgment*" by the relevant Competent Persons within Barrick and Antofagasta who adopted and implemented the method, which Mr. Rossi had proposed upon his review of the methods previously applied by Claimant's two owners in March 2009.

3. Whether Claimant Has Established That Sufficient Metallurgical Testing Was Conducted to Confirm That the Minerals Could Be Economically Extracted

a. Summary of Claimant's Position

502. Claimant submits that: (i) its metallurgical sampling adequately represented the material to be processed by the mine; and (ii) its metallurgical testing validated "*consistently high recoveries of copper and gold at marketable concentrate grades.*" Claimant refers to its metallurgy expert, Dr. Corby Anderson, who confirmed that "*the Reko Diq Feasibility Study is robust. The underlying methodology and metallurgical testing are of excellent quality. TCC conducted many phases of metallurgical testwork on many tonnes of Reko Diq material originating from thousands of samples, which are representative of the orebody's relevant lithologies and alterations, or as we called them, 'domains.'*"⁵⁴⁶
503. Claimant acknowledges that initial tests using water from Reko Diq produced lower recoveries but emphasizes that "[a]s a result of the poor site water result, a new program of site water test optimization was implemented" which identified an improved flotation process.⁵⁴⁷ Claimant argues that by using an improved chemical recipe, it was able to obtain consistently high recoveries above 90% for all ore types found at Reko Diq, including the tests using water from the Fan Sediments; these recoveries were confirmed by subsequent pilot tests validating the proposed technology.⁵⁴⁸ Claimant notes that Respondent's expert Prof. Dagdelen acknowledged that "*AMMTEC was able to come up with a flotation process that gave high copper and gold recoveries*" and adds that Prof. Dagdelen stated during Hearing on Quantum that "*if a QP had signed [TCC's studies], then [he] would be totally happy with [them].*"⁵⁴⁹ Dr. Anderson in turn testified that, being a QP with relevant experience himself, he would have signed off on the studies "*without hesitation.*"⁵⁵⁰ Claimant also points to the confirmation by Respondent's expert Prof. Spiller that Claimant's optimized reagent scheme produced "*very, very good results.*"⁵⁵¹

⁵⁴⁶ Claimant's Quantum Post-Hearing Brief, ¶ 46, quoting from Transcript Hearing on Quantum (Day 4), p. 1112.

⁵⁴⁷ Claimant's Quantum Reply, ¶¶ 482-484, quoting from Exhibit RE-576-28.06, p. 50.

⁵⁴⁸ Claimant's Quantum Reply, ¶¶ 472-473, 484-485 referring to Rossi, Figure 10.

⁵⁴⁹ Claimant's Quantum Post-Hearing Brief, ¶ 47, quoting from Dagdelen/Owen II, ¶ 35 and Transcript Hearing on Quantum (Day 4), p. 1008.

⁵⁵⁰ Claimant's Quantum Post-Hearing Brief, ¶ 47, quoting from Transcript Hearing on Quantum (Day 4), p. 1128.

⁵⁵¹ Claimant's Quantum Post-Hearing Brief, ¶ 47, quoting from Transcript Hearing on Quantum (Day 4), p. 1199.

504. Claimant contends that the samples taken by Prof. Dagdelen during his site visit were much too small to provide meaningful data and the tests conducted on them by RDi laboratory failed to account for numerous variables such as mineralogy and liberation or likely oxidation, as Dr. Anderson pointed out in his report.⁵⁵² In any event, Claimant claims that the results of the RDi laboratory confirmed the quality of the AMMTEC results; according to Dr. Anderson, they “*tend to corroborate that TCC’s proposed flotation flowsheet was robust and adequately de-risked the project.*”⁵⁵³ Claimant also points to Prof. Spiller’s report which noted that AMMTEC’s tests “*produced a slightly higher Cu recovery (90.5 vs 87.2) while with respect to Cleaner 2 concentrate Cu grade the average was virtually the same (22.3 vs 22.8).*”⁵⁵⁴
505. Claimant further rejects the argument that “*TCC built its entire design criteria for the mine around 21 tests from shallow depths with the highest grades.*”⁵⁵⁵ Claimant emphasizes that its metallurgical program was not limited to 21 tests but rather consisted of several phases of testing in which roughly 85,000kg of materials and 120,000kg of water were used and contends that “*thousands of metallurgical tests*” were run, including “*hundreds of tests just to optimize and perfect Reko Diq’ ultimate metallurgical flowsheet.*”⁵⁵⁶ Claimant points out that Prof. Spiller admitted during the Hearing on Quantum that “*AMMTEC did many, many, many tests*” and stated that “*there [were] 21 tests that, you know, followed a vast amount of locked-cycle tests, open-cycle tests, mineralogy, very, very in-depth looking at it.*”⁵⁵⁷
506. Claimant argues that Respondent’s emphasis on AMMTEC’s interim report of March 2009 is misplaced because “*a large and critically important portion*” of Claimant’s work had not been done at that time and Dr. Anderson confirmed that TCC’s studies and design criteria were informed by “*the whole body of work from May 2007 up until December 2009.*”⁵⁵⁸ Claimant submits that Prof. Spiller admitted that he had not considered any tests conducted during the feasibility stage, which included TCC’s pilot plant tests conducted on 25 tonnes of material, and notes that he failed to list AMMTEC’s final report among the documents he had reviewed.⁵⁵⁹

⁵⁵² Claimant’s Quantum Post-Hearing Brief, ¶¶ 48-49.

⁵⁵³ Claimant’s Quantum Post-Hearing Brief, ¶¶ 48, 50, quoting from Anderson, ¶ 93.

⁵⁵⁴ Claimant’s Quantum Post-Hearing Brief, ¶ 50, quoting from Spiller I, ¶ 14.

⁵⁵⁵ Claimant’s Quantum Post-Hearing Brief, ¶¶ 48, 50, quoting from Respondent’s Rejoinder on Quantum, ¶ 167.

⁵⁵⁶ Claimant’s Quantum Post-Hearing Brief, ¶ 52; Claimant’s Quantum Reply, ¶ 449.

⁵⁵⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 52 and note 101, quoting from Transcript Hearing on Quantum (Day 4), p. 1198.

⁵⁵⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 54, quoting from Transcript Hearing on Quantum (Day 4), p. 1116.

⁵⁵⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 55, referring to Transcript Hearing on Quantum (Day 4), p. 1230 and pp. 1254-1255 and Spiller II, pp. 2-3.

507. Claimant also notes that the re-logging of geological samples to which Respondent has pointed occurred in the summer of 2008 and, in addition to not being uncommon once the understanding of the project's geology improves, concerned only phase 1 test work which was "*entirely superseded*" by phase 2 test work which had been already performed on the basis of the new logging codes. As noted in the Feasibility Study, "[d]ue to the amount of recategorization in Phase 1, this second phase of sampling and test work was designed to provide a complete and sound basis for the PFS."⁵⁶⁰
508. Claimant rejects the argument that its metallurgical sampling was insufficient because most of the samples tested for metallurgical response came from depths of 450 meters or less from the surface.⁵⁶¹ According to Claimant, its metallurgical sampling was representative of the deposit's geo-metallurgical domains and thus the pit as a whole.⁵⁶² Claimant considers it agreed between the Parties' experts that domains "*reflect the classification of the deposit's material into different units which, based on their mineral composition and other relevant characteristics, are expected to respond in the same way to metallurgical processes.*"⁵⁶³ It further refers to Mr. Rossi who testified that "[b]efore you send the first sample to the metallurgical test lab, you have an understanding of what the geology is because you have all this other drilling that you have done. And it's that drilling that is actually defining the domains."⁵⁶⁴ Again referring to Mr. Rossi, Claimant submits that based on the previous drilling campaigns, it "*had adequately characterized the orebody from a metallurgical standpoint,*" which allowed the metallurgical sampling program to "*target those domains.*"⁵⁶⁵
509. Claimant notes that, in total, its work comprised the drilling of 1,020 holes, extending over 350,000 meters, which provided it with a high density of data and allowed it to identify the relevant domains for metallurgical testing and target its specific metallurgical drilling campaign. While material from earlier drilling also provided it with test samples for metallurgical testing, Claimant also drilled specific metallurgical holes carrying down "*well below 450m*" given that one domain had been identified that existed only deep within the orebody. Claimant quotes from Mr. Richard H. Sillitoe, an expert on porphyry

⁵⁶⁰ Claimant's Quantum Reply, ¶¶ 475-480, quoting from **Exhibit RE-576-6**, p. 6-14.

⁵⁶¹ Claimant's Quantum Reply, ¶¶ 450, 456.

⁵⁶² Claimant's Quantum Reply, ¶ 474, quoting from Rossi, ¶ 105.

⁵⁶³ Claimant's Quantum Post-Hearing Brief, ¶ 54, referring to **Exhibit CE-1685**, p. 3, Transcript Hearing on Quantum (Day 4), p. 1001, and Rossi, ¶ 94. See also Claimant's Quantum Reply, ¶¶ 457-459, quoting from Rossi, ¶ 94.

⁵⁶⁴ Claimant's Quantum Post-Hearing Brief, ¶ 54, quoting from Transcript Hearing on Quantum (Day 3), p. 772.

⁵⁶⁵ Claimant's Quantum Post-Hearing Brief, ¶ 54, quoting from Rossi, ¶¶ 91, 96. See also Claimant's Quantum Reply, ¶¶ 460-461, referring to Rossi, ¶ 95 and Livesey IX, ¶ 21.

deposits who reviewed the project's geological data in June 2009 and confirmed that "*no further deep drilling is necessary and none need to be contemplated.*"⁵⁶⁶

510. Claimant points out that two of the main lithologies in Reko Diq's domains are horizontal layers of rock one of which (VIN) occurs at above roughly 350 meters from the surface while the other (VFL) occurs below this depth. By contrast, the third main lithology (PFB, porphyries) consists of vertical intrusions which are over 1,000 meters in depth. Claimant submits that, as acknowledged by Prof. Dagdelen, it sampled VFL material from the bottom of the pit.⁵⁶⁷ As for the vertical PFB domain, Claimant argues that it could select samples from any depth because these would show, "*within accepted levels of variance, similar metallurgical response.*" Claimant refers to Mr. Rossi who testified that "[i]n larger porphyry systems like Reko Diq, a few hundred meters in vertical depth within the porphyry formation will not substantially change the rock's metallurgical properties."⁵⁶⁸
511. Claimant adds that the classification of the PFB domain was confirmed by "*numerous variability tests*" testing material from different depths and emphasizes that neither Prof. Dagdelen nor Prof. Spiller challenged Claimant's definition of Reko Diq's domains. Claimant submits that: (i) Prof. Dagdelen confirmed during the Hearing that he did not perform any variability tests to support his assertion that the domains showed "*variability*";⁵⁶⁹ and (ii) Prof. Spiller also admitted that he did not do any statistical test of variance or variability to support his initial assertion that AMMTEC's tests showed "*internal variability.*"⁵⁷⁰
512. Claimant also rejects Prof. Dagdelen's assertion that it did not collect sufficient samples from below 250 meters and refers to examples of what it considers misleading testimony: (i) Prof. Dagdelen referred to a particular cross-section while omitting that in the immediately adjacent cross-sections TCC drilled to the lower depths; and (ii) Prof. Dagdelen had to admit that a sample of the very cross-section (RD-118) he referred to was taken from below 350 meters and shipped to AMMTEC for metallurgical testing.⁵⁷¹ Claimant also refers to Mr. Rossi who confirmed that "*drill holes were carried down at full density to the bottom of the ultimate pit.*"⁵⁷²

⁵⁶⁶ Claimant's Quantum Reply, ¶¶ 463-467, quoting from **Exhibit RE-576-3.19**, p. 8.

⁵⁶⁷ Claimant's Quantum Post-Hearing Brief, ¶¶ 57-58, quoting from Transcript Hearing on Quantum (Day 4), p. 998.

⁵⁶⁸ Claimant's Quantum Post-Hearing Brief, ¶ 59, quoting from Rossi, ¶ 35. See also Claimant's Quantum Reply, ¶¶ 469-470.

⁵⁶⁹ Claimant's Quantum Post-Hearing Brief, ¶ 60, quoting from Transcript Hearing on Quantum (Day 4), pp. 992-993.

⁵⁷⁰ Claimant's Quantum Post-Hearing Brief, ¶ 61, referring to Transcript Hearing on Quantum (Day 4), p. 1251.

⁵⁷¹ Claimant's Quantum Post-Hearing Brief, ¶¶ 62-64.

⁵⁷² Claimant's Quantum Post-Hearing Brief, ¶ 65, quoting from Rossi, ¶ 99.

513. Claimant further argues that even if it had focused on the “*top half*” of the mine as Respondent phrased it, this would have been “*perfectly acceptable and consistent with industry practice*” given that this “*top half*” of the cone shaped pit in fact corresponds to 85% of the rock that Claimant was planning to mine and mining at below 450 meters would only have started for H-14 and H-15 at the earliest in year 13 - with mining at Tanjeel and H-13 not going below 450 meters at all.⁵⁷³ According to Claimant, investors typically do not require metallurgical sampling of ore that will be mined that long after the payback period which would have been 7 to 8 years in the present case.⁵⁷⁴ Claimant submits that metallurgical test work is an iterative process and would have continued in the mining stage so that, as Mr. Livesey testified, “*it did not make sense for us to be concerned at this early stage with material below 450 meters that was only going to be mined two and a half decades later.*”⁵⁷⁵ Claimant considers the soundness of prioritizing the earlier years of production, in particular those of the payback period, in a metallurgical program confirmed by Prof. Spiller’s admission regarding his work as QP on other projects that “*you prioritize in your intensity of focus the stuff that is going to be mined during the payback period.*”⁵⁷⁶
514. Claimant further maintains that it also performed tests on material below the cut-off grade. In any event, Claimant considers it acknowledged by Prof. Dagdelen that the bottom of the pits in fact contains relatively higher grade ore and a focus on shallower parts of the deposits would therefore, if anything, have underestimated head grades.⁵⁷⁷
515. Finally, Claimant rejects the assertion that it failed to establish the required recoveries for an expansion to Tanjeel and emphasizes that phase 4 of its metallurgical program on which the Expansion Pre-Feasibility Study reports, was focused on optimizing the flotation process for ore from Tanjeel which was to be blended with the ore from H-14 and H-15.⁵⁷⁸ Claimant further submits that it sent approximately 7,000kg of H-13 samples to laboratories from June to August 2009.⁵⁷⁹

⁵⁷³ Claimant’s Quantum Reply, ¶¶ 451-452; Claimant’s Quantum Post-Hearing Brief, ¶ 66, *referring to* Rossi, ¶¶ 115-116 and Livesey IX, ¶¶ 7-9.

⁵⁷⁴ Claimant’s Quantum Reply, ¶ 453, *quoting from* Rossi, ¶ 98.

⁵⁷⁵ Claimant’s Quantum Reply, ¶ 455; Claimant’s Quantum Post-Hearing Brief, ¶ 67, *quoting from* Livesey IX, ¶ 10.

⁵⁷⁶ Claimant’s Quantum Post-Hearing Brief, ¶ 68, *quoting from* Transcript Hearing on Quantum (Day 4), p. 1245. See also Claimant’s Quantum Reply, ¶¶ 453-454.

⁵⁷⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 69.

⁵⁷⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 70.

⁵⁷⁹ Claimant’s Quantum Reply, ¶ 468.

b. Summary of Respondent's Position

516. Respondent submits that for metallurgical testing, a mining company has to drill holes “*at a depth and frequency to sample the entirety of the proposed mine*” because the metallurgical samples must “*fully represent the ore body.*” In addition, Respondent refers to the method and analysis of the testing done on the samples from the metallurgical drilling holes which are important for determining the cost of production and identifying the type of processing required for extracting the copper or gold.⁵⁸⁰
517. Respondent maintains that Claimant has not “*completely sampled and tested the deposits from a metallurgical perspective,*” as the deposit is variable and not sufficiently consistent to rely on the “*limited sampling and testing*” conducted by Claimant.⁵⁸¹ According to Respondent, Claimant did not sufficiently test the deposit at depths below 450 meters and in its last set of tests, *i.e.*, the only tests to generate higher, more consistent results, it even focused on material largely coming from the top 250 meters of the ore body and material with “*the best grades*” in the ore body.⁵⁸² Specifically with regard to samples from lower depths to which Claimant pointed Prof. Dagdelen during the Hearing on Quantum, Respondent claims that Claimant had not tested these samples, even though it had failed to establish that the domains were sufficiently consistent.⁵⁸³
518. Respondent claims that Claimant took only 20 metallurgical samples, all from above 400 meters, for the pilot plant test of its Feasibility Study and refers to Prof. Dagdelen who concluded that “*without any pilot plant work involving material that will be mined below the 400 meter depth when a significant amount of material is mined in the feasibility study mine plans from 400 meters to 780 meters depths, this feasibility study is metallurgically very uncertain and unreliable.*”⁵⁸⁴
519. Respondent also asserts that Claimant sent only 3 out of 9 rock types it had identified for testing to AMMTEC and argues that even those results showed that recoveries “*dropped dramatically*” when using water from Panangaz, a water source south of Reko Diq, and “*were uneven and experienced a range of results*” when using water from the Fan Sediments. According to Respondent, these were “*crucial errors*” showing that Claimant had not done the work to find out how the rock would respond in its contemplated scenario.⁵⁸⁵

⁵⁸⁰ Respondent's Counter-Memorial on Quantum, ¶¶ 199-204.

⁵⁸¹ Respondent's Post-Hearing Brief on Quantum, ¶ 81.

⁵⁸² Respondent's Rejoinder on Quantum, ¶¶ 172-173.

⁵⁸³ Respondent's Post-Hearing Brief on Quantum, ¶ 82, referring to Transcript Hearing on Quantum (Day 4), pp. 1011-1012.

⁵⁸⁴ Respondent's Counter-Memorial on Quantum, ¶ 208, quoting from Dagdelen/Owen I, ¶ 139.

⁵⁸⁵ Respondent's Counter-Memorial on Quantum, ¶ 209.

520. In addition, Respondent contends that Claimant “*compromised the vast majority of the samples, rendering them (and their results) useless*” because it wrongly categorized the lithology of the samples and sent them under the wrong label for testing. Respondent refers to Prof. Dagdelen who stated that Claimant incorrectly blended the materials to characterize the ore type, like flour and sugar instead of flour and salt. According to Respondent, this affected almost 60% of the samples from the scoping study and pre-feasibility study.⁵⁸⁶
521. Respondent contends that Claimant and Mr. Rossi base their conclusion regarding the alleged consistency of the entire ore body on 16 metallurgical tests (excluding 5 ore-type tests done around the same time). According to Respondent, however, Claimant’s metallurgy expert Dr. Anderson rejected this conclusion and testified that he would need to see more.⁵⁸⁷
522. Respondent claims that Reko Diq was a project with “*skinny*” economics which allowed only for a small margin of error. In Respondent’s view, Claimant’s testing program did not come to understand this margin of error because it used composites blended from rock of different depths which could not reveal potential variability.⁵⁸⁸
523. Respondent further contends that the mine plan used in the Feasibility Study including the flotation process that Claimant planned to apply was based on only 21 tests, 60% of which come from the upper 250 meters of depth, and did not include the pilot plant tests or mineralogy tests. In addition, Respondent argues that even if the 14 mineralogy tests are added to the 21 tests, a total of 35 samples, none of which was at cut-off grade, is “*plainly insufficient*” and it is an “*absurd proposition*” that these tests would accurately reflect the entire deposit.⁵⁸⁹ In any event, Respondent claims that even these tests showed that material from deeper depths provided lower recoveries.⁵⁹⁰
524. Finally, Respondent refers to Prof. Spiller’s explanation that the composites used in the pilot plant tests do “*not represent what the plant will see in any given day and may encompass years of production*” and considers it confirmed by Dr. Anderson’s testimony that a composite spanning over ten years of production could produce results of a significant variance.⁵⁹¹ Respondent criticizes that Claimant did not do “*point tests*” testing

⁵⁸⁶ Respondent’s Counter-Memorial on Quantum, ¶¶ 206-207, quoting from Dagdelen/Owen I, ¶ 121.

⁵⁸⁷ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 83-86, referring to Transcript Hearing on Quantum (Day 4), p. 1165 lines 1-8.

⁵⁸⁸ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 87-89.

⁵⁸⁹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 90-91; Respondent’s Rejoinder on Quantum, ¶ 170.

⁵⁹⁰ Respondent’s Rejoinder on Quantum, ¶¶ 167, 174.

⁵⁹¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 92, referring to Spiller III, p. 3 and Transcript Hearing on Quantum (Day 4), pp. 1144-1146.

a specific, limited portion of a given domain and that it changed the process within the last set of tests conducted, with the results varying with each of the changes.⁵⁹²

525. Respondent concludes that Claimant's metallurgical testing program was insufficient to prove consistency and considers that "*the reasonable position is to assume metallurgical variability,*" as a buyer would have done in light of the lack of testing for the deposits.⁵⁹³
526. In response to Claimant's reference to the total number of tests it conducted, Respondent notes that failed tests or tests using different metallurgical processes cannot serve to prove Claimant's mine plan and argues that "*the issue is not a magic number of tests but rather the total number of tests in relation to the size of the deposit and its variability so that the mining company can arrive at a reasonable conclusion.*" Referring to Prof. Spiller, Respondent claims that Claimant would have been required to conduct at least 435 tests using the metallurgical process it anticipated to test "*the widest range of deposit characteristics*" in the entire ore body, including point test and tests on different composites. By contrast, Respondent maintains that Claimant conducted "*a total of 35 tests, out of which a sizable percentage failed to reach the accepted range of recoverabilities and none of which tested material at cut-off grade.*"⁵⁹⁴
527. Respondent further considers that its independent analysis has "*conclusively shown*" that Reko Diq has variable recoverabilities and that the 21 tests performed by Claimant are not reliable, as demonstrated by the samples that Prof. Dagdelen took from his site visit to Reko Diq. Respondent contends that the results of the tests conducted by RDi laboratory on samples from the same composites as Claimant had tested, which are shown in Tables 3 and 4 in Prof. Spiller's second report, show variability between the samples when the same process is applied to all of them. According to Respondent, any buyer would have proceeded in the same manner as Pakistan did, *i.e.*, by sampling and testing certain material to verify the consistency within a given set of samples, and it would have discovered as Respondent did that it could not duplicate Claimant's results because, instead, these tests show variability.⁵⁹⁵
528. Respondent refers to the conclusion drawn by Prof. Spiller:

"Based on the comparative sampling and testwork, it is apparent that the various ore samples, both ore type and variability type samples, produce inconsistent results when following the same procedures. The inconsistencies

⁵⁹² Respondent's Post-Hearing Brief on Quantum, ¶¶ 93-94, *quoting from* Transcript Hearing on Quantum (Day 4), p. 1203 lines 14-18 *and referring to* **Exhibit RE-576-6**, pp. 6-52, 6-58 and 6-63.

⁵⁹³ Respondent's Post-Hearing Brief on Quantum, ¶ 95.

⁵⁹⁴ Respondent's Post-Hearing Brief on Quantum, ¶¶ 96-97, *referring to* Spiller II, pp. 2, 3, 6 and Table 1; Respondent's Rejoinder on Quantum, ¶ 175.

⁵⁹⁵ Respondent's Post-Hearing Brief on Quantum, ¶¶ 99-100, *referring to* Spiller II, Tables 3 and 4 and p. 10. *See also* Respondent's Rejoinder on Quantum, ¶ 166, *referring to* Spiller I, Section VI.

*are independent of feed sample lithology/alteration and grade. The flotation response variability, both internally to the RDi results and the AMMTEC results, cast doubt on the feasibility study and the ability to achieve consistently high value-recovery at marketable concentrate grades.”*⁵⁹⁶

529. In response to the argument that the samples in the core shed used for Pakistan’s testing have oxidized in the meantime, Respondent “*maintains that the core was competent for the purposes of its testing.*” However, Respondent claims that if the Tribunal were to follow Claimant’s argument that it is not, it should find that Claimant did not adequately preserve the core and destroyed any value in that core for a future buyer, resulting in additional costs and uncertainty and another reason to reject any DCF valuation.⁵⁹⁷
530. Respondent emphasizes that Claimant also claims damages deriving from the Expansion Pre-Feasibility Study even though, according to Respondent, Claimant’s testing program shows that “*any attempt to mix ore from Tanjeel with ore from H14 and H15 produced very poor results,*” with the one test conducted showing recoverabilities at 60%. Respondent further submits that no tests were conducted with H-13 ore. Noting that none of Claimant’s experts referred to the Expansion Pre-Feasibility Study, Respondent concludes that “[t]here is no technical basis to arrive at any conclusion regarding the processing necessary for the EXP PFS, meaning the costs have no foundation, the mine plan is baseless, the pit limits are a guess, and every other element associated with the processing of EXP PFS is no more than speculation.”⁵⁹⁸

c. Tribunal’s Analysis

531. The dispute between the Parties concerns two issues: (i) whether Claimant collected adequate and sufficient metallurgical samples which are representative of the different types of rock contained in the ore body at Reko Diq; and (ii) whether the metallurgical testing conducted by the laboratory assigned by Claimant, AMMTEC, was adequate and showed the consistent high recoveries reported in the Feasibility Study.
532. The Tribunal will address these two issues in turn.

i. Whether the Metallurgical Samples Were Representative of the Ore Body

533. First, the Tribunal will analyze Respondent’s allegation that the metallurgical samples collected by Claimant do not adequately represent the entire ore body. In this regard, Respondent argues in particular that the number of metallurgical samples was too low

⁵⁹⁶ Respondent’s Rejoinder on Quantum, ¶ 176, quoting from Spiller I, Section VI.

⁵⁹⁷ Respondent’s Post-Hearing Brief on Quantum, ¶ 101.

⁵⁹⁸ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 102-103.

and that the samples were largely taken from depths above 450 meters and, for the final set of tests, even from depths above 250 meters.

534. The Tribunal notes that there is agreement between the Parties and their experts that the metallurgical samples should be representative of the geo-metallurgical domains found at Reko Diq. As defined in the Glossary of Terms used in the CIM Best Practice Guidelines for Mineral Processing, domains are “*commonly known as geometallurgical units or end members defined as mineral assemblages that have a common mineralogical feature that is expected to have a specific metallurgical response.*”⁵⁹⁹ Mr. Rossi provided the following description of geo-metallurgical domains:

*“A geo-metallurgical domain is essentially a group of rocks that have statistically similar metallurgical properties in that they are of the same rock type, have similar alteration styles and the like. Since the rocks within a domain are alike, they will exhibit similar metallurgical characteristics and respond in the same way to the recipes used to extract the metals from the rock – regardless of where in the ore body they are located.”*⁶⁰⁰

535. Respondent and its expert Prof. Dagdelen do not appear to challenge the validity of identifying domains or the identification of a total of 12 domains in Reko Diq. However, their argument is that Claimant has not conducted sufficient tests to verify the consistency of the domains it has identified at Reko Diq. In particular, Prof. Dagdelen takes the view that there are not sufficient metallurgical samples coming from depths below 450 meters that would allow Claimant to assume that the rock at those depths would provide the same metallurgical response as the rock closer to the surface. Prof. Dagdelen stated in his first report:

*“After reviewing the shipments of all the metallurgical test samples from the Reko Diq Project between May 2007 and December 2009, it was found that almost all of the metallurgical samples tested for the comminution work as well as for the flotation process at H14 and H15 come from the upper 450 meters of pit depth. As a result, these samples are not sufficient and representative of ore types to be mined and processed from these deposits because these pits extend to the depths of 780 meters and 765 meters during the life of the mine.”*⁶⁰¹

⁵⁹⁹ Exhibit CE-1685, p. 3.

⁶⁰⁰ Rossi, ¶ 30.

⁶⁰¹ Dagdelen/Owen I, ¶ 172.

536. As pointed out by Claimant, Prof. Dagdelen referenced in this context an interim report prepared by AMMTEC in March 2009 rather than AMMTEC's final report.⁶⁰² These reports will be addressed in further detail below.

537. In response to Prof. Dagdelen's opinion, Mr. Rossi explained in his report that *"metallurgical sampling is not independent of all other geological data and drilling. Rather, it relies on exploration and resource definition drilling to build the geo-metallurgical domains, which are based on a geologic model and an understanding of the impact of certain geologic variables on the overall beneficiation process."*⁶⁰³ He further stated:

"Once you understand the relevant geological properties and build the geo-metallurgical domains, the metallurgical sampling can then target those domains, irrespective of the depth from which the material comes. This is standard practice in the industry and is also justified by economic considerations. Metallurgical test work, especially if done at a pilot plant scale, requires large volumes of samples that are often drilled using larger and more expensive drilling equipment.

*Where material closer to the surface fairly represents the relevant domain, you do not need to collect further samples from deeper within the deposit, as you know the metallurgical response of those samples will be similar. You only need to do further sampling at certain depths if the geology shows that material found at specific depths represents a different domain and, further, that domain is expected to be subjected to mineral processes in the future."*⁶⁰⁴

538. Mr. Rossi explained that such a different domain, which exists only at a certain depth, was in fact found at Reko Diq, referred to as lithology VFL. Claimant illustrated the domains at Reko Diq, including lithology VFL in blue at the bottom of the pit, as follows:⁶⁰⁵

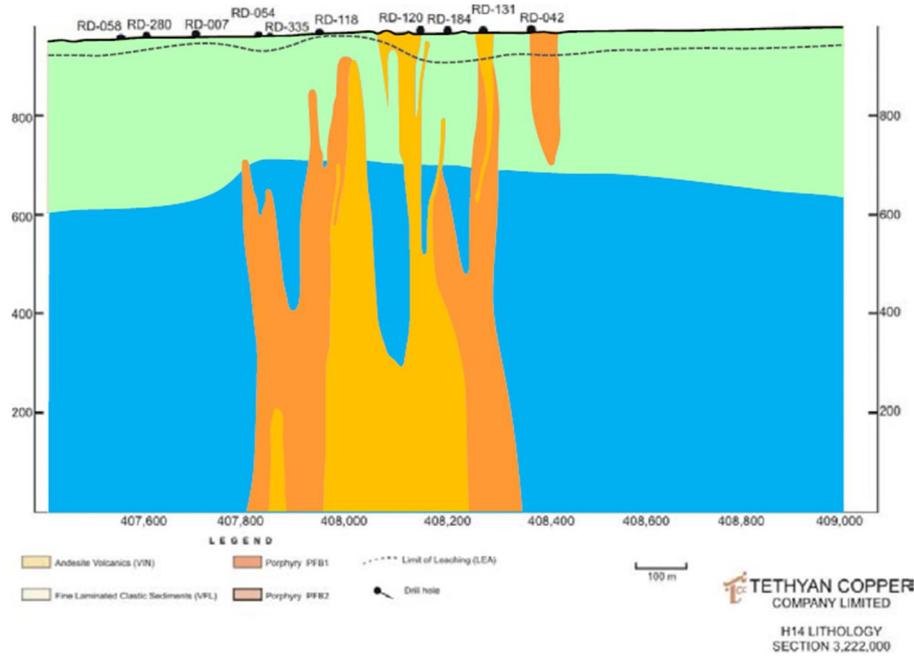
⁶⁰² **Exhibit RE-576-28.14**, pp. 13-14. The final report was not submitted by either Party into the record. **Exhibit RE-576-28.29** was *"Intentionally Left Blank"* according to the Cumulative Index of Respondent's Documents Filed in the Proceedings.

⁶⁰³ Rossi, ¶ 95.

⁶⁰⁴ Rossi, ¶¶ 96-97.

⁶⁰⁵ Claimant's Closing Presentation, p. 25.

Figure 4.13 H14 Lithology E-W Section 3 222 000 – View Towards North



539. Prof. Dagdelen described in his first report that samples from the VFL lithology had been taken from depths between 400 and 700 meters:

“As part of Shipment 4, TCCA also shipped 15 samples of finely laminated volcanic rock samples with SCC type alteration (VFL – SCC ore type samples) in blue drums. Since the very finely laminated volcanic rocks is located close to the sandstone layers towards the bottom of the volcanic layers, 8 of these holes representing this ore type at the intervals between 400m and 600m depths while one hole went down to 700m depth.”⁶⁰⁶

540. In his second report, Prof. Dagdelen referred to the metallurgical domains identified in the Wester Porphyries at H-14 and H-15 which are based on: (i) the three lithologies VFL, VIN (depicted in green above) and PFB (depicted in orange above); and (ii) alteration types, as illustrated by Claimant through the following matrix:⁶⁰⁷

Matrix of Domains		Alterations		
		POT	SCC	MIX
Lithologies	PFB	PFB-POT	PFB-SCC	PFB-MIX
	VIN	VIN-POT	VIN-SCC	VIN-MIX
	VFL	VFL-POT	VFL-SCC	VFL-MIX

⁶⁰⁶ Dagdelen/Owen I, ¶ 123, referring to Exhibit RE-576-28.14, pp. 5-6.

⁶⁰⁷ Claimant’s Opening Presentation, p. 44.

541. Prof. Dagdelen described the depths from which the metallurgical samples for each domain had been taken with the following chart:

Table 2: Ore Type and DWT Sample Locations and Depth Intervals in H14

OPTIMIZED METALLURGICAL FLOATATION TEST SAMPLE LOCATIONS AND DEPTH INTERVALS												
WESTERN PORPHYRIES - H14												
Test #	DWT-1	DWT-2	DWT-3	DWT-4	DWT-5	DWT-6	DWT-7	DWT-8	DWT-9	DWT-10	ORE TYPE-3	
Domain	PFB1-POT	PFB1-MIX	PFB2-POT	PFB2-MIX	VIN-POT	VIN-MIX	VIN-SCC	VFL-POT	VFL-MIX	VFL-SCC	VIN-SCC	
0-50	RD-198	RD-213	RD-202					RD-228			RD-223	
50-100	RD-213	RD-213	RD-202	RD-219		RD-209		RD-211, RD-223			RD-211, RD-223	
100-150	RD-213		RD-198	RD-219				RD-211, RD-223			RD-211, RD-223, 226	
150-200			RD-198	RD-219	RD-188	RD-226					RD-223	
200-250					RD-188						RD-226	
250-300	RD-198							RD-188, RD-125	RD-196		RD-226	
300-350	RD-198							RD-125	RD-226	RD-216, RD-270		
350-400								RD-188, RD-103	RD-46	RD-201, RD-270		
400-450								RD-103	RD-115, RD-125	RD-201		
450-500								RD-103	RD-125	RD-113		
500-550								RD-103, RD-46				
550-600								RD-103, RD-46				
600-650								RD-46				
650-700												
700-750												
750-800												
800-850												
850-900												

Table 3: Ore Type and DWT Sample Locations and Depth Intervals in H15

OPTIMIZED METALLURGICAL FLOATATION TEST SAMPLE LOCATIONS AND DEPTH INTERVALS											
WESTERN PORPHYRIES - H15											
Test #	DWT-11	DWT-12	DWT-13	DWT-14	DWT-15	DWT-16	ORE TYPE-1	ORE TYPE-2	ORE TYPE-4	ORE TYPE-5	
Domain	PFB1-MIX	PFB1-SCC	PFB2-SCC	VIN-MIX	VIN-SCC	VFL-MIX	PFB1-SCC	PFB2-SCC	VIN-SCC	VFL-SCC	
0-50	RD-238	RD-237, RD-241	RD-241, RD-248	RD-231	RD-232, RD-236		RD-237, RD-245	RD-248	RD-232, RD-236		
50-100	RD-238	RD-237	RD-245, RD-248	RD-231	RD-232, RD-236		RD-237	RD-248	RD-232, RD-236		
100-150	RD-238	RD-241	RD-245, RD-248	RD-231, RD-238	RD-232, RD-236		RD-237	RD-248	RD-232, RD-236		
150-200				RD-231, RD-238	RD-231, RD-236			RD-248	RD-236		
200-250											
250-300						RD-242, RD-92					
300-350						RD-32					
350-400						RD-32, 89, 106			RD-81, 101, 103		
400-450						RD-32, 89, 106			RD-81, 81, 89, 104		
450-500						RD-32, RD-106			RD-89, RD-106		
500-550						RD-32			RD-89		
550-600						RD-32					
600-650											
650-700											
700-750											
750-800											
800-850											
850-900											

542. Prof. Dagdelen’s chart confirms that the samples for domains including the VFL lithology were taken from depths ranging between 250 and 600 meters. On that basis, the Tribunal considers it undisputed the metallurgical samples were taken from depths below 450 meters for the domains including the VFL lithology.

543. As illustrated by Claimant, the VIN domains exist only on top of the VFL domains and were therefore taken from depths ranging between 0 and 300 meters. There appears to be no dispute regarding the depth from which samples for the VIN domains were or should have been taken.

544. In the Tribunal’s view, the remaining question is therefore whether it was reasonable for Claimant to conclude based on the available data that the vertical PFB domains, *i.e.*, the porphyries, ranging from the surface to the bottom of the ore body were sufficiently consistent to allow for metallurgical samples to be taken from shallower depths.

545. Prof. Dagdelen referred to the PFB domains in his second report when stating that “significant ore type domains characterized by the porphyry lithologies, alterations, and

mineralization zones were only represented by one or two metallurgical samples coming from mostly near surface samples. As such, the metallurgical floatation test results that are based on samples coming from near surface are insufficient and not representative of many of the ore types that extend from surface to 800m below surface containing more than 100 millions of tonnes of material in these ore types.”⁶⁰⁸

546. Prof. Dagdelen considered it contradictory for Mr. Rossi to argue on the one hand that it was irrelevant whether the rock within the porphyries was coming from 200 meters or 600 meters below the surface but to state on the other hand that the samples for metallurgical testing are composites comprised of rock from many different holes so as to reasonably represent the domain even if the specific metallurgical samples are not taken from deeper portions of the mine.⁶⁰⁹ Prof. Dagdelen therefore maintained his conclusion:

“Since there are not many metallurgical tests done on samples representing the many ore types coming from ore type domains below the 450m from the surface, no one can predict the metal recoveries of the flotation process in these rocks reliably, except by speculating that their performance will be the same as the rocks in the domains that are located near surface to above the 450m depth. In other words, the composites created lacked the samples from the lower part of the mine, meaning that the composite is no better than its inputs.”⁶¹⁰

547. The Tribunal agrees with Prof. Dagdelen to the extent that it would not appear plausible to test the metallurgical consistency of a domain by using samples from only the upper part of the mine, *i.e.*, in order to verify whether the upper and lower parts of the mine even constitute a common domain as defined by the CIM Guidelines or to test for any remaining variability within the domain. However, the Tribunal does not believe that this is the case here. As explained by Mr. Rossi, the domains were identified before the samples were taken for the specific purpose of metallurgical testing. The Tribunal finds his explanation plausible that, as metallurgical testing requires large volumes of material, the domains and thus the types of material that will have to be tested are narrowed down and identified beforehand. The Tribunal also considers it plausible that once domains have been identified and it has also been verified that no more than a reasonable variance exists within these domains, the large volume of samples required for metallurgical testing can then be taken from shallower depths.

548. Mr. Rossi has shown that Claimant’s previous drilling campaigns extended to 900 meters below the surface with an average distance of 70 meters (except for depths below 800 meters where the average density extended to 100 meters):⁶¹¹

⁶⁰⁸ Dagdelen/Owen II, ¶ 40.

⁶⁰⁹ Dagdelen/Owen II, ¶¶ 41-42, *quoting from* Rossi, ¶¶ 31-32.

⁶¹⁰ Dagdelen/Owen II, ¶ 43.

⁶¹¹ Rossi, Figure 5.

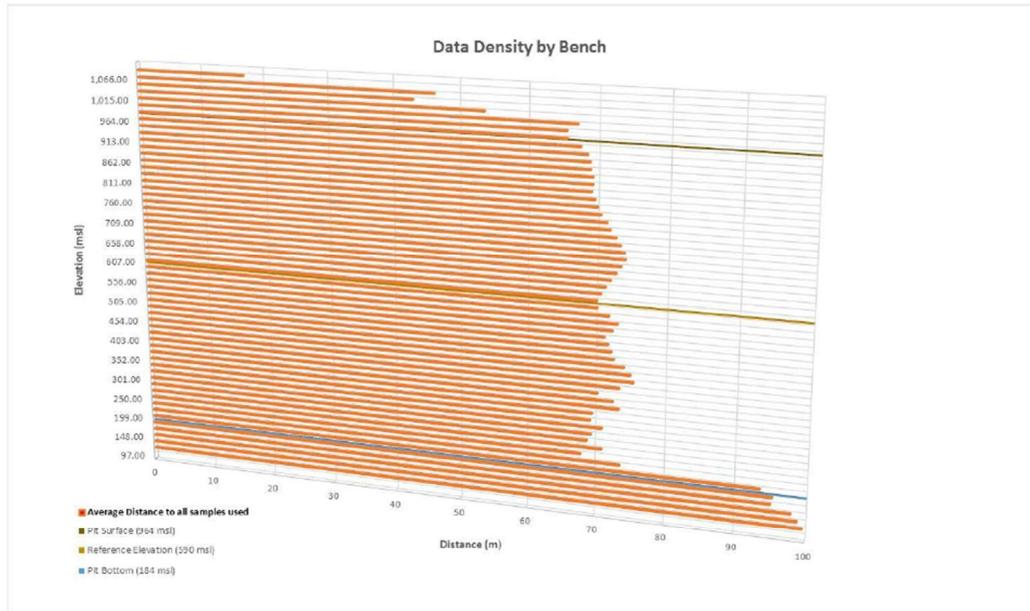


Figure 5: Exploration drill hole data: average distance to blocks by bench (msl elevation) for 100m horizontal search radii. In the graph, the smaller the average distance, the higher the amount of information available. Data from the surface (top-most horizontal line) to the bottom (bottom-most horizontal line) of the pit – *i.e.*, for the entire life of the mine – is quite constant. One can see that the data is less dense (with a higher average distance) only below the pit bottom.

549. Mr. Rossi explained that an average distance of 70 meters commonly appears in other copper porphyry deposits to classify resources as “*indicated*”. In his opinion, the density of the data obtained through these drilling campaigns is “*very high*” compared to other deposits, in particular because the same level of data density extended to the entire life of the mine.⁶¹² Mr. Rossi explained:

“While the drilling density shown in Figure 5 is used mostly for resource estimation, it is also relevant to metallurgical test work in two ways:

- (a) The geologic model, the geological domains, and the geometallurgical domains are all supported by that data. To be clear, the geometallurgical domains are NOT defined from metallurgical holes, but from the resource definition holes shown in Figure 5.*
- (b) The composites used for at least some of the metallurgical testing can also contain material partially taken from those SAME exploration drill holes. This will happen mostly in the initial phases of testing, which are performed at bench scale, with specific intervals chosen from different drill holes to reflect the geo-metallurgical domains. Later in the life of the project, as knowledge of the domains gets refined, specific metallurgical holes are drilled, usually at a much larger diameter (‘PQ,’ or approximately 85mm in diameter) than that of the resource drill holes (‘HQ,’ or 61mm in diameter). The large-diameter (PQ) holes*

⁶¹² Rossi, ¶ 101.

are a convenient method to extract from the relevant domains the significant tonnages required for pilot plant testing (typically, a final metallurgical testing step prior to detailed plant design in a Feasibility Study). This sequence was basically what happened at Reko Diq.”⁶¹³

550. Neither Respondent nor its experts specifically challenge Mr. Rossi’s explanation that the definition of geo-metallurgical domains was made before the specific metallurgical holes were drilled and is thereby based on data obtained from previous drilling campaigns which extended to the full depth of the ore body. In the Tribunal’s view, it is therefore not convincing to look only at the depths from which the metallurgical samples were taken when analyzing whether Claimant has adequately classified the domains and/or whether it has verified that the rocks classified into a certain domain do not exceed a reasonable variance in terms of their metallurgic response.
551. This does not yet answer the question, however, whether Claimant has, based on the data it had collected through its previous drilling campaigns, adequately classified and verified the domains at Reko Diq or whether there is any indication of variability as alleged by Respondent and its experts.
552. During the Hearing on Quantum, Prof. Dagdelen did “*not necessarily*” agree with the proposition that materials coming from a certain domain, once appropriately defined, will respond the same way metallurgically but maintained that “[t]hey have a lot of variability down a given domain.” In response to the question whether he had tested the variability within domains on the samples he had obtained during his site visit to Reko Diq, he testified that it “*wasn’t [his] job or [his] expertise area to test the variability of the material performance recoveries within these domains*” and confirmed that he had not done any tests to this effect.⁶¹⁴
553. Prof. Spiller, who reviewed the samples used for testing to establish the design criteria used in the Feasibility Study, also referred to a “*variability*” of the test results produced by AMMTEC. In his second report, he concluded that these tests showed “*significant lower copper recovery on domain samples taken from below 250 meters in the deposit*” and that the design criteria are therefore unreliable.⁶¹⁵ Prof. Spiller based this conclusion on recoveries measured by AMMTEC for the samples listed in the two tables from Prof. Dagdelen’s second report, which he illustrated as follows:

⁶¹³ Rossi, ¶ 102.

⁶¹⁴ Transcript Hearing on Quantum (Day 4), p. 992 line 2 to p. 993 line 6.

⁶¹⁵ Spiller II, Section VII lit. C.

Table 3: Based on Dagdelen Table 1 – Report March 29, 2018

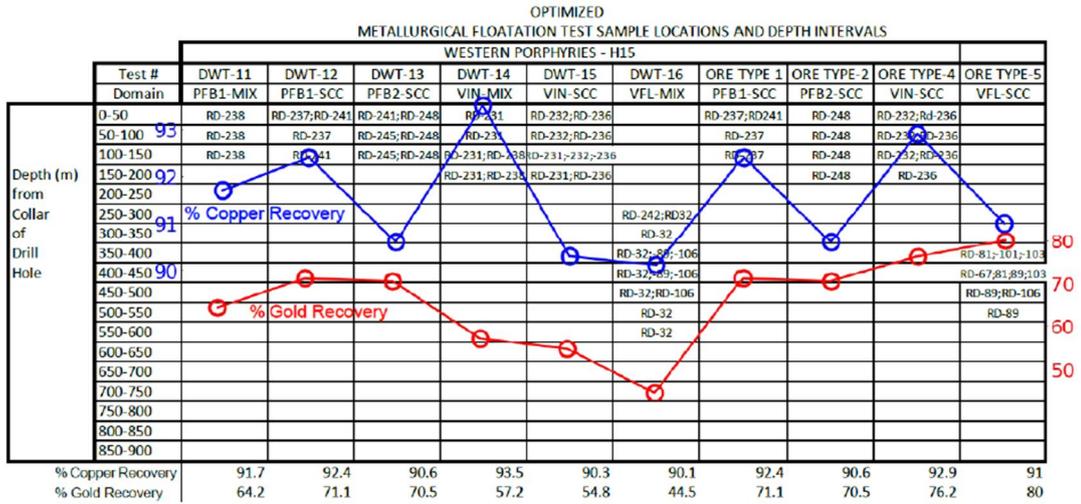
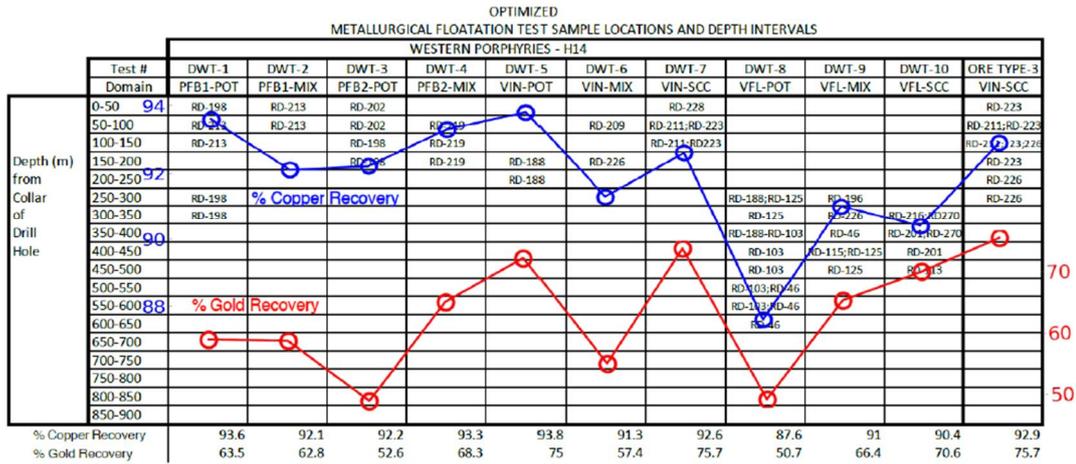


Table 4: Based on Dagdelen Table 2 – Report March 29, 2018



554. During the Hearing on Quantum, Prof. Spiller confirmed his opinion that these tables “tend to indicate [lower recoveries with depth].”⁶¹⁶ At the same time, however, he also confirmed that he had not done any tests to show that within a certain domain there was any difference in metallurgical recovery and acknowledged that what he had shown in the tables above was that recoveries varied between the different domains rather than within a given domain.⁶¹⁷ He maintained that “those samples did come from deeper, and they were more difficult to process” but confirmed that variability within any one domain had “not been tested because no one has looked at recoveries within a domain with depth ... because there was no test done.” It became clear during Prof. Spiller’s oral testimony that he had not found any information in the available data that would positively confirm

⁶¹⁶ Transcript Hearing on Quantum (Day 4), p. 1248 lines 11-13.

⁶¹⁷ Transcript Hearing on Quantum (Day 4), p. 1251 lines 1-15.

or indicate variability of recoveries within a given domain. Prof. Spiller was rather complaining that there was no data to show that no such variability existed:

“Q. Is there anything in the data? Can you point us to anything in the data that would give you reason to think that somehow the domaining was so wrong that you can't actually trust it?”

*A. I have nothing in the data. It is just not there. There is just no metallurgical test in the deeper parts of the orebody in each domain.”*⁶¹⁸

555. In this regard, the Tribunal recalls Mr. Rossi's explanation that the definition of domains took place before the metallurgical sampling and testing and is based on data obtained from previous drilling campaigns. Neither Prof. Dagdelen nor Prof. Spiller have analyzed previous drilling data but maintained that the relevant samples were only those taken from the metallurgical drill holes. At least as far as the process of defining geo-metallurgical domains is concerned, the Tribunal is not convinced by this opinion. It appears to contradict economic and common sense to assume that data from previous drilling could not be used to identify domains and verify whether these were reasonably consistent before starting to extract the large volumes required for metallurgical testing for each of the identified types of material.
556. Consequently, the Tribunal cannot accept Respondent's argument that Claimant used only samples from shallower depths for the purposes of identifying and verifying the consistency of the ore body. Regardless of the precise number of samples collected for metallurgical testing, the Tribunal agrees with Claimant that it is inaccurate to look at these samples in isolation, without taking into account the large amount of data collected through previous drilling and the corresponding knowledge about the ore body and its domains that Claimant already had when starting its metallurgical sampling and testing.
557. In the absence of any specific challenge on the classification of domains based on data from previous drilling and given that Prof. Spiller did not find any indication of variability in the data he had reviewed, the Tribunal has no reason to believe that the classification of domains was not made in accordance with industry standards. Consequently, the Tribunal also does not agree with Respondent that the collection of metallurgical samples for the PFB domains from depths above 450 meters rendered them inadequate and not sufficiently representative of the ore body.
558. In addition, the Tribunal takes note of Mr. Rossi's opinion that the drilling conducted by Claimant at Reko Diq exceeded industry standards because it covered the entire body rather than *“only a significant or financially relevant portion of the deposit [which] is usually covered.”* He explained that *“[c]ommon indicators that determine the depth to*

⁶¹⁸ Transcript Hearing on Quantum (Day 4), p. 1253 lines 8-14.

which sampling is usually done include: (a) the initial five to 10 years' operation; (b) the project's payback period; or (c) the project's payback period plus a discrete number of production years.”⁶¹⁹ He further pointed out that the envisaged payback period in the Feasibility Study was 7.1 years.⁶²⁰

559. Respondent and Prof. Dagdelen repeatedly criticized the sampling as inadequate, asserting that most of the metallurgical samples had been taken from depths above 450 meters. In response, Mr. Rossi pointed out in his report that, while the deposits at H-14 and H-15 extended to approximately 800 meters in depth, about 70-75% of the rock to be mined at those two deposits would come from depths above the 450-meter line. For Tajeel and H-13, which would become relevant in the expansion scenario, all mining was to occur above that depth. If taken together, 85% of the rock to be mined at those four deposits would come from depths above the 450-meter line.⁶²¹ Both Mr. Rossi and Mr. Livesey explained that it would have taken at least 13 years of operations (under the expansion scenario) before drilling would have first “hit” the depth of 450 meters.⁶²² Mr. Livesey further explained that “even then, the material from or above 450 meters would still be the bulk of our operation— in year 13, in fact, it was still 100% of the operation (as the deepest bench being mined in year 13 was at, and not below, 450 meters below the surface).” Based on the mine plan data from the Expansion Pre-Feasibility Study, Mr. Livesey illustrated “the proportion of the overall tonnages that would come from above 450 meters until year 25 of our operations” as follows:⁶²³

Year of Mining Operation	Tonnes From <u>Above</u> 450 meters (as a % of total tonnage)
1 through 13	100%
14	97%
15	100%
16	90%
17	82%
18	64%
19	84%
20	90%
21	54%
22	75%
23	85%
24	83%
25	10%

560. Neither the timing of mining operations illustrated by Mr. Livesey nor Mr. Rossi's statement that initial sampling usually covers “only a significant or financially relevant portion of the deposit” have been specifically challenged by Respondent or its expert.

⁶¹⁹ Rossi, ¶ 98.

⁶²⁰ Rossi, ¶ 116, referring to **Exhibit RE-576-1**, Table 1.2.

⁶²¹ Rossi, ¶ 115. See also Livesey IX, ¶ 7 and **Exhibit CE-1498**.

⁶²² Rossi, ¶ 116; Livesey IX, ¶ 8.

⁶²³ Livesey IX, ¶ 8.

Respondent maintains that Claimant had to sample the entire ore body in order to be certain that the ore would provide the recoveries it needed to economically extract the minerals from the rock. The Tribunal takes note, however, of Mr. Livesey's explanation, which was confirmed by Mr. Rossi, that throughout the initial years of mining operations, Claimant would have continued to learn about the resource and would have been able to make adjustments to the metallurgical process if needed. Mr. Livesey described "[t]he ongoing review and adjustment of mining and processing techniques [as] a normal part of the mining business" and also "good financial practice" given that revenues from the project can be used to fund additional drilling and testing.⁶²⁴ Mr. Livesey testified that apart from the fact that they "knew that the material below 450 meters was also going to respond similarly to the physical and chemical processes of comminution and metallurgical recovery," even if that had not been the case, "it did not make sense for [them] to be concerned at this early stage with material below 450 meters that was only going to be mined two and a half decades later."⁶²⁵

561. During the Hearing on Quantum, Prof. Spiller agreed that at the stage of metallurgical testing, the payback period and first several years of mine operation "are the most important."⁶²⁶ He then testified:

Q. So, do you know how long it would take to penetrate down to even touch the area below 450 meters?

A. I'm guessing it's 12 years or something like that.

Q. Okay. So it would be reasonable, at least, to concentrate your metallurgical testwork on the part that you're going to reach in the first 10 years, let's say; right?

A. Not if you're creating a value, a sale price. You need to be able to figure out what the value of that orebody is and how much of that copper and gold is going to be recovered through the whole entire deposit.

Q. Yeah. But you don't need as much testing. I mean, otherwise, what would be the point of this rule, this general principle that you should prioritize the early years of the deposit in your metallurgical testing? It's got to be that it means that you focus on that, and that you don't need to do the same level of metallurgical testing on the stuff that you're not going to reach for more than a decade; right?

A. That's not the principle that I follow. I think you need to sample the whole entire orebody."⁶²⁷

⁶²⁴ Livesey IX, ¶ 12.

⁶²⁵ Livesey IX, ¶ 10.

⁶²⁶ Transcript Hearing on Quantum (Day 4), p. 1240 lines 4-9.

⁶²⁷ Transcript Hearing on Quantum (Day 4), p. 1240 line 10 to p. 1241 line 12.

562. In the context of a subsequent discussion on Prof. Spiller's involvement in a different project as "*Qualified Person*," i.e., "*Principal Metallurgist*," responsible, *inter alia*, for the section on "*Mineral Processing and Metallurgical Testing*," of the NI 43-101 Technical Report Updated Feasibility Study,⁶²⁸ Prof. Spiller was pointed to a sentence on "*Sample Selection*" which stated, *inter alia*, that "[p]articular focus was made on material likely to be mined in the first five years."⁶²⁹ In that context, Prof. Spiller testified:

Q. ... And so I think you probably do--..., that principle up before, that one of the things you do when you do metallurgical work is you prioritize in your intensity of focus the stuff that is going to be mined during the payback period, during the early years; right?

A. Yes, I agree with that.

Q. And you do follow that principle in practice; right?

A. Yes.

Q. Okay. Now, and that makes perfectly good economic sense because, of course, once you're operating a mine and once you're there and you're digging, you will just continue to keep--I mean, it's an iterative process all the way through, and you'll continue to keep understanding and exploring the Resource; right?

*A. Yes. You always are exploring, yeah."*⁶³⁰

563. In the Tribunal's view, Prof. Spiller's oral testimony confirmed that even if Claimant had limited metallurgical sampling to a depth of 450 meters, without having verified whether the rock below 450 meters would provide a reasonably consistent metallurgical response as Respondent and its experts allege, this would not have been unusual or below industry standards because 450 meters would have fully covered at least 13 years of mining operations during which additional drilling and testing could have occurred. The Tribunal is aware that Prof. Spiller's agreement with this approach concerned a different project and that he appeared to take a different opinion with regard to the Reko Diq project because this was about "*creating a value, a sale price*." The Tribunal is not convinced, however, by this distinction. When Claimant was preparing the Feasibility Study, it was not contemplating to sell its investment to a third party but intended to build and operate the mine itself. Neither Respondent nor its experts have argued that an approach which is in accordance with industry standards when planning to build and operate a mine based on a feasibility study would not be sufficient for the purposes of selling the same mine to a third party.

⁶²⁸ Exhibit CE-1678, p. 309.

⁶²⁹ Exhibit CE-1678, p. 66.

⁶³⁰ Transcript Hearing on Quantum (Day 4), p. 1244 line 21 to p. 1245 line 17.

564. Consequently, and in addition to its conclusion reached above that the collection of metallurgical samples for the PFB domains from depths above 450 meters did not render them inadequate or not sufficiently representative of the ore body, the Tribunal further concludes that even if the results of the metallurgical testwork had been representative of only the portion of material above 450 meters, this would have been in accordance with industry standards and sufficient for a willing buyer in November 2011.
565. Finally, the Tribunal is also not convinced that the number of metallurgical samples collected by Claimant was below industry standards. Prof. Spiller stated in his second expert report that “*an expected minimum number of sample/tests would be in the range of 435, based on 1 sample for each 5 million tonnes of ore*” and therefore “*far more than the 21 tests used in the feasibility.*”⁶³¹ While it appears to be undisputed that Claimant conducted more than one test on each of the metallurgical samples, the Tribunal understands Prof. Spiller’s opinion to be that at least 435 samples should have been collected in order for the samples to be representative of the ore body. In support of his opinion, Prof. Spiller referred to the Mineral Processing Plant Design, Practice, and Control issued by the Society for Mining, Metallurgy and Exploration (SME) in 2002, which states that “*the number of samples should bear some correlation to the size, value and variability of the deposit. Medium to large deposits typically have a sample of each 1-5 million tonnes of ore.*”⁶³²
566. During the Hearing on Quantum, Prof. Spiller was pointed to a section on “*Practical requirements*” in the document issued by SME, which notes that “*the best sample(s) for testwork are composite samples*” and that “*it is generally recommended that the team create four to six composites.*”⁶³³ In response to the proposition that this indicated that when the source relied on by Prof. Spiller referred to samples, it was talking more about the point samples rather than the number of composites, Prof. Spiller testified that “[t]hat’s a fair reading of this document. I don’t agree with that.”⁶³⁴ Prof. Spiller agreed that the 21 metallurgical samples he was referring to were composite samples. He then testified:

“Q. Okay. Now, in fact, if you look at samples in the way I’ve described it, if it’s point samples, you would agree with me that TCC and AMMTEC, in the 87,000 kilograms of material, had a lot more than 435 samples that they analyzed; right?”

⁶³¹ Spiller II, p. 6.

⁶³² Spiller II, p. 2, quoting from **Exhibit ES-1**.

⁶³³ **Exhibit ES-1**, p. 148.

⁶³⁴ Transcript Hearing on Quantum (Day 4), p. 1215 lines 13-22.

A. They did. They took a lot of samples. I mean, they put the material together."⁶³⁵

567. Mr. Rossi explained in his report that for the first two phases of metallurgical testwork, approximately 32 tonnes of material were shipped to AMMTE; for phase 3 (Feasibility Study) and phase 4 (Expansion Pre-Feasibility Study), approximately 56 tonnes of material were shipped to AMMTEC.⁶³⁶ While Respondent initially alleged that "*the vast majority of the samples*" was "*compromised*" due to a wrong categorization of lithologies,⁶³⁷ it did not dispute Claimant's explanation that the re-logging concerned only phase 1 testwork for the scoping study and did not affect any subsequent test work in phases 2 through 4. Therefore, the Tribunal considers this point moot.
568. Based on the evidence in the record, the Tribunal is not convinced that the number of composite samples used for metallurgical testing was too low. Prof. Spiller acknowledged that, on a "*fair reading*" of the SME recommendation, the number of at least 435 samples he calculated referred to point samples rather than the composite samples which in turn are composed of several point samples. The Tribunal also notes that the Feasibility Study summarized the process to achieve representative composite samples as follows:

"In summary, the samples chosen for the FS metallurgical test work were based on relative proportions of lithology and alteration types in the mine plan V10 and within pit limits. The samples were also chosen to approximate grades over the life of mine for each lithology/alteration ore type, and maintain a broad distribution throughout the ore body.

Based on both lithology and alteration, the ore types for deposits H14 and H15 form a sound basis for differentiating metallurgical ore types, and assessing the representivity of metallurgical samples and composites.

Composite construction was based on selecting, wherever possible, multiple intervals of similar lithology/alteration ore types throughout the deposit, compositing to achieve Cu and Au grades roughly proximal to anticipated mine plan grades, as well as compositing pilot plant samples via mine plan based proportions of ore types.

Samples collected for FS pilot plant test work were found to be reasonably representative. Composites were blended to reflect the proportions of each lithology and alteration type according to the V10 mine plan. HPGR samples collected represent the dominant ore types.

Flotation Locked Cycle (LC) composites used to assign recovery and concentrate grades to the block model represent the full suite of main Western Porphyries ore types in both the H14 and H15 deposits."⁶³⁸

⁶³⁵ Transcript Hearing on Quantum (Day 4), p. 1216 lines 10-16.

⁶³⁶ Rossi, ¶¶ 142, 144.

⁶³⁷ Respondent's Counter-Memorial on Quantum, ¶ 206.

⁶³⁸ **Exhibit RE-576-6**, p. 6-12.

569. In the Tribunal's view, it is apparent that each composite sample consisted of a considerable number of point samples and, based on data obtained through Claimant's previous drilling campaigns, was compiled with the specific aim to be representative of actual mining operations at Reko Diq.
570. Prof. Dagdelen's only and Prof. Spiller's main criticism regarding the composition of the samples concerned the depths from which the material for the composite samples was taken. This aspect has been addressed in detail above.
571. Prof. Spiller further criticized that the samples did not include material at cut-off grade. Claimant pointed out, however, that Prof. Spiller did not rely on AMMTEC's final report dated December 2009 but rather on an interim report dated March 2009. According to Claimant, AMMTEC's final report shows that it in fact did perform tests at cut-off grade.⁶³⁹ To the Tribunal's knowledge, the final report is not in the record of this arbitration.⁶⁴⁰ During the Hearing on Quantum, Claimant's metallurgy expert Dr. Anderson confirmed, however, that "[w]ithin the testing campaign and in actuality in the final test used to define the design criteria, ... there were tests done at exactly the cutoff grade."⁶⁴¹ He was not cross-examined on this point.
572. Prof. Spiller's criticism on cut-off grade was raised together with his opinion that material from deeper parts of the deposit showed lower recoveries than material from shallower depths.⁶⁴² The Tribunal has already concluded above that Prof. Spiller's analysis underlying his conclusion that material from deeper parts of the deposit showed lower recoveries did not show variability of recoveries within a certain domain. In addition, the Tribunal is also not convinced that across the domains, material coming from the deeper part of the mine generally showed lower recoveries than material from shallower depths.
573. During the Hearing on Quantum, Prof. Spiller was pointed to the results of DWT-14 and DWT-12 on the tables he had used, which did not show a correlation between lower recoveries and increasing depth. He responded that Claimant was "*appreciating or lending too much credence to the details of this*" but maintained that "*[w]hat we're looking at is, in general, where those samples came from, and they came--they are shallow samples, and there's a couple that are deeper, and I think it's quite obvious that as you go deeper, you get lower recoveries.*"⁶⁴³ Prof. Spiller further agreed that the highest gold recovery had occurred in the second deepest hole but pointed out that "*gold analyses are quite irregular, and they are notoriously different, based on the ability to analyze the*

⁶³⁹ Claimant's Quantum Post-Hearing Brief, ¶ 69, referring to **Exhibit RE-576-28.29**, p. 5.

⁶⁴⁰ **Exhibit RE-576-28.29** was "*Intentionally Left Blank*" according to the Cumulative Index of Respondent's Documents Filed in the Proceedings.

⁶⁴¹ Transcript Hearing on Quantum (Day 4), p. 1127 lines 17-20.

⁶⁴² Cf. Transcript Hearing on Quantum (Day 4), p. 1206; Prof. Spiller's Presentation, p. 22.

⁶⁴³ Transcript Hearing on Quantum (Day 4), p. 1248 line 22 to p. 1249 line 22.

*tailings accurately or the throwaway” and maintained that “again, what I’m saying is, just look at this table in general.”*⁶⁴⁴

574. In addition to the fact that Prof. Spiller had to recognize during the Hearing that his conclusion did not prove to be valid on each of the composites, he further confirmed that he was aware that DWT-8, *i.e.*, the composite comprising material from the deepest hole with the lowest recoveries in H-15 according to the table he had presented, was later retested and achieved an improved recovery once Claimant and AMMTEC had further tweaked the process. While he could not confirm the precise recovery of 93.5% that was put to him, he acknowledged that “[i]f that’s exactly what happened, it would [undermine his analysis in these charts].”⁶⁴⁵
575. As pointed out by Claimant, Prof. Spiller did not rely on the final report prepared by AMMTEC for his analysis but rather on an interim report dated March 2009. While the final report is not in the record of this arbitration, the Tribunal notes that Prof. Spiller acknowledged and had apparently been aware prior to his oral testimony that certain recoveries improved following the interim report on which he had relied for his analysis. Also taking into account the fact that his analysis did not prove valid on certain drill holes even on the data from the interim report, the Tribunal considers that it cannot give much weight to his conclusion that recoveries were lower for material from deeper parts of the mine.
576. Respondent and Prof. Spiller further criticized Claimant for not having done tests on point samples instead of or in addition to the tests of composite samples. However, the Tribunal recalls that the SME on which Prof. Spiller relied considers that “*the best sample(s) for testwork are composite samples.*” The SME further states that “[e]xcessive compositing (*i.e. production of large, overall composites*) can mask valuable metallurgical response information and can give misleading conclusions about the actual plant performance. Therefore, it is generally recommended that the team create four to six composites.”⁶⁴⁶ Given that, even on Respondent’s case, Claimant conducted tests on a total of 21 composite samples, the Tribunal has no reason to believe that this approach was not in accordance with industry standards.
577. Finally, Respondent criticized Claimant for having relied on composites to test variability but, as has also been addressed above, the classification of domains and verification that they were reasonably consistent had been done before the metallurgical tests on the composite samples.

⁶⁴⁴ Transcript Hearing on Quantum (Day 4), p. 1250 lines 4-21.

⁶⁴⁵ Transcript Hearing on Quantum (Day 4), p. 1253 line 15 to p. 1254 line 14.

⁶⁴⁶ **Exhibit ES-1**, p. 148.

578. In the absence of any further specific challenge on the composite samples, the Tribunal is convinced that the metallurgical sampling conducted by Claimant was adequate and in line with industry standards.

ii. Whether the Metallurgical Testing Produced Variable Recoveries

579. Respondent further argues that the metallurgical testing carried out by AMMTEC in 2007-2009 produced variable recoveries and considers this confirmed by the results of tests performed by RDi laboratory on samples taken by Prof. Dagdelen during his site visit to Reko Diq. Respondent refers to its expert Prof. Spiller who reviewed both AMMTEC's and RDi's test results and concluded in his first report:

*“Based on the comparative sampling and testwork, it is apparent that the various ore samples, both ore type and variability type samples, produce inconsistent results when following the same procedures. The inconsistencies are independent of feed sample lithology/alteration and grade. The flotation response variability, both internally to the RDi results and the AMMTEC results, cast doubt on the feasibility study and the ability to achieve consistently high value-recovery at marketable concentrate grades.”*⁶⁴⁷

580. In his second report, Prof. Spiller maintained his conclusion.⁶⁴⁸

581. Dr. Anderson disagreed with Prof. Spiller's conclusion:

*“In my opinion, the Reko Diq Feasibility Study is robust, and the underlying methodology and metallurgical testing are of excellent quality. TCC conducted many phases of metallurgical test work on many tonnes of Reko Diq material, originating from thousands of samples, which were representative of the orebody's relevant lithologies and alterations (or ‘domains’). This included not only laboratory testing (open- and locked-cycle, as well as variability, tests), but also pilot-plant test work.”*⁶⁴⁹

582. Dr. Anderson pointed out that neither Prof. Dagdelen nor Prof. Spiller had referred to AMMTEC's metallurgical test reports of July 2009 or September 2009 but had compared the RDi results only to Claimant's March 2009 tests.⁶⁵⁰ According to Dr. Anderson, however, “[t]hrough both the laboratory and pilot-plant tests, TCC validated the technologies it would use at Reko Diq, obtaining recoveries above 90% Cu and concentrate grades of approximately 30%.”⁶⁵¹

583. In Dr. Anderson's opinion, RDi had, by contrast to AMMTEC, not been presented with representative quantities of samples and both the samples and the testing had “many

⁶⁴⁷ Spiller I, Section VI.

⁶⁴⁸ Spiller II, Section VI.

⁶⁴⁹ Anderson, ¶ 15.

⁶⁵⁰ Anderson, ¶ 16, referring to Exhibits RE-675-28.15 and RE-576-28.16.

⁶⁵¹ Anderson, ¶ 32.

*shortcomings,” which rendered the results “not directly comparable” to AMMTEC’s results.*⁶⁵²

584. In any event, Dr. Anderson pointed to Prof. Spiller’s statement that “[o]n average the AMMTEC results produced a slightly higher Cu recovery (90.5 vs 87.2) while with respect to Cleaner 2 concentrate Cu grade the average was virtually the same (22.3 vs 22.8) [i.e., slightly higher grades for RDi’s tests].” In his opinion, where RDi’s results are compared to comparable tests performed by AMMTEC, the results are in fact “very similar” and “tend to corroborate that TCC’s proposed flotation method was robust and produced consistent recoveries across the various relevant metallurgical domains.”⁶⁵³
585. In response, Prof. Spiller stated that “the pilot plant results, often referred to by Dr. Anderson, were not used to establish copper and gold recovery data used as the basis of the feasibility study and economics of the project presented therein.” He explained that “pilot plants are conducted on composite samples representative of large swaths of the ore and are not representative of ore that the production plant is likely ever to be fed on a given day, over a week, or month, or often even a year” and that “[t]herefore, appropriately, the basis for feasibility design is based on locked-cycle tests conducted on individual alteration units, and should have included tests on un-composited variability samples characterized as representing extremes in grade and alteration.”⁶⁵⁴ On that basis, Prof. Spiller continued to discuss the results of AMMTEC’s March 2009 interim report, which he considered to be the only relevant tests for determining the design criteria used in the Feasibility Study.
586. With respect to Dr. Anderson’s report, he considered:
- “Many of the criticisms in the Expert Report of Dr. Anderson are directed at comparisons with the pilot plant testing and the representativeness of the RDi samples in relation to the entire set of testwork done at Reko Diq. It is important to return to the results in Spiller March 20, 2018. Those tests and the results showed variability, which formed the basis for my conclusions. In reviewing Dr. Anderson’s report, there is little challenge to the variability of the results, which was the focus of the tests done for my first report. Because the criticisms do not go to variability, I do not see the need to respond in-depth to each of Dr. Anderson’s criticisms.”*⁶⁵⁵
587. He further maintained his conclusion that “after considering the arguments of Dr. Corby G. Anderson, the variability of flotation response demonstrated in the AMMTEC work and the RDi work does not support the Design Basis establishing a minimum performance

⁶⁵² Anderson, ¶¶ 17-19, 34-87, 88.

⁶⁵³ Anderson, ¶¶ 20, 92-98, quoting from Spiller I, p. 14.

⁶⁵⁴ Spiller III, pp. 2-3.

⁶⁵⁵ Spiller III, pp. 5-6.

*of 91.3 percent copper recovery and 64.2 percent gold recovery throughout the life of mine as presented by the August 2010 TCC Reko Diq Feasibility Study.”*⁶⁵⁶

588. During the Hearing on Quantum, Dr. Anderson testified in direct testimony that the design criteria for the Feasibility Study were established based on “*the whole body of work from 17 May 2007 up until December 2009, including the three pilot-plant runs, as well as further understanding and optimization of some of the earlier testwork that was done and reported in March.*” Dr. Anderson explained that “*in March, these results came out and AMMTEC and TCC decided that they need to work on a few areas*” and specifically identified the result of composite DWT-8, which had a low recovery of 87.6 in March 2009 and, after the pilot work and locked-cycle test, reached a recovery of 93.5%.⁶⁵⁷

589. The Tribunal notes that Prof. Spiller made it specifically clear in his third report that his conclusion that the AMMTEC results had shown variability was based exclusively on the test results of the 21 composite samples reported in the March 2009 interim report. He dismissed Dr. Anderson’s reference to subsequent tests and in particular the pilot plant test results by arguing that these results were “*not used to establish copper and gold recovery data used as the basis of the feasibility study and economics of the project presented therein.*”⁶⁵⁸

590. Dr. Anderson disputed this statement by stating:

“[T]his early work from March that's portrayed here led them to do more work that led into three pilot campaigns. So, you do a pilot plant to, one, confirm what you're doing, and then take it up to the next level so that you can see at an operational level rather than just a bench scale that the equipment you're going to choose and the parameters, your key process indicators, are correct.

And so, the best thing you can have in a pilot plant is to try it out and find out a little bit is wrong or something is wrong because you can fix it before you get in the operation. So, you see through the pilot plant, progressively, they got better.

*If you look in the Feasibility Study, they compared their results from the pilot plant to the locked-cycle projections they had, and they correlated quite well.”*⁶⁵⁹

591. In response to Prof. Spiller’s statement that “*pilot plants are conducted on composite samples representative of large swaths of the ore and are not representative of ore that*

⁶⁵⁶ Spiller III, p. 6.

⁶⁵⁷ Transcript Hearing on Quantum (Day 4), p. 1116 lines 14-20, p. 1119 line 11 to p. 1120 line 11.

⁶⁵⁸ Spiller III, pp. 2-3.

⁶⁵⁹ Transcript Hearing on Quantum (Day 4), p. 1121 lines 6-22.

the production plant is likely ever to be fed on a given day, over a week, or month, or often even a year,” Dr. Anderson testified:

“I don't understand that exactly because you're just taking it up to the next step, and you're using materials from the same orebody, but you're using them on a larger scale in the proposed equipment and flow sheet that you plan on using. So, it's a good way to test out your design and then modify if there's issues.

And in the mining process--having actually run a copper flotation circuit--you're always receiving wide swaths of ore that you have to deal with. So, you can learn in the pilot plant, if you run an open-cycle test--it's a batch process--you have a one-shot deal. Right? And if you run locked-cycle testing on the bench, you may go anywhere from six to ten cycles to see if you get it closed, but it's still on the bench. So, you haven't actually applied any engineering or operational input or output.

So, when you run the pilot plant on material from the same deposit, over a period of time, you can see how you're operating, you're learning. And, also, it is quite common that people will blend ores in order to--in operations, blend them so that they can have a more consistent feed. You know, it allows you to learn and understand and make your design that much better.”⁶⁶⁰

592. The Tribunal notes that the Parties' experts disagree on which of AMMTEC's test results formed the basis of the process design criteria and the recovery data reported in the Feasibility Study. Prof. Spiller referred in his third report to the Executive Summary of the Feasibility Study, which reported:

“Metallurgical results used as the basis of the FS are obtained from locked cycle tests using samples representing the various lithology/alteration rock types. Copper recovery is consistently high, ranging from 91.3% to 93.1%. Gold recovery varies from 64.2% to 73.1%, being higher in the early years. Concentrate grade is generally in the 28-31% range and gold grades are generally in the 10 to 15 g/t range until the last few years of run-of-mine ore production.”⁶⁶¹

593. Prof. Spiller concluded from this quote that the pilot plant results were not used to establish the copper and gold recovery data. He then presented the recovery data from the 21 composite samples reported in the March 2009 reports.⁶⁶² Dr. Anderson pointed out in his direct testimony, however, that the recovery and ore grade data and thus the design criteria used in the Feasibility Study is contained in Tables 6.46 to 6.48 of Chapter 6 on

⁶⁶⁰ Transcript Hearing on Quantum (Day 4), p. 1123 line 1 to p. 1124 line 3.

⁶⁶¹ Spiller III, p. 2, quoting from **Exhibit RE-576-1**, p. 1-33.

⁶⁶² Spiller III, pp. 4-5.

Metallurgy and Process Development.⁶⁶³ He further confirmed that the data in these tables are different from the data presented by Prof. Spiller.⁶⁶⁴

594. As pointed out by Dr. Anderson, the copper recoveries presented by Prof. Spiller in his third report indeed do not match the recoveries reported in Table 6.46 of the Feasibility Study. Specifically, the copper recoveries in the test results presented by Prof. Spiller range between 87.6% (for DWT-8 discussed above) and 93.8%;⁶⁶⁵ Table 6.46 reports copper recoveries ranging between 90.1% and 95.8%.⁶⁶⁶ As for the gold recoveries, there is only a slight difference in the overall recovery range. However, individual test results also differ. For example, the recovery for the domain VIN-SCC at H-15 was at 54.8% in March 2009;⁶⁶⁷ in the Feasibility Study, it was reported to be at 70.2%.⁶⁶⁸ Similarly, the recovery for the domain VIN-MIX at H-14 was at 57.4% in March 2009;⁶⁶⁹ in the Feasibility Study, it was reported to be at 68.1%.⁶⁷⁰
595. As for the range of recoveries included in the Executive Summary of the Feasibility Study on which Prof. Spiller based his conclusion that the design criteria in the Feasibility Study rely exclusively on the results of the March 2009 report, it appears to the Tribunal that the paragraph quoted by Prof. Spiller does not report the range of individual recoveries but rather an average of recoveries over time, given its note that “[g]old recovery varies from 64.2% to 73.1%, being higher in the early years.”⁶⁷¹ In any event, these recovery ranges would also not match the recoveries of the March 2009 tests that Prof. Spiller presented as the alleged exclusive basis for the Feasibility Study’s design criteria.
596. In the Tribunal’s view, the fact that the recoveries reported in Chapter 6 on Metallurgy and Process Development of the Feasibility Study are higher than those presented by Prof. Spiller not only confirms that the Feasibility Study was not based exclusively on the tests presented and analyzed by Prof. Spiller. It also corroborates Dr. Anderson’s testimony that after these test results in March 2009, “AMMTEC and TCC decided that they need to work on a few areas” and improved, for example, the recovery of composite DWT-8 based on further tests conducted by AMMTEC until December 2009.

⁶⁶³ Transcript Hearing on Quantum (Day 4), p. 1116 lines 6-9.

⁶⁶⁴ Transcript Hearing on Quantum (Day 4), p. 1118 line 18 to p. 1119 line 4.

⁶⁶⁵ Spiller III, pp. 4-5.

⁶⁶⁶ **Exhibit RE-576-6**, Table 6.46.

⁶⁶⁷ Spiller III, p. 4. DWT Composite No. 15 corresponds to the domain VIN-SCC at H-15. *See, e.g.*, Spiller II, Table 3.

⁶⁶⁸ **Exhibit RE-576-6**, Table 6.47.

⁶⁶⁹ Spiller III, p. 4. DWT Composite No. 6 corresponds to the domain VIN-MIX at H-14. *See, e.g.*, Spiller II, Table 3.

⁶⁷⁰ **Exhibit RE-576-6**, Table 6.47.

⁶⁷¹ **Exhibit RE-576-1**, p. 1-33.

597. As Prof. Spiller specifically confirmed that his analysis of variability of the AMMTEC test results is based entirely on the results of AMMTEC's March 2009 interim report,⁶⁷² the Tribunal is of the view that it cannot attach much weight to this analysis, which does not take into account subsequent testing conducted by AMMTEC until December 2009. In addition to the fact that the recoveries relied on by Prof. Spiller do not match those reported in the Feasibility Study, the Tribunal also finds Dr. Anderson's testimony plausible that the design criteria were established based on the entire test work conducted by Claimant and AMMTEC on the metallurgical process rather than only the 21 tests pointed to by Prof. Spiller. While the Tribunal agrees with Respondent and Prof. Spiller that tests preceding the optimization of the process in early 2009 may not be as decisive at this point because they did not form the basis for the reported recoveries, the Tribunal does not consider it plausible that tests following the March 2009 report, which resulted in further improved recoveries until December 2009, would not be incorporated into the Feasibility Study.
598. In addition and while Prof. Spiller maintained that pilot plant tests could not be used for the definition of design criteria, Dr. Anderson explained that after March 2009 AMMTEC conducted not only the pilot plant tests but also an additional 30 locked-cycle tests whose results were incorporated into the recoveries reported by AMMTEC in December 2009. He further explained that "*they were vetting their pilot-plant results with locked-cycle testing.*"⁶⁷³ As pointed out by Dr. Anderson, the results of this vetting were summarized in Table 6.31 of the Feasibility Study:

Table 6.31 Flotation Pilot Plant and Locked Cycle Test Results for the Commissioning, FS01 and FS02 Composite Samples, Summary

Ore Types Tested		Final Concentrate				
		Mass Pull %	Copper		Gold	
			%	% Distribution	ppm	% Distribution
Commissioning	Average locked cycle results	1.7	29.5	93.8	11.9	76.0
Sample	Best pilot plant survey	1.9	30.3	91.0	9.6	72.2
	Pilot survey, average from optimum conditions	1.7	30.5	90.6	8.2	68.1
FS2 composite	Average locked cycle results	1.4	29.9	94.0	16.3	81.3
	Best pilot plant survey	1.7	28.7	93.4	8.1	71.1
	Best pilot plant shift composite	2.1	30.5	93.4	10.6	72.3
	Pilot survey, average from optimum conditions	1.7	28.9	92.8	8.9	72.5
FS1 composite	Average locked cycle results	1.5	28.5	93.6	14.2	77.1
	Best pilot plant survey	1.6	27.6	94.1	8.1	76.9
	Best pilot plant shift composite	1.5	28.3	92.5	10.8	73.6
	Pilot survey, average from optimum conditions	1.6	28.3	92.8	8.2	72.8

* FS2 results are presented ahead of FS1 results in order to follow the order of testing

⁶⁷² Prof. Spiller stated in his third report that "[i]t is important to return to the results in Spiller March 20, 2018. Those tests and the results showed variability, which formed the basis for my conclusions." Spiller III, p. 5.

⁶⁷³ Transcript Hearing on Quantum (Day 4), p. 1116 line 21 to p. 1117 line 7.

599. Based on the evidence in the record, the Tribunal concludes that it would not be correct to look at the test results reported in AMMTEC's March 2009 interim report in isolation and to ignore the additional test work done by Claimant and AMMTEC on the metallurgical process until December 2009. As neither Respondent nor Prof. Spiller have addressed the final test results reported by AMMTEC in December 2009, the Tribunal also cannot follow the argument that AMMTEC's test results show metallurgical variability in a manner that would affect the value of Claimant's investment.
600. As an additional argument, Respondent claims that the test results produced by RDi laboratory on samples collected by Prof. Dagdelen during his site visit to Reko Diq have "*conclusively shown ... that Reko Diq has variable recoverabilities.*"⁶⁷⁴
601. The Tribunal recalls that Dr. Anderson has raised several detailed criticisms regarding the testing conducted by RDi, such as that the quantities of material were, in his opinion, not sufficient to be representative samples and that there were what he considers to be shortcomings in the technical processes employed by RDi. In addition, Dr. Anderson criticized Prof. Dagdelen and Prof. Spiller for their comparison of open-cycle tests with locked-cycle tests.⁶⁷⁵
602. In response, Prof. Spiller expressed the opinion that "*what is important is the variability of results for the contemporary testing at RDi when tested following duplicated procedures in the same laboratory conducted by the same personnel. Whether the tests are Locked Cycle or Open Cycle, any variability will be present, and it is not necessary to conduct only Locked Cycle tests to judge the variability of the recoveries.*" Prof. Spiller emphasized that the samples collected by Prof. Dagdelen "*came from drill core generally expected to represent material previously (historically) tested at AMMTEC. In fact, all the samples contained copper and gold values within the expected ore grade for the project. Further, all the samples responded to the crush/grind/float process following the same protocol, including the same reagents.*" He then stated that "[w]hat was not similar was the variability of performance." In his view, Dr. Anderson's criticisms did not go to variability and he therefore did not see the need to respond in-depth to each of Dr. Anderson's criticisms.⁶⁷⁶
603. In the Tribunal's view, the argument raised by Respondent and Prof. Spiller appears to be two-fold: (i) the test results produced by RDi allegedly show that AMMTEC's test results could not be duplicated by a buyer;⁶⁷⁷ and (ii) the test results produced by RDi allegedly show variability among themselves so that even if the test conditions at RDi

⁶⁷⁴ Respondent's Post-Hearing Brief on Quantum, ¶ 99.

⁶⁷⁵ Anderson, ¶¶ 17-19; 21-87.

⁶⁷⁶ Spiller III, pp. 5-6.

⁶⁷⁷ Cf. Respondent's Rejoinder on Quantum, ¶ 166.

were not identical to those at AMMTEC, the RDi test results alone show a variable deposit.⁶⁷⁸

604. As for the first argument, the Tribunal takes note of Dr. Anderson's opinion that open-cycle tests cannot be directly compared with locked-cycle tests and that the only valid comparison drawn by Prof. Spiller with the locked-cycle tests reported by AMMTEC in the March 2009 interim report therefore concerns the locked-cycle tests of RDi.⁶⁷⁹ In the Tribunal's view, the lack of comparability is confirmed by Prof. Spiller's first report in which he noted that "*RDi conducted open cycle flotation tests following the standard procedure with site water on six variability samples provided from Professor Dagdelen's site visit. The AMMTEC reports did not show directly comparable test results for what were termed Drop Weight Test (DWT) composite samples. Instead, AMMTEC conducted locked cycle tests on the DWT samples and modified the procedure to include aeration.*"⁶⁸⁰ Prof. Spiller then compared the results of RDi's open cycle tests "*a[s] well as possible*" to AMMTEC's locked cycle test results and concluded that "*[i]n virtually every test the AMMTEC results produced higher recovery and higher concentrate grade results.*"⁶⁸¹
605. As pointed out by Dr. Anderson, RDi also conducted locked-cycle tests and Prof. Spiller stated in his report that he had compared those to "*similar tests by AMMTEC.*" For this comparison, he concluded that "*[o]n average the AMMTEC results produced a slightly higher Cu recovery (90.5 vs 87.2) while with respect to Cleaner 2 concentrate Cu grade the average was virtually the same (22.3 vs 22.8). Differences in recovery and grade results were similar with respect to Au, Ag, Fe and S.*"⁶⁸²
606. Given that Prof. Spiller himself considered the open-cycle tests not "*directly comparable*" with AMMTEC's test results, the Tribunal considers it reasonable to refer only to the comparison of locked-cycle tests. There, Prof. Spiller did not find any large differences between the AMMTEC and RDi results but only what he described as "*a slightly higher Cu recovery*" while the copper average grade was "*virtually the same.*" He reached the same conclusion for the other minerals found in these samples.
607. Against this background, the Tribunal is not convinced by the first argument that a buyer would not have been able to duplicate the results achieved by Claimant. It would contradict common sense to expect that the results would be identical and the fact that they are within a close range rather corroborates the robustness of AMMTEC's results. The Tribunal therefore also does not consider it necessary to express an opinion on Dr.

⁶⁷⁸ Cf. Respondent's Post-Hearing Brief of Quantum, ¶ 100.

⁶⁷⁹ Anderson, ¶ 19.

⁶⁸⁰ Spiller I, p. 14.

⁶⁸¹ Spiller I, p. 14, referring to Appendix 5, Table 4.

⁶⁸² Spiller I, p. 14, referring to Appendix 5, Table 3.

Anderson's criticisms regarding the representativeness of the material collected by Prof. Dagdelen or the differences in methodology employed by RDi. The same applies to the discussion between the Parties regarding an oxidation of the ore kept in the core shed at Reko Diq from which Prof. Dagdelen collected the samples during his site visit.

608. For similar reasons, the Tribunal is also not convinced by Respondent's second argument, *i.e.*, that the RDi results in themselves are proof of a variable deposit. If RDi's results of locked-cycle tests produced results showing that, across all minerals tested, recoveries and grades were similar to those reported by AMMTEC, the Tribunal fails to see why a willing buyer would have concluded from these results that the deposit was variable, *i.e.*, that recovery ranges deviated from those on which the economics of the Feasibility Study are based.
609. In addition, the Tribunal notes that the comparison drawn by Prof. Spiller between RDi and AMMTEC test results concerned exclusively AMMTEC's March 2009 test results. In the Tribunal's view, it is much more likely that a willing buyer wanting to verify the recoveries relied on in the Feasibility Study would have looked at AMMTEC's final tests which actually formed the basis for the figures in the Feasibility Study. No such comparison has been made and the Tribunal has no basis to conclude that a willing buyer would have drawn any conclusion from a comparison with interim test results which were superseded by subsequent locked-cycle tests as well as pilot plant test work.
610. Consequently, the Tribunal concludes that it has no reason to believe that the metallurgical testing conducted by AMMTEC was inadequate or that such tests showed variability that would have affected the value attributed by a willing buyer to Claimant's investment.

4. Whether Claimant Has Established That Its Plans for Project Execution Were Adequate for a Project at the Development Stage of Reko Diq

a. Summary of Claimant's Position

611. Claimant submits that it was committed to building the mine at Reko Diq and had developed the necessary plans to do so. According to Claimant, "*TCC's Feasibility Study covered all the technical aspects required to build a project of this scale, as well as the capital and operating costs required to engineer, construct, and eventually operate both the initial mine and the planned expansion case.*"⁶⁸³
612. Claimant refers to its expert Mr. Neil Cusworth, who conducted an independent peer review of the Feasibility Study in 2011 and an additional detailed review in the context

⁶⁸³ Claimant's Quantum Post-Hearing Brief, ¶ 72. *See also* Claimant's Quantum Reply, ¶ 670.

of this arbitration and concluded that “*TCC’s studies are in the top 10% of feasibility studies in terms of content, quality and accuracy,*” that they would have “*allowed TCC, and its owners Barrick and Antofagasta, to make a well-informed financial investment decision,*” and, finally, that the studies “*were of bankable quality.*”⁶⁸⁴

613. Claimant rejects Respondent’s allegations regarding a “*high likelihood of cost overruns and delays*” as well as “*overly optimistic assumptions in its construction plan and cost estimates*” and refers to both Ms. Cusworth and Mr. Livesey as well as various sections of the Feasibility Study which show in its view that “*TCC’s mine plan included not only the nature and location of the mine, but also identified the specific mining equipment and processing facilities that would be used, how much and what kind of labor would be required, and how the eventual concentrate would be stored and eventually transported.*”⁶⁸⁵
614. Claimant submits that teams from Claimant, Antofagasta and Barrick, together with 13 expert groups conducted 46 trade off studies during feasibility stage and thereby determined how to design, construct and operate the mine. As examples, Claimant points to the pit design, drilling, hauling and mining support equipment, design of processing facilities and the detailed drawings and process flow diagrams for key elements of the mine.⁶⁸⁶ It further refers to a forward work plan which identified and provisionally budgeted for the next steps of the project and a section in the Feasibility Study on project execution “*detailing its eventual strategy on procurement, engineering, construction, commissioning and eventual handover*” and argues that “*the company was ready and able to actually build [the mine].*”⁶⁸⁷
615. Claimant notes that the forward work plan provided for a 48-month schedule from commencement of project engineering through to completion of construction, which Mr. Cusworth reviewed and considered reasonable and in line with other large copper projects.⁶⁸⁸ Claimant emphasizes that this schedule did not include the project commitment phase preceding project engineering during which it would have moved ahead with certain steps such as the purchase of milling equipment for the processing plant.⁶⁸⁹ Claimant further points to ten main areas identified in the forward work plan,

⁶⁸⁴ Claimant’s Quantum Post-Hearing Brief, ¶ 73, quoting from Cusworth, ¶ 60.

⁶⁸⁵ Claimant’s Quantum Reply, ¶ 672, referring to Cusworth, ¶¶ 60-65; Livesey IV, ¶¶ 53-54; Livesey IX, ¶¶ 21–39 and Exhibits RE-576-5, RE-576-6, RE-576-9, RE-576-22, RE-576-22, RE-576-23 and RE-576-24.

⁶⁸⁶ Claimant’s Quantum Reply, ¶¶ 672-675, referring in particular to Exhibit RE-576-14.02.

⁶⁸⁷ Claimant’s Quantum Reply, ¶ 676, referring to Exhibits RE-576-32 and RE-576-22.

⁶⁸⁸ Claimant’s Quantum Reply, ¶ 682, referring to Cusworth, ¶ 57.

⁶⁸⁹ Claimant’s Quantum Reply, ¶ 683, referring to Livesey IX, ¶ 66.

which relate to project financing and project readiness, with preliminary plans to address these areas after the feasibility stage.⁶⁹⁰

616. Claimant considers that Respondent's allegations of cost overruns and delays are ill-founded and, in any event, would not affect Prof. Davis' valuation.⁶⁹¹
617. According to Claimant, the opinion of Respondent's expert Mr. Owen should be attached no weight because he started to offer opinions on various issues beyond the construction aspects on which he initially was to comment and provided a "*laundry list of conclusions*" none of which was based on any analysis or specific or material enough to affect the value of the project. Claimant considers that following Mr. Cusworth's analysis of the alleged issues, Mr. Owen abandoned his allegations and notes that he even admitted at the Hearing on Quantum that "*as far as constructing goes, there [were] no big issues there at Reko Diq.*"⁶⁹²
618. Claimant considers that from a technical point of view, the location of the site was "*far from challenging*" and refers to Mr. Cusworth who considered that the "*site of the mine is ideal in terms of available areas for the project needs*" and compared the location to another project with several similarities regarding "*topography, distances from ports and infrastructure [and] weather conditions*" which was delivered on time and on budget.⁶⁹³
619. Claimant further points to Mr. Owen's testimony that he would be "*the guy that has to stand in front of the Board and help them make the Decisions, and then ... to go out and execute in the field*" and considers it confirmed that he had not undertaken the work required to advise the Tribunal on Reko Diq given that Mr. Owen testified that he "*took the care and diligence that [he] would have on a first basis to talk to a Board of Directors about whether they should move forward with thinking about investing in this Project.*"⁶⁹⁴
620. Claimant rejects Mr. Owen's "*refrain*" that it did not have its "*eye on the ball*" and his criticism that the Feasibility Study was allegedly missing a project execution plan. In Claimant's view, Mr. Owen conceded during the Hearing on Quantum that only a preliminary project execution plan is required at feasibility stage and failed to provide any reason why Claimant's plan would not meet or even exceed what was required at that stage of the project. Claimant emphasizes that Mr. Owen did not identify or criticize any specific sections of the Feasibility Study in his second report but merely stated during the

⁶⁹⁰ Claimant's Quantum Reply, ¶ 684.

⁶⁹¹ Claimant's Quantum Reply, ¶ 677.

⁶⁹² Claimant's Quantum Post-Hearing Brief, ¶¶ 74-77, quoting from Transcript Hearing on Quantum (Day 4), p. 1077.

⁶⁹³ Claimant's Quantum Reply, ¶ 680, quoting from Cusworth, ¶¶ 75-76.

⁶⁹⁴ Claimant's Quantum Post-Hearing Brief, ¶¶ 78-79, quoting from Transcript Hearing on Quantum (Day 4), p. 903 and pp. 1026-1027 (emphasis added by Claimant).

Hearing on Quantum that he had “*referred to the Project Execution Plan as being woefully inadequate.*”⁶⁹⁵

621. In response to the allegedly missing “*critical*” components that Mr. Owen identified for the first time in his presentation during the Hearing on Quantum, Claimant provides a list of references to those parts of the Feasibility Study in which, according to Claimant, each of the items identified by Mr. Owen is addressed.⁶⁹⁶
622. Claimant further considers that, despite Respondent’s assertion that Claimant’s ramp up assumptions were “*wildly unrealistic,*” there is no dispute between the Parties that Reko Diq would be able to ramp up in the fastest category of mines. Claimant points to Mr. Owen’s testimony that he would expect a ramp up time in the range of 12 to 24 months and emphasizes that Prof. Davis even modeled a ramp up time in the range of 16 to 24 months in his revised model.⁶⁹⁷ Claimant notes that Prof. Davis’ original model already included an average delay of 2.3 years before construction starts and that his revised model includes an additional delay of 21 months in ramp-up to full production after the end of construction.⁶⁹⁸
623. Claimant also refers to the residual risk value of USD 105 million in the Feasibility Study to which Respondent and Mr. Owen pointed during the Hearing on Quantum. According to Claimant, the residual risk value was “*a measure of the Project’s sensitivity to capital cost overruns, and one that proved that the project was sufficiently robust to withstand such overruns.*”⁶⁹⁹ Claimant then points to the following sections of the Feasibility Study: (i) the Capital Cost contingency summary in which Claimant ascribed an individual contingency amount to each discipline and category, which resulted in an overall contingency of USD 326 million (corresponding to 11% of total capital cost); (ii) the Capital Cost Section in which Claimant referred to a residual risk assessment of USD 105 million and noted that “[t]he residual value has been recommended, but is not included in the CAPEX or Sustaining Capital”; and (iii) the Residual Risk Assessment showing the financial analysis used to determine this value and stating that its purpose is to show the project’s owners that “*there exists an 85% probability that threats materializing will cost the project less than \$105M.*”⁷⁰⁰

⁶⁹⁵ Claimant’s Quantum Post-Hearing Brief, ¶¶ 80-84, quoting from Transcript Hearing on Quantum (Day 4), pp. 1092, 1093, 1094 and p. 1067 and referring to p. 1063.

⁶⁹⁶ Claimant’s Quantum Post-Hearing Brief, ¶ 85, responding to Dagdelen-Owen Presentation, pp. 30-31.

⁶⁹⁷ Claimant’s Quantum Post-Hearing Brief, ¶¶ 87-89, quoting from Respondent’s Rejoinder on Quantum, ¶ 216 and referring to Transcript Hearing on Quantum (Day 4), pp. 1046-1047 and Davis II, ¶ 16.

⁶⁹⁸ Claimant’s Quantum Reply, ¶ 671, referring to Davis I, ¶ 193 and Davis II, ¶ 84.

⁶⁹⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 91.

⁷⁰⁰ Claimant’s Quantum Post-Hearing Brief, ¶ 91, referring to **Exhibit RE-576-23**, p. 23-46 and quoting from p. 23-48 and **Exhibit RE-576-20.01**, p. 6.

624. Claimant adds that the residual risk value was derived from the risk register that Prof. Davis fed into his model and submits that “*Prof. Davis, however, made even more conservative assumptions about those risks than those made by the TCC team at the time of the Feasibility Study and then incorporated those more conservative assumptions into the valuation he has presented.*” Therefore, if Claimant’s work had been inadequate, Claimant contends that this would not affect Prof. Davis’ valuation.⁷⁰¹ Claimant points in particular to Prof. Davis’ increase of the initial mine development capital costs by 58% to account for the risk of cost overruns, which exceeds the amounts that Respondent’s experts considered necessary.⁷⁰²
625. Claimant also refers to Respondent’s reliance on a “*rule of thumb*” that a cost contingency for a project in the developing world equals 20% of the project’s total expenditures and maintains that the adjustments made by Prof. Davis exceed that number given that he included a 21.4% cost increase due to escalation and a 10% contingency from Claimant’s studies.⁷⁰³
626. As for the overall contingency rate of 11% presented in the Feasibility Study, Claimant explains that it is a blend of different contingencies varying from 5% to 25% depending on the level of certainty that Claimant had regarding the various cost estimates.⁷⁰⁴ It refers to Mr. Cusworth who explained:
- “[T]he amount of contingency, therefore, varies according to the degree of engineering design definition achieved. For example, mining equipment prices are now sourced from existing fixed price global contracts with selected suppliers. As a result, it is appropriate to reduce the level of contingency for mining equipment to around 5%. Because of the level of certainty, a lower contingency can be used.”*⁷⁰⁵
627. Finally, as for Respondent’s allegation that Claimant overestimated productivity of its workforce and should have made use of the Gulf Coast Factor, Claimant contends that the approach it took was more appropriate than “*Pakistan’s arbitrary approach*” because no specific construction labor productivity factor existed for Pakistan when Claimant prepared its studies. Claimant explains that it instead drew on productivity assumptions and manpower estimates from local contractors and SNC Lavalin, which was familiar with Pakistani labor from previous experience and obtained no less than three bids for each major construction package, analyzing and comparing them to other projects in the

⁷⁰¹ Claimant’s Quantum Post-Hearing Brief, ¶ 92

⁷⁰² Claimant’s Quantum Reply, ¶ 671, referring to Davis I, ¶ 155.

⁷⁰³ Claimant’s Quantum Reply, ¶¶ 686-687, referring to Davis II, ¶ 160.

⁷⁰⁴ Claimant’s Quantum Reply, ¶¶ 688-689.

⁷⁰⁵ Cusworth, ¶ 89.

region.⁷⁰⁶ Claimant notes that according to Mr. Cusworth, the Feasibility Study “*provided the estimates of labour hours and costs in painstaking detail*” and that he further testified that “[t]his comprehensive methodology goes well beyond the normal practices at feasibility study stage and is a more accurate method than that suggested by Mr Owen.”⁷⁰⁷

b. Summary of Respondent’s Position

628. Respondent submits that, according to Claimant, Reko Diq is a “*mega project*” which would have cost almost USD 3.3 billion in capital expenditures in order to get the mine operational. Respondent claims, however, that the Feasibility Study and Expansion Pre-Feasibility Study “*failed to quantify sizable costs, adopted an overly aggressive construction schedule that did not prepare for the requirements of building a mine in Pakistan, and adhered to overly optimistic assumptions in its construction plan and cost estimates.*”⁷⁰⁸
629. Respondent contends that the Feasibility Study was “*a blueprint for another Mega Project failure*” and refers to the statistic presented by Mr. Owen at the Hearing on Quantum pursuant to which “*Mega projects*” in the Asia-Pacific region frequently experience significant cost and schedule overruns. According to Respondent, Claimant has not challenged Mr. Owen’s years of “*research, experience, and studied analysis*” showing that “*Mega-projects are undeniably prone to failure.*”⁷⁰⁹ Referring to independent studies, Respondent submits that of the projects built in the mining industry, “*85% come in over budget, 75% fail to start up one time, and 75% do not meet operation specifications*” and adds that the “*propensity for failing to meet feasibility studies is even worse with ‘Mega’ Projects,*” *i.e.*, projects with a capital investment of over USD 1 billion.⁷¹⁰ Respondent submits that industry analysts have identified three “*key factors*” in large project failures, *i.e.*, not adhering to industry practice, management turnover, and overly aggressive scheduling, and claims that Reko Diq “*exhibited all the warning signs of becoming a failure.*”⁷¹¹
630. Respondent argues that a “*primary driver of these failures*” are “*over-eager Project Advocates*” which are solely concerned with getting the project approved and intend to resolve issues in the future. According to Respondent, successfully delivered projects require not only a feasibility study but also a fully detailed project execution plan (as

⁷⁰⁶ Claimant’s Quantum Reply, ¶¶ 690-694, referring to Cusworth, ¶¶ 119-120, 124, Livesey IX, ¶¶ 71-72 and **Exhibit RE-576-21**.

⁷⁰⁷ Claimant’s Quantum Reply, ¶ 695, quoting from Cusworth, ¶¶ 123-124.

⁷⁰⁸ Respondent’s Counter-Memorial on Quantum, ¶ 352.

⁷⁰⁹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 108-109, referring to Dagdelen/Owen Presentation, p. 22.

⁷¹⁰ Respondent’s Rejoinder on Quantum, ¶ 194, referring to Dagdelen/Owen II, ¶¶ 42, 44, 78.

⁷¹¹ Respondent’s Counter-Memorial on Quantum, ¶ 353, referring to **Exhibit RE-610** and Dagdelen/Owen I, ¶¶ 184-186.

opposed to a single chapter in the feasibility study) and employ third parties to review the feasibility study and confirm the project execution plan.⁷¹²

631. Respondent argues that the “*real work*” begins after the feasibility study where “*numerous unknowns arise during execution*” and refers to Mr. Owen who testified that there are significant problems where the feasibility study has “*a determined Project Advocate*” who might lower the capital costs, use the best results for metal recovery, minimize risk factors and lower the contingency in order to show a better IRR and hopefully get board approval for the project.⁷¹³ According to Respondent, project advocates are unreliable and “*TCCA and its vendors fall solidly into this camp*” as the Feasibility Study and Expansion Pre-Feasibility Study “*display all of the problems of a Mega Project.*”⁷¹⁴
632. Respondent argues that Claimant either under-spent on the Feasibility Study or failed to present any capital expenditures for the Expansion Pre-Feasibility Study and points to what it considers identical tables of expenditures in both studies.⁷¹⁵ According to Respondent, Mr. Cusworth conceded that the Expansion Pre-Feasibility table is a “*cut and paste*” which, in Respondent’s view, is a “*sign of hopelessly inadequate work by TCC in overseeing this element of the EXP PFS.*”⁷¹⁶ In any event, Respondent contends that Claimant has failed to prove its expenditures in the project given that it only offered a table “*without any detailed breakdown and support*” despite Respondent’s challenge that “*TCC duplicated many of its costs by having full teams from both owners where only one team was necessary.*”⁷¹⁷
633. Respondent claims that spending USD 204 million on the Feasibility Study is “*a rather low number for a Megal Project*” in comparison to the overall CAPEX and refers to Mr. Own who testified that buyers would be looking for more than 2-3% of the project value in expenditures and in fact would be expecting 3-5% to avoid the “*overwhelming frequency of cost blow-outs and developmental failures*” in mega projects.⁷¹⁸
634. Respondent further submits that Claimant had not carried out any detailed engineering which, according to Respondent, forms a “*key element of any feasibility study for a mega project.*” Respondent refers to Mr. Owen who testified that a mega project requires at least 80% of the basic engineering and 15% of the detailed engineering before the

⁷¹² Respondent’s Rejoinder on Quantum, ¶ 195.

⁷¹³ Respondent’s Rejoinder on Quantum, ¶¶ 197-200, quoting from Dagdelen/Owern II, ¶¶ 42, 53.

⁷¹⁴ Respondent’s Rejoinder on Quantum, ¶¶ 201-202.

⁷¹⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 111, comparing **Exhibit RE-576-31**, Table 31.3 with **Exhibit RE-577-30**, Table 30.3.

⁷¹⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 112, quoting from Transcript Hearing on Quantum (Day 3), p. 876 lines 13-17.

⁷¹⁷ Respondent’s Post-Hearing Brief on Quantum, ¶ 112.

⁷¹⁸ Respondent’s Rejoinder on Quantum, ¶ 204; Respondent’s Post-Hearing Brief on Quantum, ¶ 113, referring to Dagdelen Owen II, ¶¶ 77, 85 and Transcript Hearing on Quantum (Day 4), p. 1083 lines 11-22.

decision to go forward with instruction. He further explained that detailed engineering shows how the different pieces of the project will work with each other when the project is executed. According to Respondent, the absence of detailed engineering, despite the absence of any experience of working in Pakistan, was “*an important blind spot in TCC’s preparations that it could not quantify.*”⁷¹⁹

635. As for the requirement of having a project execution plan, Respondent considers that the dispute between the Parties relates to the detail required of this plan and contends that the “*section on project execution*” is not comparable to the “*full, detailed execution plan*” without which a mega project “*is primed to fail*” due to cost overruns, scheduling flaws and design failures.⁷²⁰ Respondent argues that during the Hearing on Quantum, Mr. Owen described the missing elements such as a resource plan describing where people will come from and what they will do, the 300 pages describing what an EPCM company would do, the lack of operations readiness in the procurement plan or the lack of a plan for seeking agreement with the tribes along the pipeline route and the actions of the owner at project execution stage.⁷²¹ Respondent claims that “*TCC did not know what it needed in a Project Execution Plan*” and therefore had no documents or questions to put to Mr. Owen in response to his criticisms.⁷²²
636. According to Respondent, Mr. Livesey’s testimony supported the absence of a project execution plan by confirming that Section 32 of the Feasibility Study describes a future project execution plan and that numerous high-value items in the execution portion were not finished even though the Feasibility Study described them as “*essential.*” Respondent contends that “*Reko Diq was not ready for execution and the costs and time that would come with the work.*”⁷²³
637. As for the ramp-up time of the project, Respondent emphasizes that Mr. Owen correctly identified that the ramp up was “*wildly unrealistic*” because even those mines in the fastest category (28% of the projects in the world) reach steady state production in no less than 12-16 months and Claimant failed to provide any evidence that its project should be classified in that category. Respondent further points out that Mr. Cusworth “*didn’t see*” in its review of the Feasibility Study the unreasonably short ramp-up time to which Claimant then ascribed hundreds of millions of dollars. In Respondent’s view, this

⁷¹⁹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 114-115, referring to Transcript Hearing on Quantum (Day 4), p. 1084 lines 1-14; Respondent’s Rejoinder on Quantum, ¶¶ 205-206, referring to Dagdelen/Owen II, ¶ 88.

⁷²⁰ Respondent’s Rejoinder on Quantum, ¶¶ 207-209, quoting from Claimant’s Quantum Reply, ¶ 685 and referring to Dagdelen/Owen II, ¶¶ 52, 79, 88, 93-95.

⁷²¹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 116, 118, referring to Transcript Hearing on Quantum (Day 4), p. 1066 lines 1-7, p. 1086 lines 5-17, p. 1067 lines 5-7, p. 1068 lines 20-22, and p. 1063 lines 11-22.

⁷²² Respondent’s Post-Hearing Brief on Quantum, ¶ 117.

⁷²³ Respondent’s Post-Hearing Brief on Quantum, ¶ 118, referring to Transcript Hearing on Quantum (Day 2), p. 394 lines 8-14, pp. 391-393 and p. 397 lines 3-12.

confirms a lack of seriousness in his review and “*dubious quality*” of Mr. Cusworth’s testimony.⁷²⁴ Respondent points out that the average ramp-up time is 16-18 months and that mines on average achieve less than 70% of design capacity in the first year of production and require more than two years to achieve 90% but maintains that Claimant has failed to show that Reko Diq would achieve this performance.⁷²⁵

638. Respondent further considers it confirmed by Mr. Cusworth that there were no productivity factors or other means to estimate the productivity of the workforce in the Feasibility Study. Respondent also refers to Mr. Cusworth’s confirmation that it would be difficult to predict how productive laborers might be in “*unique*” countries such as Pakistan and his testimony that “[i]t’s very hard to get reliable productivity figures which you can rely on. They can give you an indication, but you wouldn’t rely on them.” In Respondent’s view, the Tribunal must therefore conclude that Claimant did not have the detail available to reasonably estimate its ability to execute the project.⁷²⁶
639. Respondent submits that the mining industry uses the “*Gulf Coast Factor*,” which uses the US Gulf Coast as a baseline for productivity, to adjust the estimated man-hours for the project. Respondent submits that there was a shortage of qualified labor in Balochistan and contends that “[i]n all likelihood, the *Gulf Coast Factor* would have been high.” By not using a Gulf Coast Factor and instead relying on estimates prepared by Pakistani contractors, Respondent claims that Claimant failed to provide a realistic estimate of construction time and cost. Respondent notes that Claimant acknowledged an increased capital expenditure over over USD 130 million to account for the high risk of not finding adequate labor due to the lack of technical skills but maintains that Claimant failed to consider the possibility of delays in the construction schedule. According to Respondent, Claimant also failed to include a productivity curve in the Feasibility Study to model productivity over the life of the mine.⁷²⁷
640. Respondent further asserts that Claimant “*did not have the right people in charge*” because in particular Mr. Livesey, in its view, did not have the necessary experience and his supervisor was, according to Respondent, engaged in a securities fraud in another project. Respondent contends that Barrick was pushing the project forward even though it “*did not know how to run a copper project and could not even keep its gold mines*

⁷²⁴ Respondent’s Rejoinder on Quantum, ¶¶ 215-217; Respondent’s Post-Hearing Brief on Quantum, ¶ 124, quoting from Transcript Hearing on Quantum (Day 3), p. 834 line 6.

⁷²⁵ Respondent’s Counter-Memorial on Quantum, ¶ 373, referring to **Exhibit RE-611**.

⁷²⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 119, quoting from Transcript Hearing on Quantum (Day 3), p. 837 line 15 to p. 838 line 4.

⁷²⁷ Respondent’s Counter-Memorial on Quantum, ¶¶ 363-366, referring to **Exhibit RE-611** and Dagdelen/Owen I, ¶¶ 193-196.

remotely close to their budget.” Respondent claims that “*leadership failures at TCC would have given any buyer further concern in purchasing Reko Diq.*”⁷²⁸

641. Respondent further argues that the contingency calculated by Claimant was based on “*known-unknowns*” and did not account for “*unknown-unknowns*” even though it had not done the detailed engineering to identify these unknowns and therefore failed to include at least 10-15% of project costs.⁷²⁹ Respondent contends that for a project in the developing world, “*the rule of thumb is a cost contingency that equals 20% of the project’s total capital expenditures.*”⁷³⁰ As for the “*supplemental overrun facility*” described by Mr. Cusworth, which would include “*unkown-unknowns,*” Respondent contends that Mr. Cusworth had no means to calculate the number which remained secret and was based on “*crude*” estimates. According to Respondent, Claimant thereby failed to provide the necessary certainty to apply modern DCF as no buyer would have had the tools to calculate the future costs as the basis for its investment decision.⁷³¹
642. Respondent also claims that Claimant failed to budget for “*key items*” such as a reverse osmosis plant to treat the water from the Fan Sediments, which is relied on in Claimant’s studies but does not appear as a purchase item, and many of the risks contained in the residual risk assessment, which are identified but not quantified and therefore do not appear in the capital expenditures or operating expenses.⁷³² Respondent submits that its experts took the missing components of capital expenditures recommended in the Feasibility Study and adjusted the cost contingency to 20%, which raised the total capital expenditure estimate from USD 3,299 million to USD 3.667 million and, according to Respondent, shows the magnitude of the errors made by Claimant but does not yet include security costs, the “*inevitable cost overruns,*” or costs of bringing the mine to meet the environmental standards.⁷³³
643. Respondent further alleges that Claimant decided to leave out USD 105 million in “*owner’s cost*” and points to Mr. Cusworth’s testimony that it was in the “*supplemental overrun facility*” whose number was unknown. According to Respondent, the likely increase of costs by having to change from Light Sulfur Fuel Oil to Heavy Fuel Oil could also not be found in the operating expenses, contingency or the risk register and would therefore amount to “*another case of millions of missing dollars.*”⁷³⁴

⁷²⁸ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 120-121. *See also* Respondent’s Rejoinder on Quantum, ¶¶ 210-211.

⁷²⁹ Respondent’s Rejoinder on Quantum, ¶¶ 212-214

⁷³⁰ Respondent’s Counter-Memorial on Quantum, ¶ 361, *referring to* Dagdelen/Owen I, ¶ 189.

⁷³¹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 122-123.

⁷³² Respondent’s Counter-Memorial on Quantum, ¶¶ 356-357.

⁷³³ Respondent’s Counter-Memorial on Quantum, ¶¶ 375, *referring to* Dagdelen/Owen I, ¶ 189.

⁷³⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 125, *quoting from* Transcript Hearing on Quantum (Day 3), p. 850 lines 1-6 *and referring to* p. 846 line 19 to p. 848 line 13.

644. As for the risk register of the Feasibility Study, Respondent claims that it has “*hardly any value*” given that Claimant itself referred to further “*adjustments*” made by Prof. Davis for items not listed in the risk register and therefore accepted that it had failed to “*de-risk*” the project in respect of numerous areas of unknown costs such as security costs. Respondent contends that: (i) Claimant failed to correctly add up the cost of the risk it had identified which resulted in an error amounting to “*hundreds of millions of dollars*”; and (ii) Claimant failed to include high-risk items such as theft for explosives which were also worth “*hundreds of millions of dollars.*” According to Respondent, Prof. Davis has also not assigned any value to this risk and in any event, Respondent maintains that the project cannot be “*de-risked*” by Prof. Davis by adding costs to a model that relies on an allegedly already “*de-risked*” project.⁷³⁵
645. Respondent also refers to the highly likely risk of a “*direct violent attack in-country by any hostile force,*” which was again not assigned any risk in the risk register and could not be explained by Mr. Cusworth who merely referred to the “*risk specialists*” and gave shifting answers as to why the risk was not quantified.⁷³⁶ Respondent further contends that Claimant has failed to properly account for the risk of terrorism in its supply routes by excluding the pipeline and only assigning a value to operating expenses but not the capital expenditures to protect the supply routes before an attack occurred.⁷³⁷ According to Respondent, Claimant also failed to quantify other risks such as “*criminal extortion and kidnap caused by criminal groups possibly resulting in personnel harm, reputation and financial loss,*” not signing a Mineral Agreement or port approvals, all of which were identified as a high risk.⁷³⁸
646. Respondent further contends that the risk register inappropriately reduced the risk for items such as the absence of trained geologists even though Claimant had no plan in place to mitigate this risk. According to Respondent, “[n]o *after-the-fact mathematical calculations can repair this kind of shoddy work.*”⁷³⁹ Respondent concludes that the risk register prepared prior to 2012 “*contains millions, if not billions in missing values*” and “*Davis/Brattle should not be able to turn a blind eye to these deficiencies.*”⁷⁴⁰

⁷³⁵ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 126-128, quoting from Claimant’s Reply on Quantum, ¶ 147; Respondent’s Rejoinder on Quantum, ¶¶ 218-221.

⁷³⁶ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 129-130, quoting from Transcript Hearing on Quantum (Day 3), p. 857 lines 15-16 and p. 858 lines 11-12 and referring to pp. 858-860. See also Respondent’s Counter-Memorial on Quantum, ¶ 356.

⁷³⁷ Respondent’s Counter-Memorial on Quantum, ¶ 357, referring to **Exhibit RE-576-20.01**, p. TCCA042250.

⁷³⁸ Respondent’s Counter-Memorial on Quantum, ¶¶ 357-358, referring to **Exhibit RE-576-20.01**, pp. TCCA042249 and TCCA042245.

⁷³⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 131.

⁷⁴⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 132, Respondent’s Rejoinder on Quantum, ¶ 221.

c. Tribunal's Analysis

647. At the outset of its analysis, the Tribunal notes that it is undisputed between the Parties that the Feasibility Study was not silent on project execution but that it contained a Chapter 22 entitled "*Project Execution*" as well as a Chapter 32 entitled "*Forward Work Plan*".⁷⁴¹ Claimant further points to a section containing detailed piping and instrumentation drawings for the various processing steps of the mine.⁷⁴²
648. The question for the Tribunal to determine is whether the plans that Claimant had prepared as of November 2011 were, from the perspective of a buyer, adequate for a project at the development stage of Reko Diq.
649. The Tribunal notes that both Respondent and its expert, Mr. Owen, have repeatedly referred to studies showing that a considerable percentage of large-scale mining projects experiences cost overruns and/or delays in their construction and ramp-up schedule. While the Tribunal agrees with Respondent and Mr. Owen that this information is relevant to the extent that it shows that reasonable contingencies have to be factored into a plan to build and operate a mine, such studies cannot, in and of themselves, serve as evidence that Reko Diq would have experienced these cost overruns and/or delays. In particular, the Tribunal is not convinced by Respondent's general allegation that the Reko Diq project "*exhibited all the warning signs of becoming a failure.*"⁷⁴³
650. In this regard, the Tribunal notes that Respondent itself makes the argument that "*TCC duplicated many of its costs by having full teams from both owners where only one team was necessary.*"⁷⁴⁴ Mr. Owen also noted that "*it normally requires 10-12 people to prepare a feasibility study. The IMD FS had 23 people from TCC, showing that Barrick and Antofagasta each wanted their own pair of eyes on everything.*"⁷⁴⁵ Respondent thus does not dispute Claimant's submission that the preparation of the Feasibility Study was supervised by teams from both Antofagasta and Barrick. The Tribunal therefore also cannot follow the suggestion that the team preparing the Feasibility Study was inexperienced and was not aware of the necessary components of a feasibility study in terms of planning project execution. The Tribunal does not consider it necessary to engage with Respondent's allegation that Claimant "*did not have the right people in charge.*"⁷⁴⁶ Apart from the fact that the Tribunal is not convinced by Respondent's criticisms aimed specifically at the expertise of Mr. Livesey, the Tribunal also recalls Mr.

⁷⁴¹ Exhibits RE-576-22 and RE-576-22.

⁷⁴² Exhibit RE-576-14.02.

⁷⁴³ Cf. Respondent's Counter-Memorial on Quantum, ¶ 353.

⁷⁴⁴ Respondent's Post-Hearing Brief on Quantum, ¶ 112.

⁷⁴⁵ Dagdelen/Owen I, ¶ 208.

⁷⁴⁶ Respondent's Post-Hearing Brief on Quantum, ¶ 120.

Livesey's testimony in response to the question whether he thought that they had the right team at TCC to help him lead the Feasibility Study:

"Absolutely. We had a very well-developed structure, both below me and above me. What you have to remember is the structure of the team was not only the Tethyan staff themselves, either seconded or recruited into Tethyan, but for each main discipline oversight from both owners, Barrick and Antofagasta.

And then below me--above that group and interfacing to me immediately was a study manager, an experienced mining engineer. And then above me was the technical committee.

Now, the technical committee was representatives of both Barrick and Antofagasta, and the chairmanship of the technical committee alternated between Barrick and Antofagasta. It was predominantly technical people, and it included the Senior Vice President of capital projects for Barrick and for Antofagasta.

So, there was a good, solid team below, capable in their divisions and in their various specialties. And there was oversight above them and then above me as well. ...

*And then we had the Board, obviously, beyond that."*⁷⁴⁷

651. The Tribunal does not consider it credible that a buyer would have had concerns regarding "leadership failures at TCC"⁷⁴⁸ while being aware that the team, including Mr. Livesey, was supervised by a technical committee comprising representatives of Antofagasta and Barrick, who combined the experience of building and operating copper companies as well as building and operating gold mines in various locations across the continents.
652. While the Tribunal is therefore not convinced by the general argument that Claimant did not have the necessary expertise to conduct a feasibility study, including the relevant plans to be made for construction and execution of the project, this does not yet exclude the possibility of potentially justified criticisms on individual parts of the Feasibility Study. The Tribunal will therefore turn to the specific criticisms raised by Respondent and Mr. Owen with regard to the plans for the construction and execution of the project.
653. Mr. Owen criticizes, *inter alia*, that the cost spent on the Feasibility Study was too low which, in his view, demonstrates that the level of engineering was not adequate. In his opinion, the total amount spent on feasibility studies for "Mega Projects" is "normally" 3% to 5% of the total capital cost estimate.⁷⁴⁹ Mr. Owen does not identify any source for this statement. Claimant's expert Mr. Cusworth, on the other hand, considers that the cost

⁷⁴⁷ Transcript Hearing on Quantum (Day 2), p. 346 line 16 to p. 347 line 17.

⁷⁴⁸ Respondent's Post-Hearing Brief on Quantum, ¶ 121.

⁷⁴⁹ Dagdelen/Owen II, ¶ 85.

for the studies conducted by Claimant, *i.e.*, USD 81.37 million or 2.47% of the total capital cost estimate, exceeded the industry benchmark, which he considered to be 1% to 2%.⁷⁵⁰ In support of his opinion, he refers to an excerpt from the AIMM Cost Estimation Handbook, which identifies an expected range of study costs depending on the complexity and/or size of the project. For a feasibility study, the Handbook identifies the following percentages: low (1-2%); moderate (1.5-2.5%) and high (2.5-3.5%).⁷⁵¹

654. The Tribunal notes that the range referred to by Mr. Cusworth in fact corresponds to the percentages identified in the Handbook for projects of low size and/or complexity. In addition, the number he relies on is presented in the Feasibility Study but in fact identifies the cost for project expenditures on the studies since inception of the project in June 2006, *i.e.*, including scoping and pre-feasibility studies.⁷⁵² On the other hand, the Tribunal notes that the same chart of the Feasibility Study identifies significant other cost items such as “*Resource Geology*” which are listed separately and result in a total amount of project expenditures from inception of USD 204,261, *i.e.*, approximately 6.2% of the total capital cost estimate. As for the total percentages of costs to be expected over the study stages, the AIMM Cost Estimation Handbook gives an overall range of 1.3% to 6%.⁷⁵³ Consequently, while the Tribunal is not entirely convinced by the comparison drawn by Mr. Cusworth, it appears that the expenditures made by Claimant would be well within the range of expected costs even for a project of high complexity and/or size.
655. In addition, the Tribunal notes that the amount of cost spent cannot in and of itself be evidence of whether the Feasibility Study included adequate plans for construction and execution of the project. Mr. Owen states that the total expenditures should have been higher because a “*Mega Project*” requires a higher amount of upfront engineering and development to execute than a “*normal*” project. In his opinion, “*Mega Projects*” should have a substantial amount of basic engineering done in the feasibility study, which should amount to at least 15% to 20% of the overall engineering.⁷⁵⁴ In this regard, the Tribunal notes that Respondent’s allegation that at least 80% of the basic engineering and 15% of the detailed engineering should be completed⁷⁵⁵ and its criticism for lack of detailed engineering in the Feasibility Study⁷⁵⁶ is not supported by Mr. Owen. To the contrary, he confirmed in his presentation during the Hearing on Quantum that detailed engineering starts only after the feasibility level:⁷⁵⁷

⁷⁵⁰ Cusworth, ¶ 61.

⁷⁵¹ Exhibit CE-1219.

⁷⁵² Exhibit RE-576-31, p. 31-3.

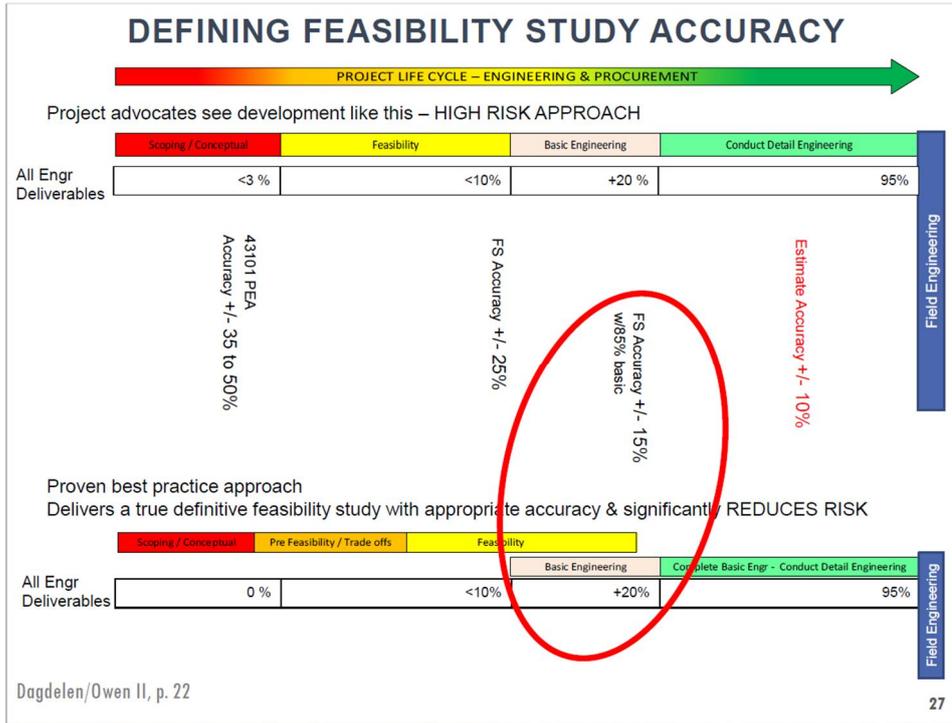
⁷⁵³ Exhibit CE-1219.

⁷⁵⁴ Dagdelen/Owen II, ¶¶ 86, 96.

⁷⁵⁵ Respondent’s Rejoinder on Quantum, ¶ 205.

⁷⁵⁶ Respondent’s Rejoinder on Quantum, ¶ 206. *See also* Respondent’s Post-Hearing Brief on Quantum, ¶ 114: “[D]etailed engineering forms a key element of any feasibility study for a mega project.”

⁷⁵⁷ Dagdelen/Owen Presentation, p. 27.

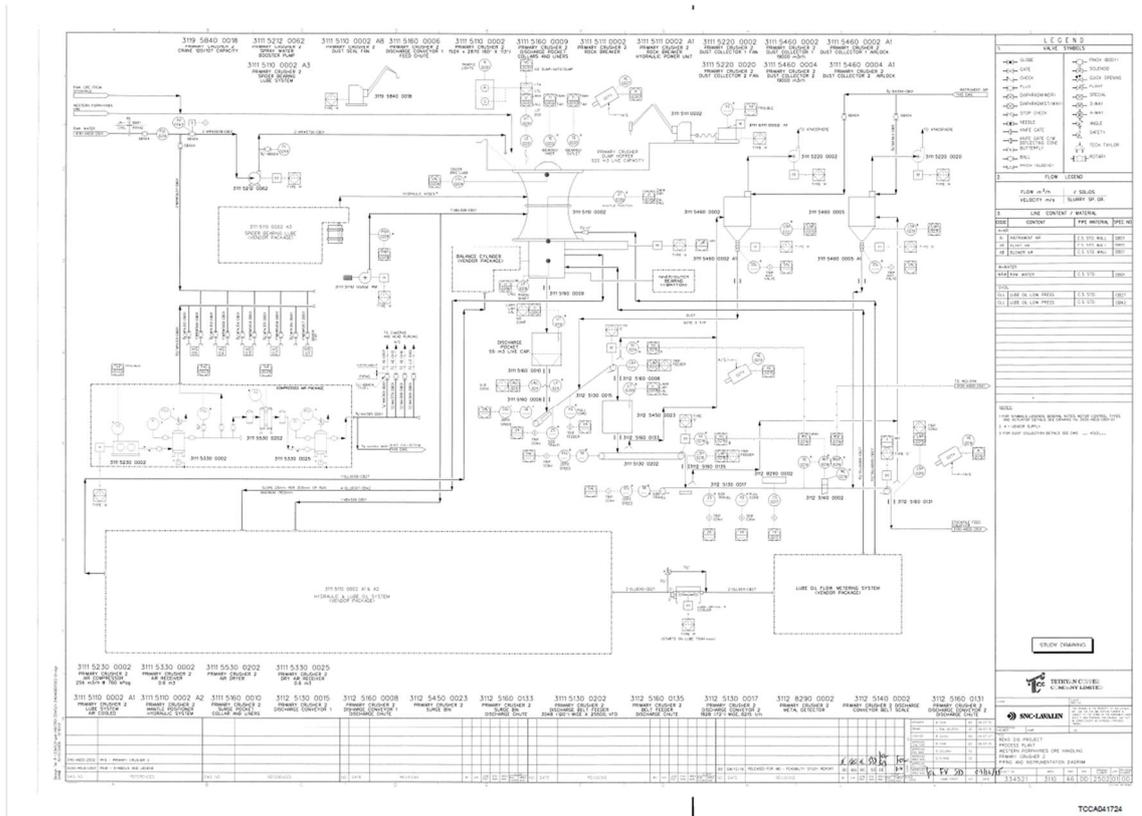


656. Mr. Owen criticizes Mr. Cusworth for not identifying the percentage of basic engineering completed in the Feasibility Study.⁷⁵⁸ On the other hand, Mr. Owen himself does not specifically identify which aspect of the basic engineering was not adequate in his opinion. He states that basic engineering includes Process Flow Diagrams and Process & Instrument Diagrams but does not address the Annex pointed to by Claimant, which contains a considerable number of highly detailed drawings and diagrams.⁷⁵⁹ As an example, Claimant pointed to the following drawing:⁷⁶⁰

⁷⁵⁸ Dagdelen/Owen II, ¶ 97.

⁷⁵⁹ Exhibit RE-576-14.02.

⁷⁶⁰ Exhibit RE-576-14.02, p. 9.



657. Mr. Cusworth also refers to these drawings, which were validated through a process testing for hazards and operability issues, as an example that the level of engineering was further advanced than would be required to comply with normal practices at feasibility study stage.⁷⁶¹ Mr. Owen does not address any of these drawings in his report and does not specify why or how they would not satisfy the level of basic engineering that he would have expected in a feasibility study. He merely raises general criticisms that the level of basic engineering was inadequate.

658. During the Hearing on Quantum, Mr. Owen presented a list of components that should be included in a project execution plan and took the view that a project execution plan with these “key components does not exist.”⁷⁶² In response, Claimant has identified the sections of the Feasibility Study, which address the components listed by Mr. Owen. While Claimant makes reference to Chapter 22 on Project Execution for some of the components, it also refers to various other Chapters, such as Chapter 20 on Operations, Chapter 21 on Contracts, Procurement and Logistics, Chapter 10 on Information Technology, Chapter 17 on Communications, Chapter 18 on Safety & Health and Chapter 19 on Security.⁷⁶³

⁷⁶¹ Cusworth, ¶ 50.

⁷⁶² Dagdelen/Owen Presentation, pp. 30-31.

⁷⁶³ Claimant’s Quantum Post-Hearing Brief, ¶ 85, referring, *inter alia*, to Exhibits RE-576-22, RE-576-20, RE-576-21, RE-576-10, RE-576-17, RE-576-18 and RE-576-19.

659. The Tribunal understands Mr. Owen's criticism to be, *inter alia*, that Claimant did not have a single document entitled "*Project Execution Plan*", which comprised all of the elements he was looking for. As for the Chapter on Project Execution in the Feasibility Study, Mr. Owen considers this to be "*a boilerplate chapter ... on EPCM project execution*" and maintains that "*a fully detailed and costed*" Project Execution Plan would have been required.⁷⁶⁴ However, the Tribunal is not convinced that a buyer would have expected to find all of the relevant information in one document rather than in the Chapters of the Feasibility Study setting out the individual aspects of the project. More specifically, neither Respondent nor Mr. Owen have pointed to any authority which would support the suggestion that only a "*Project Execution Plan*" comprising the elements listed by Mr. Owen in a single document would satisfy the level of basic engineering or the level of accuracy that a buyer would expect in a feasibility study.
660. In this regard, the Tribunal takes note of the fact that Claimant's expert Mr. Cusworth identified a total of four "*deltas*" in respect of which the Feasibility Study, in his opinion, "*was not at best practice, but rather more in line with normal industry standards for a feasibility study*" and could have provided further detail. Specifically, he identified funding arrangements which had been considered only on a preliminary basis, the timetable contained in the Forward Work Plan, the transportation of large quantities of freight to the site during construction and the strategy and timing of selecting the EPCM contractor.⁷⁶⁵ In Mr. Cusworth's opinion, these "*deltas*" did not, however, affect the "*bankable quality*" of the Feasibility Study, which would have allowed Claimant and its owners to make a well informed financial investment decision.⁷⁶⁶
661. Mr. Owen does not address these "*deltas*" and in particular does not present a different opinion regarding their potential effect on the quality of the Feasibility Study. Therefore, the Tribunal has no reason to assume that these would have affected the value of the project from the perspective of a buyer.
662. Mr. Owen rather addresses a variety of different subjects, which in his opinion are not or not adequately dealt with in the Feasibility Study. First, as to the question of the construction and ramp-up schedule, the Tribunal notes that in his first report, Mr. Owen criticized an "*overly aggressive construction schedule*" which he considered to be "*at least 10-12 months too aggressive.*" In addition, he considered that Claimant took an "*unrealistic approach to its ramp up assumptions,*" by assuming that ramp up would be

⁷⁶⁴ Dagdelen/Owen II, ¶ 102.

⁷⁶⁵ Cusworth, ¶¶ 54-59.

⁷⁶⁶ Cusworth, ¶ 60.

completed in three months, and opined that the average ramp up was 16 to 18 months, with up to 24 months in “*remote difficult locations*.”⁷⁶⁷

663. In response, Mr. Cusworth assessed first the construction schedule and concluded based on an analysis of the project and recent benchmarking that the construction period of 48 months put forward in the Feasibility Study was “*readily achievable, and indeed even more conservative than what has recently been achieved on similar mining projects*.”⁷⁶⁸ Mr. Cusworth then examined the ramp-up time to be expected for Reko Diq based on a normalized benchmarking of copper mine and concentrator projects over the past 40 years and concluded that Reko Diq would have qualified as a “*Category I*” style ramp up using simple, mature methodology because it: (i) was “*technically straight forward*”; (ii) had “*high quality sponsors with relevant expertise*”; (iii) had “*with a degree of certainty a continuous, consistent ore body*”; and (iv) had SNC Lavalin as an experienced EPCM contractor. On that basis, Mr. Cusworth presented a production forecast for Reko Diq projecting that it would achieve its design capacity of throughput and recovery after 24 months of operations.⁷⁶⁹
664. On that basis, Prof. Davis decided in his second report to maintain the 48-month construction schedule but to adjust his valuation model to reflect the ramp-up schedule provided by Mr. Cusworth. This adjustment from the 3-month ramp up estimated in the Feasibility Study to the ramp-up schedule presented by Mr. Cusworth reduced the value of the project by USD 0.6 billion.⁷⁷⁰
665. In his second report, Mr. Owen questioned whether Mr. Cusworth was in a position to give an independent opinion given his previous involvement with the project through his firm, Enthalpy, and in particular his review of the Feasibility Study in 2011 in which he did not point out the “*improbable ramp-up time*” of three months.⁷⁷¹ Mr. Owen did not, however, raise any specific criticisms regarding Mr. Cusworth’s assessment and benchmarking of the construction schedule in the Feasibility Study. In the absence of any such criticism, the Tribunal sees no basis for a conclusion that a buyer would not have considered the construction schedule contained in the Feasibility Study adequate.
666. In particular, the Tribunal cannot follow Mr. Owen’s suggestion that Mr. Cusworth, by providing an analysis on the ramp-up schedule in his expert report for this arbitration that he apparently did not perform during his contemporaneous review of the Feasibility Study in 2011, would not be in a good position to give an independent opinion on either aspect

⁷⁶⁷ Dagdelen/Owen I, ¶¶ 206-207.

⁷⁶⁸ Cusworth, ¶¶ 96-101.

⁷⁶⁹ Cusworth, ¶¶ 102-113.

⁷⁷⁰ Davis II, ¶¶ 172-175.

⁷⁷¹ Dagdelen/Owen II, ¶¶ 81-83.

of the project. During the Hearing on Quantum, Mr. Cusworth testified that he “*didn’t look at that technical issue*” during his three-day review of the Feasibility Study in 2011 and readily acknowledged that he “*didn’t see it at the time [he] did the review in 2011.*”⁷⁷² In the Tribunal’s view, the fact that Mr. Cusworth performed an additional analysis in response to Mr. Owen’s criticisms and reached a different result for one aspect of the project does not in itself raise any doubts as to the independence of his opinion.

667. As for Mr. Cusworth’s analysis on the ramp-up schedule, Mr. Owen questioned his opinion that Reko Diq would qualify as a “*class one*” ramp up and noted that only 28% of the projects “*are truly class one startups, so the vast majority of startups will not be class one.*” Mr. Owen further considered that achieving a class one startup requires “*extensive experience in this specific task,*” adding that in his opinion Antofagasta and Barrick did not have the requisite experience because they had never worked in Pakistan and were planning to use a “*rather a new technology*” for crushing the rock. He therefore considered it more likely that Reko Diq would have a “*normal 12 to 16 month startup*” in the “*Series 1 or Series 2 range.*”⁷⁷³
668. The Tribunal notes that Mr. Owen does not engage with the four reasons provided by Mr. Cusworth in support of his opinion that Reko Diq would classify as a “*Category I*” ramp up. The Tribunal also cannot follow the rather general argument that Claimant’s owners did not have the required expertise of building and operating a mine at Reko Diq. While they may not have worked specifically in Pakistan, Barrick had built and was operating mines in various remote locations across the continents and, therefore, more specific arguments would be required to convince the Tribunal that the personnel from Barrick did not bring the necessary expertise to develop a mine in Pakistan.
669. In addition, the Tribunal notes that Mr. Owen himself does not specify what he means by “*Series 1 or Series 2 range*” and, most importantly, considers that a ramp-up over 12 to 16 months would be “*normal.*” The Tribunal recalls that Mr. Cusworth’s production forecast for Reko Diq assumes that the ramp-up would be completed after 24 months and Prof. Davis incorporated this analysis into his valuation model. On that basis, the Tribunal has no reason to believe that the adjusted ramp-up schedule include in Prof. Davis’ revised model would not be considered adequate by a buyer.
670. Mr. Owen continued to emphasize during his presentation at the Hearing on Quantum that Claimant had estimated a ramp-up of three months, which he considered “*totally unrealistic*” and evidence of “*the team’s lack of experience in leading projects in real ramp-ups.*”⁷⁷⁴ The Tribunal considers, however, that even on the assumption that a buyer

⁷⁷² Transcript Hearing on Quantum (Day 3), p. 833 line 13 to p. 834 line 7.

⁷⁷³ Dagdelen/Owen II, ¶¶ 99-100.

⁷⁷⁴ Transcript Hearing on Quantum (Day 3), p. 907 lines 6-14.

would have reached the same conclusion as Mr. Cusworth regarding a reasonable ramp-up time, the buyer would presumably have done the same exercise as Prof. Davis, *i.e.*, it would have quantified the impact of making the necessary adjustments for what it considered a reasonable ramp-up time and it would have deducted that amount from the purchase price it would have been willing to pay. The Tribunal is not convinced that, as Mr. Owen suggests, the buyer would have used this as a basis for questioning the expertise of Claimant's team or the validity of the Feasibility Study in general.

671. In his first expert report, Mr. Owen further criticized that the Feasibility Study did not use productivity factors to evaluate its estimate of the man-hours required for the project and explained that Claimant should have used the Gulf Coast Factor, which calculates productivity as a multiple of the Gulf Coast Rate, *i.e.*, a standard based on productivity in the Gulf Coast area. Mr. Owen noted that he did not know what the Gulf Coast Factor would be for Pakistan but considered that “*4 is a minimum.*” He added that he was not able to calculate the factor due to the lack of a productivity analysis in the Feasibility Study.⁷⁷⁵ As for the estimates from local contractors on which Claimant had relied, Mr. Owen considered these “*likely to be understated, and schedules based on those estimates ... not reliable.*” Mr. Owen further criticized the lack of a productivity curve showing the amount of work done over time as well as the absence of a benchmarking effort. In his opinion, the Feasibility Study “*recognizes this shortcoming*” by stating that this will be done during the engineering phase and puts into question the estimate's reliability for forecasting construction.⁷⁷⁶
672. In response to this criticism, Mr. Cusworth provided several reasons why, in his opinion, an application of the “*Gulf Coast Rate*” would have been “*inappropriate*” for Reko Diq: (i) absence of reliable, relevant data on productivity for Pakistan; (ii) general unreliability of data developed based on the Gulf Coast standard due to the absence of a specific baseline to which appropriate factors can be applied and its high subjectivity; and (iii) Claimant and SNC Lavalin's use of a “*detailed and rigorous plan to obtain accurate estimates of the labour costs*” which comprised obtaining a minimum of three bids from local and international contractors for all major construction packages, preparing a bid analysis and comparison against recent and ongoing projects in the region by SNC Lavalin's estimators who had experience with sourcing labor for construction projects in Pakistan. Mr. Cusworth noted that it would be “*unrealistic to expect that these in-house benchmarks would be disclosed in a third party document such as the Reko Diq Feasibility Study.*”⁷⁷⁷ In the opinion of Mr. Cusworth, the Feasibility Study “*provided the estimates of labour hours and costs in painstaking detail*” and he pointed to estimates for

⁷⁷⁵ Dagdelen/Owen I, ¶¶ 193-195.

⁷⁷⁶ Dagdelen/Owen I, ¶¶ 196-199, referring to **Exhibit DO-38**, p. 22-105.

⁷⁷⁷ Cusworth, ¶¶ 115-122, referring to **Exhibit RE-576-10.13**, p. 6.

every item of the scope of work in the Appendices of the Feasibility Study and the curves of labor hours and number of personnel required for construction. On that basis, Mr. Cusworth concluded that “[t]his comprehensive methodology goes well beyond normal practices at feasibility study stage and is a more accurate method than that suggested by Mr. Owen.”⁷⁷⁸

673. Mr. Owen did not provide any substantive response to Mr. Cusworth’s opinion in his second report. While acknowledging that Mr. Cusworth’s report “*does touch on the issues of labor productivity,*” Mr. Owen did not address any of the reasons provided by Mr. Cusworth in support of the methodology used by Claimant. He did not again refer to the Gulf Coast rate but only generally criticized a “*lack of details on productivity.*”⁷⁷⁹ The Tribunal therefore agrees with Claimant that Mr. Owen appears to have abandoned his specific criticism of not using the Gulf Coast Factor. In any event, the Tribunal finds Mr. Cusworth’s explanation credible as to why it was more appropriate to rely on bids and estimates from local and international contractors rather than the Gulf Coast Factor, in particular taking into account the apparently undisputed absence of sufficient data for Pakistan.
674. The Tribunal notes that Respondent points to Mr. Cusworth’s oral testimony at the Hearing on Quantum that “[i]t’s very hard to get reliable productivity figures which you can rely on. They can give you an indication, but you wouldn’t rely on them.”⁷⁸⁰ Respondent draws the conclusion that “[w]ith this level of uncertainty regarding the productivity of any future work force, this Tribunal must side with Pakistan and conclude that TCC did not have the detail available to reasonably estimate its ability to execute the project.”⁷⁸¹
675. The Tribunal considers it worth recalling Mr. Cusworth’s testimony on this point in more detail. In response to the question whether the distinction between what “*can be done*” and what “*might be done*” also applies to the productivity of employees, Mr. Cusworth responded as follows:

“A. I think so, yeah. Well, let's put it this way: I couldn't see that. What I could see was a good training program, a good site culture, in terms of ensuring productivity was the best that could be done in the circumstance. I didn't see details of people doing very detailed evaluations of a particular contractor doing this piece of work, achieving this productivity. These projects, they're special.

⁷⁷⁸ Cusworth, ¶¶ 123-124, referring to Exhibits RE-576-10.02, RE-576-10.08, RE-576-22, pp. 22-75 – 22-76 and RE-576-23, pp. 23-13 – 23-15.

⁷⁷⁹ Owen/Dagdalen II, ¶¶ 101-102.

⁷⁸⁰ Transcript Hearing on Quantum (Day 3), p. 837 lines 19-22.

⁷⁸¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 119.

Q. Because these projects are special, is it difficult to predict how productive laborers might be?

A. In countries where it's--and locations that are unique, the answer is yes. It's very hard to get reliable productivity figures which you can rely on. They can give you an indication, but you wouldn't rely on them.

Q. Would you have considered Pakistan to be a unique location, like the one you just referenced in your prior answer?

A. I would say so, yes. In the location, I think in around the major cities and ports, there would be a lot more capability, mainly related to infrastructure; so roads and things like that. And there's roads on Reko Diq. But putting in crushers and mills, the answer is, they've got some cement industries where there might be capability there, but as far as a single copper project put in this area, they have limited experience.

Q. With that limited experience, would it have made it harder to keep the Project on schedule?

A. No. Possibly the other way around. The reason is that the resources are readily available. The ability to bring people in and throw them at a bottleneck in construction would be very high; whereas, in Australia or North America, getting the people and getting them onto the job can be a lot more difficult.

So, I would say there is some advantages.

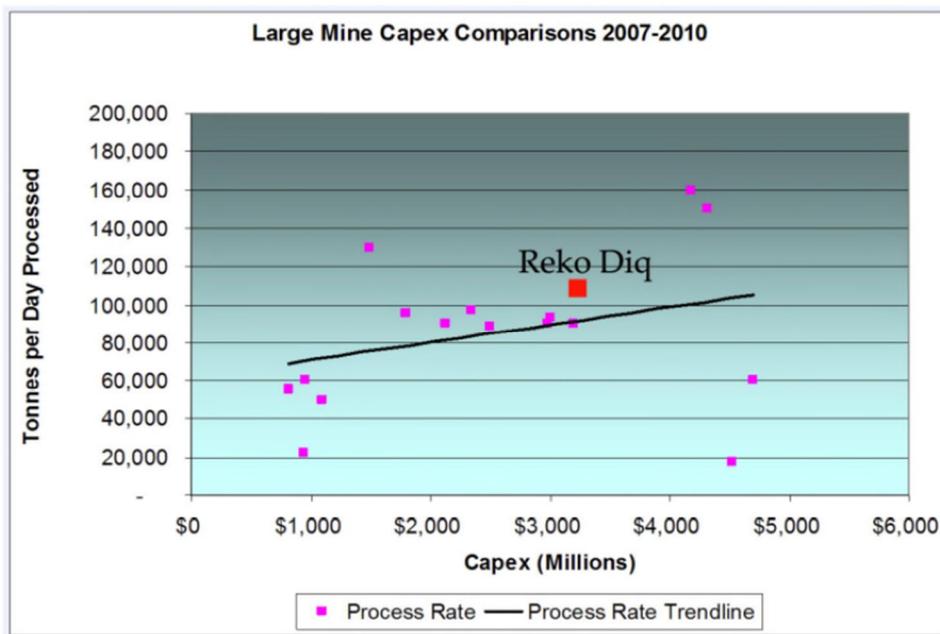
Q. Even though the people you would be bringing in would not have any experience in large-scale copper mining; right?

A. If you're looking for a good carpenter's assistant, it doesn't matter. Someone putting up scaffolding or that sort of thing doesn't matter. Someone doing an instrumentation and control system for a copper project, there may be very limited supply in Pakistan, but there is good supply worldwide.”⁷⁸²

676. Based on the evidence in the record, including Mr. Cusworth’s oral testimony, the Tribunal cannot follow Respondent’s conclusion that Claimant was not able to prepare a reasonable estimate of the productivity of its workforce. While Mr. Cusworth indeed confirmed that it is hard to get reliable productivity figures for a place such as Reko Diq, he did not agree with Respondent that Reko Diq’s location would have made it harder for the project to stay on schedule. In addition, Mr. Cusworth explained that Claimant did “*the best that could be done in the circumstance*” in terms of ensuring productivity and the Tribunal has not been provided with any specific argument from either Respondent or Mr. Owen as to why it should doubt that testimony. Consequently, the Tribunal has no reason to believe that a buyer would have taken a different view and/or that it would have considered the productivity estimates prepared based on the methodology explained by Mr. Cusworth inadequate.

⁷⁸² Transcript Hearing on Quantum (Day 3), p. 837 line 6 to p. 839 line 10.

677. Mr. Owen further considered the cost estimates for the construction of the plant “*too aggressive*” and first expressed the opinion that USD 30,000 per ton of installed capacity was low. Specifically, he noted that the capital costs for a project he had worked on in Canada had been USD 25,000 per ton of capacity and considered a premium of 20% for Reko Diq “*low considering the location, potential manpower issues, security, and general construction costs.*”⁷⁸³ Mr. Owen did not provide any support for his opinion that a cost estimate corresponding to USD 30,000 per ton of installed capacity is too low.
678. Mr. Cusworth noted in his expert report that the Feasibility Study presents a benchmarking of capital costs of 16 “*sufficiently similar*” projects, which showed that Reko Diq was slightly above the average cost rate but “*reasonably comparable in cost to similar sized remote projects*”:⁷⁸⁴



679. In his second report, Mr. Owen did not address this benchmarking exercise reported in the Feasibility Study, nor did he repeat his previous criticism regarding a cost of USD 30,000 per ton of installed capacity. The Tribunal is therefore not convinced that the cost estimate presented by Claimant was generally too low.
680. In his first report, Mr. Owen further raised the following specific criticisms: (i) pipeline cost estimate over 50% estimated from other jobs rather than qualified contractors; (ii) no CAPEX or OPEX assigned to several high risk items in the Residual Risk Assessment, specifically regarding the pipeline; (iii) no true line item for the Reverse Osmosis plant;

⁷⁸³ Dagdelen(Owen I, ¶ 187.

⁷⁸⁴ Cusworth, ¶ 84.

- (iv) labor estimates (which have already been addressed above); and (v) an 11% cost contingency, which Mr. Owen considered to be “*unrealistic*” and below the expected 15 to 20%.⁷⁸⁵
681. In response to the criticism under (iii), Mr. Cusworth pointed out that, contrary to Mr. Owen’s suggestion, the capital cost for the Reverse Osmosis plant (or rather both contemplated water treatment plants) is included in Appendix 10.5 of the Feasibility Study.⁷⁸⁶ Mr. Owen did not again refer to this point in his second report and the Tribunal therefore considers this criticism moot.
682. As for the criticism under (i), Mr. Cusworth noted that the feasibility of the pipeline had been assessed in a thorough 600-page report prepared by experts at slurry pipelines (PSI) and considered that the level of detail in this report is “*greater than one would normally expect in a Feasibility Study.*” Mr. Cusworth therefore expressed “*a high level of confidence in the definition of the pipeline, the estimates of the costs associated with sourcing the materials of the construction, and associated works.*”⁷⁸⁷
683. In response, Mr. Owen maintained that “*pipeline security remains a concern*”⁷⁸⁸ but did not again refer to his previous criticism that Claimant’s cost estimate was not based on estimates of qualified contractors. The Tribunal notes that the aspect of pipeline security has been addressed in detail by the Parties’ security experts and will form subject of a separate analysis on security aspects of the project below. Therefore, the Tribunal will not address this criticism in any further detail at this point.
684. As for the criticism under (v) regarding the 11% cost contingency, Mr. Cusworth explained that the amount of contingency, *i.e.*, the judgment of the costs of “*Known Unknowns*” in an estimate, varies according to the degree of engineering design definition achieved and pointed to the varying amounts of contingency applied in the Feasibility Study for different components of the project, ranging from 5% for mining equipment to be sourced from existing fixed-price global contracts with suppliers to up to 25% for piping. In particular, Mr. Cusworth noted that the contingency for labor and pipeline material, *i.e.*, 20%, was in line with what Mr. Owen had required and was, in Mr. Cusworth’s opinion, “*higher than necessary.*”⁷⁸⁹
685. In his second report, Mr. Owen maintained that the project should have a higher contingency “*due to its size, complexity, location and risks.*” He acknowledged the “*basic feasibility contingency calculation*” in the Feasibility Study but considered that “*this is*

⁷⁸⁵ Dagdelen(Owen I, ¶¶ 187-189.

⁷⁸⁶ Cusworth, ¶ 77, referring to **Exhibit RE-576-10.05**, pp. 349, 487.

⁷⁸⁷ Cusworth, ¶ 78, referring to **Exhibit RE-576-6.01**.

⁷⁸⁸ Dagdelen/Owen II, ¶¶ 107-108.

⁷⁸⁹ Cusworth, ¶¶ 85-92, referring to **Exhibit RE-576-23**, Table 23.20.

only part of the calculation.” In his opinion, “[t]he second, and critical component is taking the feasibility study contingency value, a fully developed and costed risk assessment, and then use a company like ARES Risk Management ... to conduct a statistical analysis utilizing a Monte Carlo simulation that provides significantly more confidence as to what the schedule timeline should be and the total cost of the project should not exceed.”⁷⁹⁰ Mr. Owen explained that this exercise would provide the owner with a contingency value providing a 80-90% confidence that the project should not exceed that value. According to Mr. Owen, Claimant did not fully engage in this exercise but was driven by “*Project Advocates*” trying to minimize the contingency in order to get board approval for the project. He then noted that the Feasibility Study actually includes a supplemental calculation of what an 85% confidence factor would add to the project, *i.e.*, a “*contingency of 105 million USD for Capex cost overruns,*” but emphasized that the number was not included in the CAPEX.⁷⁹¹

686. Specifically, Mr. Owen referred to the following statement in the Feasibility Study:

*“A residual risk value of \$105 000 000 has been identified, and it is recommended that TCC carry the costs as part of owner’s costs. Details of the risks and calculations are provided in Section 30, Risk. The residual value has been recommended, but is not included in the CAPEX or Sustaining Capital.”*⁷⁹²

687. In Chapter 30 of the Feasibility Study, the section on “*Residual Risk*” states, *inter alia*, the following:

“Based on the results of the risk review held in Toronto on October 6 and 7, 2009 the Reko Diq Project is considered to be a well thought out and low financial risk project. A review of the risk register contained in Appendix 20 will show that the major challenges for the project reside in the areas of Security, Community Relations and Human Resources.

*The residual risk for the project CAPEX has been calculated taking into account all of the threats identified and reviewed during this phase and the PFS using a statistical Monte Carlo approach. It is recommended that a risk allowance of \$105 M be added to the IMD estimate to account for risk which may materialize between now and commissioning. This compares very favourably with the figure of \$135 M which was recommended following at the end of the PFS.”*⁷⁹³

688. Appendix 20.01 containing the “*Residual Risk Assessment*” presents in the section on “*Capex Residual Risk*” a figure comprising “*the distributions of all Monte Carlo outcomes*” as well as a figure representing “*the risk allowance required for any desired*

⁷⁹⁰ Dagdelen/Owen II, ¶¶ 90-92.

⁷⁹¹ Dagdelen/Owen II, ¶¶ 91-93, referring to **Exhibit RE-576-20.01**, p. 6.

⁷⁹² **Exhibit RE-576-23**, p. 23-48.

⁷⁹³ **Exhibit RE-576-30**, p. 30-14.

level of confidence that the risk allowance will not be exceeded.” It then provides a table summarizing the Capex risk allowance required for different levels of confidence:

	Mean	P70	P75	P80	P85
All Threats	\$79M	\$84M	\$89M	\$96M	\$105M

689. Finally, Appendix 20.01 recommends “that a Risk Allowance of \$105M be added to the Capex estimate, which will give an 85% probability of not exceeding the budget.”⁷⁹⁴
690. The Tribunal notes that, as specifically stated in Chapter 30 and Appendix 20.01, “[t]he residual risk for the project Capex has been calculated taking into account all of the threats identified and reviewed during this phase and the Pre-Feasibility study using a statistical Monte Carlo approach”⁷⁹⁵ and thus in line with what Mr. Owen considered to be the “critical component” of a contingency calculation. However, as pointed out by Mr. Owen, Chapter 23 states that the residual risk value of USD 105 million was “recommended, but is not included in the CAPEX or sustaining capital.”⁷⁹⁶
691. Claimant argues that the residual risk value is not a missing contingency but rather a measure of the Project’s sensitivity to capital cost overruns.⁷⁹⁷ In any event, Claimant submits that “this residual risk value of US\$ 105 million was derived from the same Risk Register that Prof. Davis fed into his model. Prof. Davis, however, made even more conservative assumptions about those risks than those made by the TCC team at the time of the Feasibility Study and then incorporated those more conservative assumptions into the valuation he has presented. Thus, even if Pakistan could establish that TCC’s work was inadequate, which it cannot, this could not possibly have any effect on the valuation presented by TCCA.”⁷⁹⁸
692. Mr. Cusworth testified at the Hearing on Quantum that the USD 105 million does not form part of the Capex or sustaining capital but “will be in the supplemental overrun facility that the companies will approve on the investment decision point.” He confirmed that the decision about whether or not to assume the risk of this USD 105 million would be made at the investment decision point: “Correct, which is standard practice if you go to BHP or Rio or any of the big mining companies. This is the way they handle these sorts of things in their investment decisions.”⁷⁹⁹
693. In the Tribunal’s view, the question whether Claimant should have included the residual risk value in its contingency or whether that amount would have had to be approved

⁷⁹⁴ Exhibit RE-576-20.01, p. 7.

⁷⁹⁵ Exhibit RE-576-20.01, pp. 1-2.

⁷⁹⁶ Exhibit RE-576-23, p. 23-48.

⁷⁹⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 91.

⁷⁹⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 92.

⁷⁹⁹ Transcript Hearing on Quantum (Day 3), p. 850 lines 4-13.

separately at the point of making the investment decision is not decisive at this point. In any event, the Tribunal agrees with Respondent to the extent that a buyer would have considered the calculation of the residual risk value relevant and would have factored it into its calculation of the purchase price it would have been willing to pay.

694. The Tribunal understands both from Claimant's submission and from Prof. Davis' explanations in his second report that he did not directly include the USD 105 million residual risk value in his valuation model. Rather, he looked at the risks in the risk register on which the calculation of the residual risk value was based, formed his own assumptions as to the appropriate adjustments for these risks and then included these assumptions in his valuation model.
695. Prof. Davis noted in his second report that the 11% contingency presented in the Feasibility Study was intended to account only for "*items which are included in the scope of work, but which cannot be adequately defined at this time due to lack of accurate detailed design information.*" It was "*not intended to cover such items as labour disputes, changes in scope or price escalation.*"⁸⁰⁰ In Prof. Davis' opinion, the 15-20% contingency that Mr. Owen would have considered adequate is therefore not comparable to the 11% figure. In any event, he noted that Mr. Owen did not address Prof. Davis' estimate of capital costs, "*which reflects substantial additional adjustments relative to the numbers in the feasibility study for cost escalation and delays.*"⁸⁰¹ Prof. Davis explained that while feasibility studies typically estimate capital costs without allowance for future cost increases, all of the potential causes of cost overruns (including inflation caused by delays) are reflected in his model, resulting in a capital cost estimate which is 58% higher than in the Feasibility Study and therefore well above the figures that Mr. Owen as well as Respondent's valuation experts Mr. Brailovsky and Prof. Wells considered necessary.⁸⁰² Specifically with regard to the cost increases he estimated in order to account for risks identified in Claimant's residual risk register, Prof. Davis explained:

"I further increased capital costs to account for asymmetric risks evaluated by TCC in its residual risk register that, if realized, would result in cost overruns relative to those initial estimates. My research, which Mr. Brailovsky and Professor Wells cite, shows that the effect of these risk factors on cost overruns is typically small for large projects, and this is the case here. A possible explanation for this is that large projects are more flexible, making it easier for managers to take mitigating actions to control budgets and overruns. Large projects are also more subject to scrutiny. Certainly, TCC's residual risk analysis is consistent with this: Reko Diq is a large project which

⁸⁰⁰ Davis II, ¶ 161, referring to **Exhibit RE-577-23**, Section 23.11. The same statement is included in **Exhibit RE-576-23**, Section 23.11.

⁸⁰¹ Davis II, ¶¶ 162-163.

⁸⁰² Davis II, ¶¶ 155, 160, 163.

*was subjected to extensive engineering work and scrutiny. Therefore, I would not expect significant overruns arising from residual risks and due to imprecision in capital cost estimates.”*⁸⁰³

696. The Tribunal notes that, as pointed out by Prof. Davis, neither Mr. Owen nor Mr. Brailovsky and Prof. Wells raised specific criticisms regarding the adjustments made by Prof. Davis to the capital cost estimate of the Feasibility Study and Expansion Pre-Feasibility Study. In particular, they did not raise the allegation that either the 11% contingency or the residual risk value of USD 105 million would not be adequately reflected in the 58% capital cost increase included by Prof. Davis in his valuation model. In the absence of any specific criticism regarding the contingency and residual risk value accounted for by Prof. Davis, the Tribunal sees no basis for a finding that Prof. Davis has not sufficiently accounted for them in his valuation.
697. The Tribunal notes that Mr. Owen also suggests that the Monte Carlo simulation was not done properly and that a “*better developed*” risk assessment would have resulted in a higher amount than USD 105 million.⁸⁰⁴ However, in light of the fact that the Feasibility Study does make reference to “*using a statistical Monte Carlo approach,*”⁸⁰⁵ the Tribunal considers that a more specific explanation would have been necessary in order to cast into doubt the adequacy of the methodology used by Claimant and SNC Lavalin in the residual risk assessment. In any event, the fact remains that Mr. Owen did not express any opinion on the additional risk adjustments included by Prof. Davis in the valuation that forms the basis for the claim raised by Claimant in this arbitration.
698. Finally, Mr. Owen raised as criticism (ii) that the residual risk register included risks to which Claimant had assigned no CAPEX or OPEX impact, in particular with regard to the pipeline. Mr. Cusworth responded to this criticism by pointing out that out of seven identified risks relating to the pipeline, there were only four such items without an assigned CAPEX or OPEX impact and considered that these “*would not have any quantifiable financial impact on the project*” as they relate to either community or health and safety where financial impact is either difficult to quantify (reputational damage) or financially insignificant. He therefore concluded that “*the treatment of risk has been addressed in accordance with good practice across the project, particularly for the pipeline.*”⁸⁰⁶ In addition, the Tribunal notes that Prof. Davis analyzed each of the previously unquantified risks and either placed them in one of the three risk categories he identified for his valuation or rated them as “*not material.*”⁸⁰⁷ This approach will be discussed in further detail in the Tribunal’s assessment of whether it is convinced that

⁸⁰³ Davis II, ¶ 159.

⁸⁰⁴ Dagdelen/Owen II, ¶ 95.

⁸⁰⁵ **Exhibit RE-576-30**, p. 30-14.

⁸⁰⁶ Cusworth, ¶¶ 93-95, referring to **Exhibit RE-576-20.01**.

⁸⁰⁷ Cf. Davis I, Workpaper 27.

Prof. Davis has adequately accounted for all risks affecting the project in his valuation model. At this point, it suffices to note that Mr. Owen again did not address the adjustments for risk made by Prof. Davis but only focused on the Feasibility Study. Consequently, even if his criticism were accurate and Claimant inadequately failed to assign an impact to these risks, the Tribunal still has no basis for a finding that Prof. Davis inadequately accounted for these risks.

699. As a final note, the Tribunal has taken note of Mr. Owen's repeated argument that the project was pushed forward by "*Project Advocates*" who were trying to get board approval by including unrealistic assumptions in the Feasibility Study.⁸⁰⁸ During the Hearing, Mr. Owen also used the expression that Claimant and its owners did not have their "*eye on the ball*" because "*SNC [Lavalin] was running this whole show.*"⁸⁰⁹ The Tribunal is not convinced by either of these arguments but in fact considers them contradicted, *inter alia*, by Respondent's own submissions. As noted at the beginning of this section, Respondent specifically recognized that Claimant had "*full teams from both owners*" working on and supervising the Feasibility Study."⁸¹⁰ Mr. Owen noted that "*it normally requires 10-12 people to prepare a feasibility stud. The IMD FS had 23 people from TCC, showing that Barrick and Antofagasta each wanted their own pair of eyes on everything.*"⁸¹¹ Mr. Livesey also testified as to the structure subject to whose supervision the Feasibility Study was prepared.
700. In the Tribunal's view, Barrick and Antofagasta's attention to the Feasibility Study appears entirely reasonable given the large amounts of equity that Barrick and Antofagasta were planning to invest in the project. At the same time, the Tribunal does not find it credible that these "*full teams*" comprised only what Mr. Owen referred to as "*Project Advocates*," who were allegedly willing to ignore substantial risks in order to get the project approved. The Tribunal also notes that, in addition to Claimant and its owners, the Feasibility Study was reviewed by numerous third-party consultants, several of which have appeared as experts before this Tribunal and, as will be set out in more detail below, have provided convincing explanations on individual aspects of the project that were criticized by Respondent and its experts.
701. The Tribunal therefore cannot follow Mr. Owen's argument but wishes to emphasize that its impression is quite to the contrary, *i.e.*, that Barrick and Antofagasta were significantly involved in the preparation of the Feasibility Study and had every interest to prepare a thorough Feasibility Study including plans on project execution and appropriate cost estimates accounting for the relevant risks affecting the project. Also taking into account

⁸⁰⁸ See Dagdelen/Owen II, ¶¶ 92-94, 106, 111; Dagdelen/Owen Presentation, pp. 24, 27, 31.

⁸⁰⁹ Transcript Hearing on Quantum (Day 4), pp. 1092-1094.

⁸¹⁰ Respondent's Post-Hearing Brief on Quantum, ¶ 112.

⁸¹¹ Dagdelen/Owen I, ¶ 208.

that Prof. Davis made additional risk adjustments in his valuation model which were not criticized by Mr. Owen, the Tribunal concludes that it has no reason to believe that Claimant's plans for executing the project and the capital cost estimate, as adjusted by Prof. Davis, would have been considered inadequate by a buyer in November 2011.

5. Whether Claimant Has Established That It Had a Feasible Plan for the Supply of Water to the Project

a. Summary of Claimant's Position

702. Claimant submits that Respondent's arguments on water ignore the Tribunal's findings in its Decision on Jurisdiction and Liability that "*Claimant did make a full feasibility assessment of the groundwater source that it intended to use for the project*" and that its alleged failure to do so did "*not present a justifiable basis for denying TCCP's Mining Lease Application.*"⁸¹²
703. According to Claimant, Respondent relies on a single phrase in the executive summary of the 2007 Scoping Study Report observing that the improper or incomplete identification of a water supply can become a "*kill point*" for a mining project. Claimant maintains, however, that after the Scoping Study, it performed "*an enormous amount of work to satisfy itself that it had sufficient water for the project*" and to eliminate the risk that existed in 2007.⁸¹³ Claimant refers to its expert Mr. Mayer, Barrick's senior hydrogeologist during the relevant time period, who testified that Claimant and its owners were "*confident that TCC could supply enough water to sustain mining at Reko Diq*" for the life of the mine. In this regard, Claimant notes that it had identified: (i) an aquifer that was "*not only an abundant source of water but which could be utilized without any significant effect on surrounding communities*"; (ii) three backup sources; and (iii) the possibility to build a sea water pipeline.⁸¹⁴
704. Claimant further claims that any residual risk that remained as of November 2011 has been accounted for by Prof. Davis and refers in particular to the following risks: (i) "*Draw down of water by others leaves insufficient water for project needs*"; (ii) production interruptions and/or additional expenses caused by the available water resource being "*insufficient to supply operating requirements*"; (iii) water usage at one of the alternative sources "*causes drawdowns that impact locals . . . resulting in negative perceptions re.*

⁸¹² Claimant's Quantum Reply, ¶¶ 487-488, quoting from Decision on Jurisdiction and Liability, ¶¶ 1258, 1263.

⁸¹³ Claimant's Quantum Reply, ¶¶ 489-490, referring to **Exhibit CE-153**, p. 3.

⁸¹⁴ Claimant's Quantum Reply, ¶ 490, quoting from Mayer, ¶ 27.

the project and additional compensation costs”; and (iv) a lender would require Claimant to engage in cross border consultation with either Afghanistan or Iran.⁸¹⁵

705. Claimant submits that its assessment of the groundwater sources in the Feasibility Study drew on the experience of hydrologists employed by both owners, such as Mr. Mayer, as well as several outside consultants, such as Dr. Drury of SMEC and Mr. Jones of John Shomaker and Associates, Inc. (JSAI), who prepared numerous reports several of which were appended to the Feasibility Study and have appeared as experts in this arbitration.⁸¹⁶ Claimant explains that while it initially investigated eight potential water sources, it narrowed them down to four in the Pre-Feasibility water study and ultimately decided to focus on one primary source, *i.e.*, the Fan Sediments, because the water is brackish, not potable, not suitable for irrigation and not even suitable for making cement without treatment, which would have rendered Claimant to be “*virtually the only entity pumping water from this source*” and outweighed “*less favorable characteristics, such as the high mineral content and the distance from the site.*” At the same time, Claimant notes that it continued to perform feasibility-level studies for the three alternative water sources all of which were confirmed by SMEC to be viable options to supplement the Fan Sediments.⁸¹⁷
706. Claimant submits that in order to obtain information about the extent of the Fan Sediments as well as its capacity to store and release groundwater, SMEC performed a 21-day pumping test during which it extracted a total of 200,000 cubic meters of water, which corresponds to 4% of the water demand for the construction phase. According to Claimant, this test exceeded typical pump-out tests which usually take place over three to seven days and allowed SMEC to sufficiently stress the system to test for any barriers to the flow of water and to monitor the groundwater-level decline as well as its recovery to the previous level after the pump-out, which was completed within 21 days.⁸¹⁸ Claimant explains that based on the data obtained during this pump-out test, JSAI developed a groundwater flow model, which created a detailed reconstruction of the Fan Sediments and aimed at predicting the behavior of the aquifer over the life of the mine, showing that there was sufficient water to meet the demands of the project, including in the expansion scenario. Claimant further notes that both the JSAI model and the SMEC Water Resource Assessment were subject to peer review by Mr. Mayer and independent consultants from Douglas Partners who concluded that “[g]roundwater investigations outlined in SMEC (2009) are comprehensive and have been undertaken to a high standard” and that “[t]he

⁸¹⁵ Claimant’s Quantum Reply, ¶ 491, *quoting from* Davis I, Workpaper 26.

⁸¹⁶ Claimant’s Quantum Reply, ¶¶ 492-493.

⁸¹⁷ Claimant’s Quantum Reply, ¶¶ 494-496, 506.

⁸¹⁸ Claimant’s Quantum Reply, ¶¶ 497-500.

*conclusions and recommendations outlined therein are reasonable and can be supported.”*⁸¹⁹

707. Claimant rejects the criticisms raised by Respondent regarding SMEC’s drilling and pump-out tests and refers to the explanations provided by Dr. Drury regarding the team’s equipment and experience as well as certain problems noted by SMEC, which are typical for drilling projects and did not affect the final results.⁸²⁰ Claimant also refers to Dr. Drury’s explanation regarding the depth of the drilling, which covered the extent by which the water level would be lowered pursuant to the JSAI model, and SMEC’s additional reliance on a geophysical survey which allowed it to make a reasonable estimate regarding the aquifer’s geology.⁸²¹ Claimant further rejects the argument that the boreholes drilled by SMEC did not provide the yield required for Reko Diq and argues that pumping efficiency would have increased significantly by using more efficient pumps and fully “screening” the borehole.⁸²² Finally, Claimant acknowledges that SMEC noted in its Water Resources Assessment that it was not able to perform test work across the border in Afghanistan but emphasizes that SMEC was able to obtain relevant information from a geological survey as well as satellite images.⁸²³ Claimant concludes that while it would have continued to monitor and study the Fan Sediments, it had “*more than enough information to make an informed investment decision*”, and refers to Mr. Mayer who stated in his expert report:

*“SMEC has identified a small number of additional studies and monitoring to add to the understanding of the Fan Sediments aquifer and to optimize the production bore-field design. The practice of providing this type of advice is common and consistent with other studies I have completed. Additional information is always helpful, but there is a threshold at which a water study becomes sufficient to make a feasibility determination. Our studies were more than adequate to meet that threshold. We had contracted with experts at the top of their field, conducted rigorous pump-out tests, and studied multiple groundwater sources over a period of three years.”*⁸²⁴

708. Claimant further rejects the contention raised by Respondent and its experts Prof. Dagdelen and Mr. Owen regarding the project’s water needs based on a “*standard rate*” of one cubic meter of water per one tonne of material being processed. Claimant notes that they do not cite any authority for this “*standard rate*” and ignore the fact that Claimant had designed a “*highly efficient metallurgical process where a large amount of*

⁸¹⁹ Claimant’s Quantum Reply, ¶¶ 501-504, quoting from **Exhibit CE-1221**, p. 8.

⁸²⁰ Claimant’s Quantum Reply, ¶¶ 510-512, referring to Drury, ¶¶ 20-22, 228, 50, 40.

⁸²¹ Claimant’s Quantum Reply, ¶¶ 513-514, referring to Drury, Table 2 and ¶¶ 88(v), 95, 102, 58, 207.

⁸²² Claimant’s Quantum Reply, ¶¶ 515-517, referring to Drury, ¶¶ 217-219, 201-203, 184.

⁸²³ Claimant’s Quantum Reply, ¶¶ 518-519, referring to **Exhibit CE-410**, Chapter 1-2, ¶ 1.1 and Drury, ¶¶ 59, 108.

⁸²⁴ Claimant’s Quantum Reply, ¶¶ 520-521, quoting from Mayer, ¶ 100.

*water from the tailings slurry would be recovered and returned for use in the process plant.”*⁸²⁵ Claimant refers to the explanations provided by Mr. Mayer regarding the contemplated process as well as the amount of water used for the flotation process and the transportation of slurry to Port Gwadar. It also quotes his testimony that “*Pakistan’s recommended approach would unnecessarily increase capital and operating costs for water and tailings management, and would be irresponsible socially and environmentally. Designing a plant with Pakistan’s proposed level of water demand would result in an immense waste of water and of other resources used for flotation and tailings processing. ... Some mines took this approach prior to the incorporation of thickeners and efficient tailings management practices. I am not aware of any modern mines that operate in this fashion.*”⁸²⁶

709. Claimant also rejects the allegation that it made an error in the calculation of the “*storage coefficient.*” Quoting from Mr. Jones, Claimant first emphasizes that storage coefficients “*describe short-term water-level changes in response to pumping, but they have nothing to do with the volume of water in storage.*”⁸²⁷ Claimant explains that its consultants therefore did not use storage coefficients to calculate the volume of water contained in the Fan Sediments, which is actually reflected in the “*porosity*” of the different types of dirt which are well known from hydrogeological research. Claimant submits that while sand and gravel have a porosity of 30%, SMEC conservatively assumed a porosity of 20% to account for the fact that the Fan Sediments also contain silty clays.⁸²⁸ Claimant also emphasizes that it did not rely on SMEC’s “*rough estimate*” of the total volume of water but rather on the detailed groundwater model incorporating the entire available data from surveys and the pump-out test. By contrast, Claimant notes that the storage coefficients obtained during the pump-out test, while being consistent with a short-term pumping from a confined aquifer layer, did not show the amount of water that can be extracted during long-term pumping of a complex aquifer system.⁸²⁹
710. Claimant also rejects Respondent’s criticisms regarding the modeling of the size and shape of the Fan Sediments created by JSAI. Claimant refers to the explanations provided by its experts Dr. Drury and Mr. Jones as to how they determined that: (i) the ground water flows in northeastern direction from the Iranian side of the border across Pakistan towards the Afghanistan side of the border and there is in any event no impact on the Iranian hydrogeological systems;⁸³⁰ (ii) the estimated amount of recharge of the aquifer

⁸²⁵ Claimant’s Quantum Reply, ¶¶ 522-525, quoting from Dagdelen/Owen I, ¶¶ 190-191.

⁸²⁶ Claimant’s Quantum Reply, ¶¶ 526-530, quoting from Mayer, ¶¶ 51, 53.

⁸²⁷ Claimant’s Quantum Reply, ¶¶ 534-535, quoting from Jones, ¶ 74.

⁸²⁸ Claimant’s Quantum Reply, ¶¶ 536-537, referring to Drury, ¶¶ 177-180.

⁸²⁹ Claimant’s Quantum Reply, ¶¶ 539-542.

⁸³⁰ Claimant’s Quantum Reply, ¶¶ 543-557, referring to Drury, ¶¶ 104-164, and Jones, ¶¶ 23-40.

is based on rainfall occurring in the form of large torrential storms generating large surface water runoffs flowing into the Fan Sediments, as confirmed by Balochistan in its own Feasibility Study of the Fan Sediments in 2012, and the average annual rainfall estimated by JSAI is adequate for the elevation of the relevant site;⁸³¹ (iii) there is no evidence that climate change would negatively affect Claimant's ability to obtain water but, to the contrary, increased temperatures would likely increase the energy available to generate large storms;⁸³² and (iv) the model uses time-variant calibration based on data from the pump-out tests as set out in JSAI's final report and SMEC's 2010 Water Resources Assessment.⁸³³

711. In its Post-Hearing Brief, Claimant contends that “[a]ll four hydrogeological experts agreed that the Fan Sediments would have supplied sufficient water for the operation of the mine” and refers in particular to the oral testimony of Respondent's expert Mr. Neville who stated that he had “no doubt that the volume of water they need is there in the sediments” and added that Claimant had “certainly done a good way of showing that.”⁸³⁴ Claimant further quotes from: (i) its expert Dr. Drury who testified that the Fan Sediments aquifer “is very extensive” and could “supply a sustainable groundwater supply to [the] Reko Diq mine”; (ii) its expert Mr. Jones who explained that Claimant's pumping would have reduced the saturated thickness of the aquifer by “only a small fraction of [its] total saturated thickness” and that it was therefore “obvious” that there was “water available for the Project” in the Fan Sediments; and (iii) its expert Mr. Mayer who explained that “the volume of water the project needs to extract is very small compared to the amount of water available” and concluded that “there's plenty of water supply for the project.”⁸³⁵
712. In Claimant's view, the only remaining issue in dispute between the Parties' experts is therefore the extent of any drawdown across the Afghan border that would result from the pumping of water from the Fan Sediments. More specifically, Claimant notes that the different projections of the Parties' experts result from the different “specific yields” they assumed. Claimant agrees with Mr. Neville that the specific yield is the “ratio of the volume of water released to the volume of the porous medium” in an unconfined aquifer.⁸³⁶ Claimant notes that Mr. Jones' model on which the Feasibility Study is based

⁸³¹ Claimant's Quantum Reply, ¶¶ 558-569, referring to Drury, ¶¶ 28, 129, 132, 154-160, and Jones, ¶¶ 13, 54-56, 60-64, 69, 129, 143.

⁸³² Claimant's Quantum Reply, ¶¶ 570-571, referring to Jones, ¶¶ 67-68.

⁸³³ Claimant's Quantum Reply, ¶¶ 572-573, referring to Jones, ¶¶ 25, 84-85, and Exhibits CE-1334, ¶ 3.3.3 and CE-1337, ¶ 5.

⁸³⁴ Claimant's Quantum Post-Hearing Brief, ¶¶ 93-94, quoting from Transcript Hearing on Quantum (Day 6), p. 1716.

⁸³⁵ Claimant's Quantum Post-Hearing Brief, ¶¶ 95-97, quoting from Transcript Hearing on Quantum (Day 5), pp. 1342, 1422-1423, p. 1447 and pp. 1498, 1508.

⁸³⁶ Claimant's Quantum Post-Hearing Brief, ¶¶ 98-100, quoting from Transcript Hearing on Quantum (Day 6), p. 1600.

assumed a specific yield of 0.15 and results, in both the expansion and the non-expansion scenarios, in a predicted drawdown at the Afghan border of 3 meters and a maximum drawdown of 5 meters that would occur “*about 20 to 30 years after the end of mining.*”⁸³⁷ According to Claimant, the accuracy of Mr. Jones’ calculation when using a 0.15 specific yield was confirmed by Mr. Neville in his expert report.⁸³⁸

713. As for Mr. Neville’s application of a specific yield of 0.02, which results in a 3-meter drawdown contour extending more than 25 kilometers into Afghanistan and a 10-meter drawdown contour extending about 5 kilometers into Afghanistan, Claimant considers it conceded by Mr. Neville that he had applied this specific yield in order to “*exaggerate what [the impacts] might be*” and that “*if we’re going to be wrong, we should be wrong on the side of caution.*”⁸³⁹ In Claimant’s view, the specific yield of 0.02 for clay is “*grossly exaggerated*” because: (i) the Fan Sediments are not entirely composed of clay but there are significant layers of sand and gravel which have a specific yield that is 6 to 20 times higher than that assumed by Mr. Neville; (ii) there is no continuous plate of clay but rather separate clay lenses interspersed with much coarser sediments of sand and gravel within which the water would have moved vertically past the clay lenses; and (iii) the clay lenses would have drained more slowly than the sand and gravel sediments but they would have drained eventually and at a faster rate than assumed by Mr. Neville because over the long term, the specific yield of clay can vary significantly and be up to 0.18.⁸⁴⁰
714. Claimant therefore maintains that the specific yield assumed by Mr. Jones is more accurate and was selected based on his review of the gamma logs and on-site review of the drilling cores. According to Claimant, the projected impact of the drawdown across the Afghan border would therefore have been “*minimal and occurred only decades after the start of the project.*”⁸⁴¹ Claimant also notes that there would not have been any drawdown in Iran due to the direction of the ground water flow and satellite imagery showing that users in Iran use water supplied by a different water source.⁸⁴²
715. In any event, Claimant rejects the submission that any such drawdown across the Afghan border would have halted or delayed the Reko Diq project due to an obligation of Pakistan to notify Afghanistan under the UN Watercourses Convention. Claimant notes that Afghanistan and Pakistan are not party to the UN Watercourses Convention and argues

⁸³⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 101, referring to **Exhibit CE-1334**, p. A-4 and Figures 2.1, 3.1 and quoting from Transcript Hearing on Quantum (Day 5), p. 1438.

⁸³⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 102, referring to Neville, pp. 65, 66 and 69.

⁸³⁹ Claimant’s Quantum Post-Hearing Brief, ¶¶ 103-104, quoting from Transcript Hearing on Quantum (Day 6), pp. 1716, 1709.

⁸⁴⁰ Claimant’s Quantum Post-Hearing Brief, ¶¶ 104-109.

⁸⁴¹ Claimant’s Quantum Post-Hearing Brief, ¶¶ 111-112; Claimant’s Quantum Reply, ¶¶ 577-578.

⁸⁴² Claimant’s Quantum Reply, ¶¶ 575-576.

that its principles do not bind the countries as customary international law as demonstrated by the lack of evidence that Pakistan has ever provided Afghanistan with a notification of any project utilizing a shared watercourse. Claimant further argues that Pakistan has also not provided any evidence of giving such notification to Iran with regard to the Saindak mine even though the project has lowered the water level by at least 6.5 meters over the last 15 years and, by contrast to the water from the Fan Sediments, the water there is potable and supplies water to a large number of farm users in Iran.⁸⁴³

716. According to Claimant, the use of the Fan Sediments for the Reko Diq project would in any event be equitable and reasonable in the sense of Article 6 of the UN Watercourse Convention and not cause any harm to Afghanistan given that there are “*virtually no users in the area*” and the brackish water is not potable and cannot be used for animals or irrigation. By contrast, Claimant argues that the socio-economic advantages for Pakistan would have been “*overwhelming*” given that the Reko Diq project would have created “*thousands of direct and indirect jobs and made significant contributions to the finances of Pakistan and Balochistan.*”⁸⁴⁴ As the water is not fit for human consumption or agriculture and the Fan Sediments are located in an isolated area with no competing users, Claimant also considers that there is no basis for the argument that there would be significant local opposition to its use of the aquifer.⁸⁴⁵
717. In addition, Claimant claims that even if significant harm had been created by using the Fan Sediments, such harm could have been avoided or at least “*significantly mitigated*” by monitoring the groundwater levels at the Fan Sediments and, if the decrease approached the Afghan border, developing a mitigation system such as aquifer injections. According to Claimant, there would have been “*ample time*” to develop such a mitigation system as the drawdown would have occurred only “*many years*” after the start of operations of the mine. Claimant refers to Mr. Drury who testified that aquifer injections are regularly used and generally successful, provided that the system is properly maintained, and estimated that the costs would be “*in the tens of millions.*”⁸⁴⁶
718. Claimant further submits that in order to avoid or mitigate harm and “*although more costly than a water injection system,*” it could also have used water from one of the other three water sources that had been tested to feasibility level or, in the alternative, pumped seawater from Port Gwadar to the mine.⁸⁴⁷ Claimant rejects the allegation that it did not fully test the alternative water sources and refers to Dr. Drury’s explanations regarding

⁸⁴³ Claimant’s Quantum Post-Hearing Brief, ¶¶ 113-118; Claimant’s Quantum Reply, ¶ 579.

⁸⁴⁴ Claimant’s Quantum Post-Hearing Brief, ¶¶ 119-121.

⁸⁴⁵ Claimant’s Quantum Reply, ¶¶ 580-582.

⁸⁴⁶ Claimant’s Quantum Post-Hearing Brief, ¶ 122, referring to Transcript Hearing on Quantum (Day 6), pp. 1355-1356, 1713 and 1720.

⁸⁴⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 123.

the tests performed by SMEC on each of these alternative sources.⁸⁴⁸ Claimant also refers to Mr. Mayer's testimony regarding the option to build a seawater pipeline, which has become more common in Chile and which was costed as an option early in Reko Diq's development.⁸⁴⁹

719. Finally, Claimant notes that it is undisputed that under the UN Watercourse Convention, Afghanistan would not have had the right to veto or otherwise derail the project and refers to Dr. Nanni, who confirmed that “[t]here is no veto power in international law.”⁸⁵⁰

b. Summary of Respondent's Position

720. Respondent submits that “[w]ater was a big concern for TCC” and was identified in the Risk Assessment Report prepared by Behre Dolbear in October 2007 as the “*most critical*” limitation of the project. Respondent emphasizes that the quantities of water needed for the construction and operation of the project would be equal to the level of daily water consumption of approximately 500,000 people and thus significantly exceed the quantities needed by other mining projects in the region, including Saindak.⁸⁵¹ Respondent also points to the additional risks identified in Claimant's Risk Register, which confirms in its view that Claimant was aware that “*the availability of and right to use water could doom the entire project.*”⁸⁵²

721. According to Respondent, Claimant “*fell far short of proving the size of the aquifer, its plans for mitigation, and the effects of its plans on surrounding areas and countries.*” Specifically, Respondent contends that Claimant's expert Dr. Drury acknowledged during his cross-examination that the Fan Sediments would most likely not have provided enough water for Reko Diq.⁸⁵³ Respondent also points out that SMEC identified “*key issues*” that needed to be further addressed in developing the Fan Sediments, such as the water level drawdown across the Afghan border, the tribal No-Objection Certificates (the “**NOC**”) and the depth to bedrock at the Afghan border, and called for additional studies, warning that the “*hydrogeological assessment of the Fan Sediments Aquifer needs to be treated with caution.*”⁸⁵⁴ Respondent alleges that Claimant, however, abandoned many of SMEC's recommendations and pursued the development of the Fan Sediments even

⁸⁴⁸ Claimant's Quantum Reply, ¶¶ 583-588, referring to Drury, ¶¶ 24-30, 50-56, 120, 260.

⁸⁴⁹ Claimant's Quantum Reply, ¶¶ 589-590, referring to Mayer, ¶¶ 103-110.

⁸⁵⁰ Claimant's Quantum Post-Hearing Brief, ¶ 124, quoting from Transcript Hearing on Quantum (Day 6), p. 1701.

⁸⁵¹ Respondent's Post-Hearing Brief on Quantum, ¶ 134, quoting from **Exhibit RE-130**, ¶ 2.3.1.2; Respondent's Counter-Memorial on Quantum, ¶¶ 218, 221.

⁸⁵² Respondent's Counter-Memorial on Quantum, ¶ 218, referring to **Exhibit CE-952**.

⁸⁵³ Respondent's Post-Hearing Brief on Quantum, ¶ 134, referring to Drury, ¶¶ 65, 67 and Transcript Hearing on Quantum (Day 5), p. 1384 lines 12-18.

⁸⁵⁴ Respondent's Counter-Memorial on Quantum, ¶ 239, referring to **Exhibit RE-576-24.03** and quoting from **Exhibit RE-576-24.04**.

though they had ranked only third in Dr. Drury's assessment as they were further away from Reko Diq and less economically efficient than the other two water sources.⁸⁵⁵

722. Respondent maintains that Claimant failed to confirm the viability of the Fan Sediments aquifer. It emphasizes that "*Pakistan is not taking issue with the tests done but rather the interpretation of the results.*"⁸⁵⁶ In Respondent's view, SMEC committed "*basic errors in analyzing their own samples,*" which instead show that there was "*far from sufficient water, even for construction.*" According to Respondent, SMEC: (i) miscalculated and failed to actually test the available recharge as there is in fact little to no recharge to surface and groundwater sources in the region, with climate change exacerbating water scarcity; (ii) came up with the wrong size and shape of the aquifer because it did not drill to the required depths to identify the boundaries of the aquifer and failed to carry out a time-variant calibration; (iii) doubled the output of the aquifer; and (iv) ignored the transnational impacts of draining an aquifer shared by Afghanistan and Iran, inter alia, by assuming an incorrect water flow ignoring that the Fan Sediments extend into Iran and Afghanistan.⁸⁵⁷
723. Respondent submits that the boreholes drilled by SMEC revealed a storage coefficient ranging from .0002 to .0006, which it considers "*reasonable*" for a dry desert area with no visible groundwater. According to Respondent, however, SMEC then applied a storage coefficient of .2 when calculating the entirety of the Fan Sediments as if they were located besides a large river. Respondent claims that when applying the correct storage coefficient, "*the size of the aquifer drops dramatically, showing there is roughly enough water to merely construct the mine, only if TCC had drained the entire aquifer.*" In Respondent's view, this error, as a result of which the amount of water was deficient by a factor of 100, would have been "*obvious*" to any buyer or financier.⁸⁵⁸
724. Respondent also contends that none of the boreholes drilled provided the yield of liters per second required during construction or operation of the mine.⁸⁵⁹ In response to Claimant's reference to the 21-day pump-out test conducted by SMEC, Respondent refers to its expert Mr. Neville who testified that the test only demonstrated that "*three wells within the study area [could] be pumped for 21 days at a cumulative rate of 70-liters-per-second,*" i.e., a fraction of Claimant's overall water demand, which was over 10,000 times higher over the life of the mine, and of the pumping rate, which was to be 20 times higher during the operations of the mine. Respondent therefore contends that "[g]iven these differences, TCC could not possibly have predicted the aquifer's viability after such a

⁸⁵⁵ Respondent's Post-Hearing Brief on Quantum, ¶ 135; Respondent's Rejoinder on Quantum, ¶ 234.

⁸⁵⁶ Respondent's Rejoinder on Quantum, ¶ 223.

⁸⁵⁷ Respondent's Counter-Memorial on Quantum, ¶¶ 219-220, 232-238.

⁸⁵⁸ Respondent's Counter-Memorial on Quantum, ¶¶ 221-224, 230.

⁸⁵⁹ Respondent's Counter-Memorial on Quantum, ¶ 229.

cursory test.” In its view, “[t]he inadequacy of these tests is apparent” when considering the scale of the plans in the Feasibility Study.⁸⁶⁰

725. Respondent argues that the 21-day test might have been sufficient “*in a simpler setting with different materials*” but Claimant’s experts admitted that in this case the test failed to identify the aquifer’s specific yield and therefore required Mr. Jones to guess a key parameter in his model, leading him to create a “*one-sided and overly optimistic projection of the water supply.*” In addition, Respondent claims that Mr. Jones incorrectly assumed that the aquifer was unconfined and thereby assumed that much more water was available for extraction, arbitrarily reducing the projected impact on the groundwater levels by a factor of 1,000.⁸⁶¹ Quoting from its expert Mr. Neville, Respondent contends that in the absence of sufficient data provided by the pump-out tests, “*the results of the Shomaker (2009) groundwater model are speculative.*”⁸⁶²
726. Respondent points out that SMEC’s conclusion based on these tests was only that “*long-term extraction of large volumes of water may be possible*” and that “*the Fan Sediments may be a reasonable option to consider for water supply to Reko Diq,*” but that more information was needed. Pointing to SMEC’s statement that “[c]ontinuous pumping ... during the three years construction phase will add substantial information about the sustainability of this aquifer system,” Respondent takes the position that obtaining sufficient information only halfway through construction was “*deeply inadequate.*”⁸⁶³ In Respondent’s view, the Feasibility Study also does not affirmatively state that the Fan Sediments could sustain the necessary level of pumping but the only statement to this effect is made by Dr. Drury in his expert report, without providing evidence that the 21-day test results were sufficient.⁸⁶⁴
727. In any event, Respondent notes that it was not sufficient to establish the existence of water. Claimant’s analysis should have accounted for the exigencies of the area and determine the amount of extractable water. Respondent notes that the conclusions drawn by Mr. Jones in his expert report that the Fan Sediments could sustain the required levels of pumping were not included in the 2009 Shomaker Report, which only provided the results of his model simulations.⁸⁶⁵ In addition, Respondent maintains that Claimant adopted an “*unscientific, generic approach that lead to increased levels of uncertainty*” in particular with regard to the specific yield assumed by Mr. Jones, which was based on

⁸⁶⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 137, quoting from Transcript Hearing on Quantum (Day 6), p. 1581 lines 12-15 and referring to Neville, p. 3; Respondent’s Rejoinder on Quantum, ¶¶ 225-227.

⁸⁶¹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 138-140, referring to Transcript Hearing on Quantum (Day 5), p. 1400 lines 5-7 and p. 1441 lines 9-13; Respondent’s Rejoinder on Quantum, ¶ 224.

⁸⁶² Respondent’s Rejoinder on Quantum, ¶ 231, quoting from Neville, p. 4. See also ¶ 240.

⁸⁶³ Respondent’s Rejoinder on Quantum, ¶ 228, quoting from Exhibit RE-576-24.03, pp. 5-1 and 5-9.

⁸⁶⁴ Respondent’s Rejoinder on Quantum, ¶¶ 229-230, referring to Drury, ¶ 211.

⁸⁶⁵ Respondent’s Rejoinder on Quantum, ¶ 237, referring to Jones, ¶ 13 and Exhibit RE-576-24.04, p. 1.

his view that the upper layers of the aquifer were made up of “*a lot of sand and gravel,*” which has a “*standard literate value*” of 15%.⁸⁶⁶ However, Respondent refers to its expert Mr. Neville who reviewed the bore logs in the SMEC report and reached the conclusion that the upper layers of the aquifer were primarily “*clayey*” and noted that clay materials have a specific yield of 2% according to the US Geological Survey. Respondent submits that on that basis, Mr. Neville concluded that the specific yield was closer to 2% as the existence of clay reduces the specific yield on an exponential basis.⁸⁶⁷

728. Respondent notes that Mr. Jones did not dispute the specific yield of clay or the existence of clay in the upper layers of aquifer and considers Mr. Jones’ position that clay yields more water over time to be only an “*unsupported opinion.*” According to Respondent, the average 2% specific yield in the US Geological Survey is based on long-term tests and Mr. Jones in any event did not include a time scale for the specific yield in his model or expert report.⁸⁶⁸ Respondent rejects Mr. Jones’ position that the mixture of clay and gravel produces a “*normal specific yield*” of 15% and also rejects Mr. Jones and Dr. Drury’s reference to gamma logs for identifying the amount of clay in the sediments, arguing that no gamma readings were taken of the three bore holes pumped during the 21-day test.⁸⁶⁹
729. Respondent refers to Mr. Neville’s demonstration that a specific yield of 2% leads undisputedly to a much larger drawdown in Afghanistan, which extends approximately 30 kilometers over the border based on Mr. Jones’ model. According to Respondent, this must have been known to Claimant given that SMEC had advised Claimant in its reports to conduct assessments in Afghanistan.⁸⁷⁰ In addition to the drawdown, Respondent contends that a lower specific yield also increases CAPEX for purchase of additional pumps and OPEX for maintenance and it requires Claimant to seek water at its other potential sources, involving new permits, CAPEX and OPEX, and other communities from whom Claimant would have to obtain a social license to operate. Respondent claims that none of these issues are accounted for in the contingency calculations or other parts of the Feasibility Study.⁸⁷¹

⁸⁶⁶ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 142-143, *quoting from* Transcript Hearing on Quantum (Day 5), p. 1442 lines 13-15 and p. 1458 lines 5-7.

⁸⁶⁷ Respondent’s Post-Hearing Brief on Quantum, ¶ 143, *referring to* Neville, pp. 60-64 *and* Transcript Hearing on Quantum (Day 6), pp. 1545-1546, 1607; Respondent’s Rejoinder on Quantum, ¶¶ 238, 248.

⁸⁶⁸ Respondent’s Post-Hearing Brief on Quantum, ¶ 144, *referring to* Transcript Hearing on Quantum (Day 5), p. 1442 lines 17-19 and p. 1448 lines 2-7.

⁸⁶⁹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 145-147, *quoting from* Transcript Hearing on Quantum (Day 5), p. 1442 lines 11-13 and *referring to* p. 1353 lines 11-14, p. 1442 line 15 and p. 1459 line 7.

⁸⁷⁰ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 148-149, *referring to* Transcript Hearing on Quantum (Day 6), p. 1599 lines 3-4 and (Day 5), p. 1537 lines 17-22 and p. 1461 lines 2-4, Neville, pp. 66-67 *and Exhibits RE-722*, p. 116 and **RE-576-24.03**, p. ES-8; Respondent’s Rejoinder on Quantum, ¶ 239, *referring to* Neville, pp. 2-3.

⁸⁷¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 150; Respondent’s Rejoinder on Quantum, ¶ 256.

730. With respect to the expected effects in Afghanistan, Respondent refers to its expert Dr. Nanni who stated that Pakistan is bound by customary international law to the principles and procedural rules of the UN Watercourse Convention and must notify Afghanistan “*very early in the planning process,*” even if the transboundary effect of the project will not occur for many years.⁸⁷² Referring to Mr. Neville, Respondent maintains that in this case the drawdowns would in any event be seen “*relatively quickly.*”⁸⁷³ Respondent further claims that during the time period in which any concerns raised by Afghanistan pursuant to such a notification would be discussed between the two countries, “*Pakistan would have to refrain from developing the project.*”⁸⁷⁴
731. Respondent maintains that the principles of the UN Watercourse Convention, including “*the obligation to use international watercourse in an equitable and reasonable manner ... and to notify potentially affected riparian states of planned measures,*” are customary international law and therefore binding on Pakistan.⁸⁷⁵ Respondent considers that Claimant has failed to provide any example of Pakistan publicly rejecting its customary water obligations and also refers to the Indus Water Treaty it has concluded with India in 1960.⁸⁷⁶
732. According to Respondent, Claimant has failed to show that its use of the Fan Sediments aquifer would have been equitable and reasonable which would have been for Pakistan and Afghanistan to decide. Respondent notes that contrary to SMEC’s recommendation, no visits or assessments were ever conducted in Afghanistan and refers to Mr. Mayer’s testimony that the process “*was never started.*”⁸⁷⁷ Respondent further contends that given the already tense relationship with Afghanistan over the border, local authorities would not have allowed pumping from the Fan Sediments, which was, according to Respondent, one of the primary reasons that SMEC had ranked them only third in its report.⁸⁷⁸ At the very least, Respondent submits that the process would likely have involved “lengthy negotiations” leading to delays in using the Fan Sediments and claims that this risk was “largely ignored” by Claimant.⁸⁷⁹

⁸⁷² Respondent’s Post-Hearing Brief on Quantum, ¶ 151, quoting from Transcript Hearing on Quantum (Day 6), p. 1654 lines 12-14, p. 1656 lines 1-3 and 9-10, p. 1662 lines 14-20.

⁸⁷³ Respondent’s Post-Hearing Brief on Quantum, note 336 and ¶ 157, referring to Transcript Hearing on Quantum (Day 6), p. 1708 lines 4-10.

⁸⁷⁴ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 151, 157, referring to Transcript Hearing on Quantum (Day 6), p. 1658 lines 5-10. See also Respondent’s Rejoinder on Quantum, ¶ 249.

⁸⁷⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 152, quoting from Respondent’s Closing Presentation, p. 28.

⁸⁷⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 153.

⁸⁷⁷ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 154-155, quoting from Transcript Hearing on Quantum (Day 5), p. 1506 line 4.

⁸⁷⁸ Respondent’s Post-Hearing Brief on Quantum, ¶ 156, referring to **Exhibit RE-576-24.03**, p. ES-9.

⁸⁷⁹ Respondent’s Counter-Memorial on Quantum, ¶ 241.

733. Respondent also maintains its allegation that Claimant underestimated the project's water needs and its reference to the standard rate of water needed to process raw material of approximately 1 cubic meter of water per 1 ton of material processed, which would more than double the water need predicted in the Feasibility Study. In support of this allegation, Respondent refers to the estimates in the US Geological Survey which it describes as "*widely accepted guidelines*" and considers that Prof. Dagdelen and Mr. Owen's one-to-one ratio is conservative against this background.⁸⁸⁰ In response to Claimant's emphasis on the process it planned to use for recovering water, Respondent considers it "*striking*" that Claimant did not provide insight on the amount of water saved and further questions whether there would be an overall net recovery of water given that studies revealed a reduction of the overall water demand by only 3% and concluded that Claimant's "*estimated [water] returns from Reko Diq are consistent with the returns from other sites.*"⁸⁸¹
734. Respondent further argues that any buyer would have expected alternatives to the Fan Sediments and maintains that Claimant "*was not ready with suitable alternatives.*" Respondent acknowledges that Claimant explored four alternative groundwater sources as part of its mitigation strategy but considers that this was insufficient to surmount the risks associated with using the Fan Sediments as the primary water source. In its view, Mr. Mayer confirmed in his oral testimony that he chose on behalf of Claimant to develop the Fan Sediments as the only source of water, despite the recommendation of Dr. Drury to develop at least two other water sources to augment the Fan Sediments. Respondent further notes that the Feasibility Study does not include mitigation measures and in particular did not discuss, test or cost aquifer injection even though Dr. Drury had recommended that it be investigated.⁸⁸² In this regard, Respondent notes that the ability to re-inject water depended on having the necessary amount of water available and maintains that given the "*grave errors*" in SMEC's calculation of the volume of water, this mitigation measure was "*practically impossible.*" In any event, Respondent considers that re-injection would also have involved transboundary issues and necessitated contacting the Afghan authorities, which as Mr. Livesey admitted was not done.⁸⁸³

⁸⁸⁰ Respondent's Rejoinder on Quantum, ¶¶ 241-243, referring to Dagdelen/Owen I, ¶ 192 and **Exhibit RE-727**, p. 3; Respondent's Counter-Memorial on Quantum, ¶ 255.

⁸⁸¹ Respondent's Rejoinder on Quantum, ¶¶ 244-247, quoting from **Exhibits RE-576-28.28**, p. 3 and **RE-576-28.13**, p. 2.

⁸⁸² Respondent's Post-Hearing Brief on Quantum, ¶¶ 158-160, referring to Transcript Hearing on Quantum (Day 5), p. 1502 lines 10-18 and p. 1359 lines 10-11 and Drury, ¶¶ 65, 67; Respondent's Rejoinder on Quantum, ¶ 250; Respondent's Counter-Memorial on Quantum, ¶¶ 244-245, 247.

⁸⁸³ Respondent's Counter-Memorial on Quantum, ¶ 246, referring to Transcript Hearing on Jurisdiction and Liability (Day 5), pp. 1339-1341.

735. Respondent further acknowledges that Dr. Drury described two of the other water sources as “*very well-known*” and “*a very good water supply*,” respectively, but considers that he did not confirm that the other water sources were assessed to a feasibility level or that they could supply enough water to Reko Diq to compensate the Fan Sediments.⁸⁸⁴ According to Respondent, the conclusions drawn by Dr. Drury in his expert report are not supported by SMEC’s conclusions in its Water Resources Assessment Report, which did not assess the long-term effects of pumping water at high volumes at any of these alternative sources.⁸⁸⁵
736. Respondent points out that the other two water sources had existing groundwater users, including users located in Iran, and dismisses Claimant’s argument that it chose the Fan Sediments to minimize the impact on such users, alleging that “[o]nce TCC ‘tapped’ the Fan Sediments, it would have been faced with the same consequences to other users that it sought to avoid.”⁸⁸⁶ Respondent argues that given the “*extreme water scarcity of the region, caused by massive groundwater pumping and the increasing occurrence of more severe weather events, especially droughts*,” Claimant should have expected local opposition. In Respondent’s view, “[i]t is utterly realistic to assume that local communities would attribute any decrease in their well water levels to Reko Diq, whether that is in fact the case.” Respondent points to measures taken by Saindak to address this concern and considers that Claimant had planned “*little to nothing*” in this regard.⁸⁸⁷
737. Respondent further contends that there was no feasibility assessment on transporting the water from these other water sources to Reko Diq and no cost estimates for additional pumping wells and pipelines as well as potential electricity costs for running the pumps, which would have “*certainly added to the USD 95 million that TCC planned to spend on developing the Fan Sediments alone*.”⁸⁸⁸
738. As for the solution to pump seawater to Reko Diq, Respondent notes that the viability of this option or the associated additional costs of USD 1.7 to 2.76 billion, which it bases on Morgan Stanley estimates for the operating costs of a desalination facility per ton of copper produced and Claimant’s estimate of the total copper reserves, was never discussed by Claimant’s consultants and adds that this water pipeline would have faced the same risks as the slurry pipeline to Port Gwadar. In any event, Respondent maintains

⁸⁸⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 161, quoting from Transcript Hearing on Quantum (Day 5), p. 1385 line 16 and p. 1386 lines 20-21.

⁸⁸⁵ Respondent’s Rejoinder on Quantum, ¶¶ 251-253, referring to Drury, ¶¶ 52, 54-55 and **Exhibit RE-576-24.03**, pp. 4-7, 4-14 and Table ES-1; Respondent’s Counter-Memorial on Quantum, ¶ 250.

⁸⁸⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 162; Respondent’s Counter-Memorial on Quantum, ¶ 249.

⁸⁸⁷ Respondent’s Counter-Memorial on Quantum, ¶¶ 252-254.

⁸⁸⁸ Respondent’s Post-Hearing Brief on Quantum, ¶ 163, referring to Transcript Hearing on Quantum (Day 5), p. 1523 lines 12-13 and (Day 6), p. 1717 lines 7-9 and p. 1718 lines 4-5.

that “*the value of Reko Diq must rest on the IMD FS,*” which does not mention the use of seawater.⁸⁸⁹

c. Tribunal’s Analysis

739. At the outset of its analysis on the issues regarding the groundwater source that was contemplated to supply the required quantities of water to the project, the Tribunal recalls that the argument that TCCP failed to fully assess the water source of its project was raised by Respondent already in the liability phase of this proceeding. In its Decision on Jurisdiction and Liability, the Tribunal discussed this argument in the context of its analysis of whether any of the grounds invoked by the Licensing Authority in its Notice of Intent to Reject the Mining Lease Application and/or by Respondent in the arbitration justified the denial of the Mining Lease Application in November 2011. The alleged failure to fully assess the water source was one of the reasons that Respondent raised for the first time in this arbitration. While finding that Respondent should not be allowed to rely on reasons additional to those invoked in the Notice of Intent to Reject, the Tribunal in any event found that none of these additional reasons, including the reason invoked with regard to the water source, would justify the denial of the Mining Lease Application.⁸⁹⁰
740. At the liability stage, the Tribunal noted that it appeared to be undisputed that Claimant had made a full feasibility assessment of the groundwater source that it intended to use for the project, *i.e.*, the Baghicha Bore Field, which has in this phase more commonly been referred to as the Fan Sediments, to the extent that the Pakistani side of the aquifer was concerned. Based on a statement made by SMEC in its Final Report on the Water Resource Assessment that all of Claimant’s preferred groundwater sources spanned international borders but that hydrogeological assessment of the respective areas in Iran and Afghanistan to feasibility level had not been carried out because SMEC had not received Claimant’s permission to do so, the dispute between the Parties related to the question whether it was inadequate for Claimant not to make a feasibility assessment for the Afghan side of the aquifer.⁸⁹¹
741. In its analysis at the liability stage, the Tribunal relied in particular on the witness testimony of Mr. Livesey during the Hearing on Jurisdiction and Liability regarding the significance of SMEC’s statement for the other water sources it had assessed, which extended into Iran, the direction of water flow at the Fan Sediments from Pakistan into

⁸⁸⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 164; Respondent’s Rejoinder on Quantum, ¶¶ 254-255, referring to **Exhibit RE-668**, p. 7.

⁸⁹⁰ Decision on Jurisdiction and Liability, ¶¶ 1231-1233.

⁸⁹¹ Decision on Jurisdiction and Liability, ¶¶ 1257-1258, quoting from **Exhibit CE-410**, pp. 1-1 to 1-2 (corresponding to **Exhibit RE-576-24.03**, pp. 1-1 to 1-2).

Afghanistan, as well as the mitigation measures employed by Claimant to maintain licenses at other groundwater sources.⁸⁹² The Tribunal also considered it noteworthy that the GOB had chosen the same water source for its own mining project, citing the following advantages over other potential groundwater sources: “*No other groundwater user*”; “*Large volume of groundwater storage*”; “*Easy accessibility of pipe line route*”; and “*Most of area of resource is in Pakistan.*”⁸⁹³ On that basis, the Tribunal was convinced that “*Claimant did in fact make an adequate assessment of the groundwater source it intended to use for its project*” and therefore concluded that this additional ground invoked by Respondent did not present a justifiable basis for denying the Mining Lease Application.⁸⁹⁴

742. The Tribunal further recalls that in its Decision on Respondent’s Request for Reconsideration of the Decision on Jurisdiction and Liability filed after Respondent’s Counter-Memorial on Quantum, the Tribunal addressed, *inter alia*, Respondent’s argument that the results of the drilling for water provided in Appendix 24.03 to the Feasibility Study merit reconsideration of the Tribunal’s finding that Claimant presented an adequate Feasibility Study meriting a mining lease because these results indicated, according to Respondent, very low storage coefficients which in its view did not support SMEC’s conclusions on the amount of water available at the Fan Sediments.⁸⁹⁵
743. The Tribunal noted in its reasoning that Respondent did not argue that the alleged error it had identified in the Feasibility Study was known to the Licensing Authority at the time it rejected TCCP’s Mining Lease Application or that it formed part of the ten grounds invoked in the Notice of Intent to Reject. Based on the Tribunal’s earlier finding that to allow Respondent to rely on additional reasons in this arbitration would violate Claimant’s right to be heard, the Tribunal concluded that a potential error in the Feasibility Study that was not known to the Licensing Authority in November 2011 could not decisively affect the Tribunal’s conclusion that the denial of the Mining Lease Application was not justified by any of the reasons given by the Licensing Authority and that “*the real motive for the denial was the fact that the GOB had decided to develop and implement its own mining project rather than to collaborate with Claimant pursuant to the CHEJVA and that the grounds invoked by the Licensing Authority served only as a pretext to conceal this motive.*”⁸⁹⁶
744. The Tribunal further emphasized that “*it did not make a finding that the Feasibility Study was complete and/or that all assumptions and conclusions presented in the Study were*

⁸⁹² Decision on Jurisdiction and Liability, ¶¶ 1259-1261, *quoting from* Transcript Hearing on Jurisdiction and Liability (Day 5), pp. 1328-1331.

⁸⁹³ Decision on Jurisdiction and Liability, ¶ 1262, *quoting from Exhibit CE-372*, pp. 12-13.

⁸⁹⁴ Decision on Jurisdiction and Liability, ¶ 1263.

⁸⁹⁵ Decision on Reconsideration Request, ¶ 93; Respondent’s Reconsideration Request, ¶¶ 34-36.

⁸⁹⁶ Decision on Reconsideration Request, ¶¶ 95-96, *quoting from* Decision on Jurisdiction and Liability, ¶ 1264.

fully accurate. What the Tribunal did find was that none of the reasons invoked by the Licensing Authority and, albeit it would not have been strictly necessary for its liability finding, none of the additional reasons invoked by Respondent in the liability phase, justified a denial of the Mining Lease Application. The question whether the assumptions made in the Feasibility Study were adequate and realistic will become relevant in the present quantum phase for the purposes of assessing the amount of damages to which Claimant is entitled as a result of Respondent's Treaty breach.”⁸⁹⁷

745. Specifically with regard to its reliance on the witness testimony of Mr. Livesey and Respondent's expressed fear that the Tribunal's factual findings would affect its assessment of Respondent's arguments during the quantum phase, the Tribunal stated the following:

“[T]he Tribunal did not make a finding in the liability phase that the Feasibility Study fully reflected the true value of the project at the time. It only assessed the arguments presented by Respondent at the time in support of its position that denial of the Mining Lease Application was based on justifiable reasons. Neither of the Parties presented any opinions from independent experts in the liability phase as they have now done in the quantum phase. As Respondent's reference to its experts Mr. Holmes and [Dr.] Nanni shows, it was apparently only through their review of the relevant data that the alleged errors were detected. Consequently, the Tribunal will assess the arguments presented by Respondent with regard to the water issue in its analysis on quantum once the Parties have completed their written submissions and the Tribunal has heard the fact and expert witnesses during the hearing on quantum on this issue.”⁸⁹⁸

746. As noted in the Tribunal's Decision on Respondent's Reconsideration Request, Respondent's allegation that it had detected certain errors in the Feasibility Study, *i.e.*, that the results of SMEC's studies on water did not support the conclusions drawn in the Feasibility Study regarding the size of the Fan Sediments and the amount of water available, was based on an expert report authored by Mr. Holmes and Dr. Nanni of Water Resource Associates (WRA) (“**WRA Report**”), which Respondent had submitted together with its Counter-Memorial on Quantum.⁸⁹⁹ After the Decision on Respondent's Reconsideration Request had been rendered, Respondent submitted with its Rejoinder a second expert report authored only by Dr. Nanni, in which she clarified that her participation in the WRA Report had focused exclusively on water governance and transboundary water issues and that her comments could be found in Section 5 of the WRA Report, labelled “*Water Governance and Transboundary Issues.*” Dr. Nanni further

⁸⁹⁷ Decision on Reconsideration Request, ¶ 97.

⁸⁹⁸ Decision on Reconsideration Request, ¶¶ 98-99.

⁸⁹⁹ See in particular Respondent's Reconsideration Request, ¶ 35 and note 57, *relying on* WRA Report, Section 3.5.

clarified that she had not participated in drafting the other sections of the WRA Report.⁹⁰⁰ She then confirmed her assessments made in Section 5 of the WRA Report and reproduced them in her second report.⁹⁰¹

747. Mr. Holmes did not submit a second report in this arbitration. In preparation for the Hearing on Quantum, Respondent informed Claimant that Mr. Holmes had terminated his engagement with Pakistan and therefore could no longer be produced for examination at the Hearing. On that basis and pointing out that Section 5 of the WRA Report authored by Dr. Nanni, who remained available for examination, had been re-filed as a separate report, Claimant requested that the Tribunal strike the WRA Report from the record.⁹⁰² In response, Respondent informed the Tribunal that it had no objection to Claimant's request to strike the WRA Report "*as it rests on an incomplete packet of information provided by TCCA.*" Respondent noted that, of two reports prepared by JSAI in November 2009 and December 2009, respectively, the WRA Report could take into account only the December 2009 report as the November 2009 report was produced by Claimant only in November 2017, *i.e.*, after the WRA Report had been submitted. Respondent further stated that "[i]n light of TCCA's failure to timely provide the November Report in advance of the Counter-Memorial, Pakistan must insist that the Tribunal strike all references to the WRA report made by TCCA and its experts."⁹⁰³ Claimant objected to the striking of all references to the WRA Report, emphasizing that Respondent had not withdrawn its arguments based on the points made by Mr. Holmes and noting that the analysis presented by its new expert, Mr. Neville, had a more limited scope than the WRA Report and, according to Claimant, even confirmed that there would be enough water in the aquifer for the life of the mine. Claimant further noted that the November 2009 report referred to by Respondent had been provided to Pakistan five months before the due date for its Rejoinder and was in any event "*simply a later iteration of the August Report*" and summarized in the SMEC 2010 Report both of which had been available to Mr. Holmes when he prepared his expert report.⁹⁰⁴

748. Based on the Parties' submissions and in accordance with Section 16.9 of Procedural Order No. 1, which provides that "[t]he Tribunal may disregard the testimony of a witness or expert called to testify at the hearing who fails to appear at the hearing without justified reasons," the Tribunal decided to strike the WRA Report from the record, noting that: (i) Respondent had not provided any reason for which Prof. Holmes had terminated his engagement with Respondent and was no longer available for cross-examination; and (ii) Respondent had received the additional report of JSAI on Groundwater-Flow

⁹⁰⁰ Nanni, ¶ 2.

⁹⁰¹ Nanni, ¶¶ 7-10 and Section III.

⁹⁰² Claimant's letter regarding Pakistan's Rejoinder Testimony dated 23 April 2018, pp. 4-5.

⁹⁰³ Respondent's letter regarding Request to Strike Experts dated 26 April 2018, pp. 7-8.

⁹⁰⁴ Claimant's letter regarding the WRA Report dated 30 April 2018.

Modeling dated 6 November 2009 approximately five months before it filed its Rejoinder and Quantum and rebuttal reports from its experts, as a result of which the Tribunal did not understand this argument to serve as a reason for which Prof. Holmes had to terminate his engagement with Respondent. The Tribunal further saw no basis for striking any references to the WRA Report that were made in Claimant's submissions or the expert reports filed by Claimant's experts.⁹⁰⁵

749. In line with this decision, the Tribunal will not take into account any of the opinions expressed by Mr. Holmes in the WRA Report on which Respondent relied in support of its allegation that the results of SMEC's drilling did not support the conclusions drawn regarding the amount of water available in the Fan Sediments. At the same time, it is noted that Respondent continues to argue in its Post-Hearing Brief that by assuming that aquifer was unconfined, Mr. Jones "*assumed that much more water was available for extraction and thereby arbitrarily reduced TCC's projected impact on the groundwater levels by a factor of 1,000*" and relies on Mr. Neville's testimony during the Hearing on Quantum that "*if the aquifer remains confined as it does during the 21 days, then the effective storage coefficient [or the amount of water that can be extracted] would be 1,000 times smaller than has been assumed in all of the analyses.*"⁹⁰⁶

750. Against this background, the Tribunal does not agree with Claimant's statement in its Post-Hearing Brief that the only remaining issue in dispute is the extent of the drawdown in Afghanistan. Rather, it appears to the Tribunal that in addition to the drawdown and the effects, if any, that such a drawdown would have on the feasibility and/or costs of the project, Respondent continues to dispute that there would have been sufficient water available in the Fan Sediments and that Claimant would have been able to extract the required quantities of water at the costs estimated in the Feasibility Study. Respondent further disputes that Claimant had sufficiently tested mitigation measures that might potentially be employed in case it turned out that the Fan Sediments would for any reason not be sufficient to serve as the only water source for the project. The Tribunal will therefore address all of these issues in the following analysis.

i. Whether the Estimated Mine Water Demand of the Reko Diq Project Was Reasonable

751. As a preliminary matter and before addressing the question whether Claimant has established that the groundwater source it had chosen could supply sufficient water to the Reko Diq project, the Tribunal notes that Respondent has also challenged the estimates provided in the Feasibility Study regarding the amount of water needed for the project.

⁹⁰⁵ Tribunal's letter to the Parties regarding the Exclusion of Evidence – WRA Report dated 2 May 2018.

⁹⁰⁶ Respondent's Post-Hearing Brief on Quantum, ¶ 140 and note 307, *quoting from* Transcript Hearing on Quantum (Day 6), p. 1642 lines 11-19.

Respondent relies on its experts Prof. Dagdelen and Mr. Owen who expressed the opinion in their first expert report that the Feasibility Study “*dramatically underestimated the amount of water needed*” and that a “*standard design basis would be to start at 1 cubic meter of water ... per 1 ton of material being processed. Over time projects are capable of reducing this to 0.6 m³/ton of ore processed, but this should appear in the IMD FS.*” Based on the assumption that 1 cubic meter of water would be needed for each ton of ore to be mined per day, Prof. Dagdelen and Mr. Owen calculated that the project would require 4,583 cubic meters of water per hour and “[t]aking an optimistic approach of 0,8m³/ton of ore would suggest that 3,680 cubic meters of water per hour should be the design basis.” They noted that the Feasibility Study pegged water usage at approximately 2,100 cubic meters per hour and considered that “[e]ven the best plants are not this efficient” as a result of which “*the base case for water usage is understated.*”⁹⁰⁷

752. As pointed out by Claimant, Prof. Dagdelen and Mr. Owen did not cite any authority in support of the “*standard*” of one cubic meter of water per ton of material being processed. According to Claimant, their opinion ignored the “*highly efficient*” metallurgical process that had been developed for the project as part of which “*a large amount of water from the tailings slurry would be recovered and returned for use in the process plant.*”⁹⁰⁸ In support of its submission, Claimant refers to its expert Mr. Mayer, Senior Manager of Water and Tailings at Barrick at the time the Feasibility Study was prepared, who oversaw the work for the Reko Diq project regarding water balance, water supply, and concentrate slurry pipeline design.⁹⁰⁹ Mr. Mayer stated in his report that “[m]inimizing the amount of water consumed on-site was a key consideration throughout the design process.” He explained that the concentration of ore minerals through the “*flotation*” process is “*the core purpose of the operation and drives water demand calculation.*” He further explained that both the rougher tailings slurry stream created from the initial float, comprising 93.5% of the total tailings mass generated, and the cleaner tailings stream created after secondary grinding and further flotation, comprising about 5% of the total tailing mass, would be thickened at the plant site to recover as much water as possible, which would be returned to the process plant for use.⁹¹⁰ With regard to the mine water demand, Mr. Mayer stated:

“The largest source of water consumption at Reko Diq occurs at the rougher tailings facility. This consumption is made up of moisture trapped between the tailings particles after consolidation, seepage from the facility, and evaporation. Consumption at the rougher and cleaner facilities constitutes about 87% of the total water demand.”

⁹⁰⁷ Dagdelen/Owen I, ¶¶ 191-192.

⁹⁰⁸ Claimant’s Quantum Reply, ¶ 525.

⁹⁰⁹ Mayer, ¶¶ 1, 7.

⁹¹⁰ Mayer, ¶¶ 29-33.

The remaining 13% of water consumed at Reko Diq includes water in the concentrate slurry stream, potable, dust control, and evaporation.

Total water consumption, minus water recovered from the tailings storage facility after consolidation and return water from other minor sources, equals the mine water demand.

As a result, the Mine Water Demand for operations was calculated at 2,410 cubic meters per hour (670 l/s) for the IMD phase and 4,625 cubic meters per hour (1,285 l/s) for the EXP phase.¹ The estimate of Mine Water Demand evolved over time as the process and tailings facility designs were refined.

In order to be conservative for the purpose of estimating the effects of pumping from the Fan Sediments aquifer on the groundwater levels, the project assumed that the water could not be recovered from the tailings storage facilities, and that water would have to be made up from the Fan Sediments aquifer. Under this conservative assumption, the mine water demand would be 730 l/s (IMD) and 1460 l/s (EXP).

For the purpose of sizing the capacity of the water supply pipeline, the project assumed no water recovered from the tailings facilities, the average annual peak water consumption year, and the 92% planned availability of the process plant. Under these conditions the mine water demand would be 800 l/s (IMD) and 1,630 l/s (EXP) and would be equal to the maximum peak instantaneous rate.”⁹¹¹

753. Mr. Mayer referred to Chapter 8 of the Expansion Pre-Feasibility Study entitled “*Water Management*,” which provides in Section 8.7 on the Water Management Plan an overall water balance for the Initial Mine Development and the Expansion.⁹¹² The numbers for the Initial Mine Development are also contained in Chapter 8 of the Feasibility Study.⁹¹³
754. Specifically in response to the rate of one cubic meter of water per one ton of ore processed advanced by Respondent and its experts, Mr. Mayer considered that this approach would “*unnecessarily increase capital and operating costs for water and tailings management to the project and would be irresponsible socially and environmentally*” as it would be “*an immense waste of water and of other resources used for flotation and tailings management.*” Mr. Mayer also stated that applying this “*rule of thumb would be terribly inefficient because excess water in the tailings storage facility would slow tailings consolidation requiring increased capacity ... and would maximize the need for offsite water from the Fan Sediments aquifer.*”⁹¹⁴ Mr. Mayer acknowledged that “[s]ome older mines took this approach prior incorporation of thickeners and efficient tailings management practices” but stated that he was not aware of any modern

⁹¹¹ Mayer, ¶¶ 34-39.

⁹¹² **Exhibit RE-577-8**, Table 8.5.

⁹¹³ **Exhibit RE-576-8**, Table 8.5.

⁹¹⁴ Mayer, 51-52.

mines operating in this manner. Mr. Mayer further emphasized that in their calculations of water demand, Claimant's team did not rely on "a general rule of thumb" but rather on test work on tailing samples generated from the metallurgical test work for the project which form the basis for the tailings thickeners and the tailings facility designs.⁹¹⁵

755. Mr. Mayer also stated that the team estimated the chance to reclaim up to 9% of the water from the tailings facility by design and tailings management practices.⁹¹⁶ In this regard, Mr. Mayer referred to Appendix 28.28 of the Feasibility Study, which is a Memorandum prepared by Knight Piésold Consulting on Rougher Tailings Facility Feasibility Design dated 30 July 2009. This Memorandum evaluated in detail three thickened tailings storage options based on Phase 4 tailings tests and recommended as the base case for the Feasibility Study Option 2 which was described as a "hybrid of Options 1 and 3" and would, *inter alia*, be more water efficient than Option 3.⁹¹⁷ The Memorandum presented the water demands for the rougher facility options and the cleaner facility as well as the capital and operating costs associated with each option and a deciding making - ranking matrix.⁹¹⁸

756. In response to Mr. Mayer's explanation of the approach contemplated by Claimant, Respondent argued that "[w]hile these maneuvers seem practical in theory, they provide no insight into the amount of water saved. Nor does TCCA indicate by how much the demand for water would be reduced." In Respondent's view, Claimant's arguments should not be trusted because: (i) "TCCA's two methods for conserving water—extracting water from the slurry and reclaiming more water from the slurry at the storage facility—have an inverse relationship"; and (ii) "the studies conducted on this process do not reveal a significant decrease in the overall water demand."⁹¹⁹

757. In support of its argument, Respondent relies on the same Memorandum of Knight Piésold Consulting dated 30 July 2009 in which the results of the Phase 4 tailings tests are presented in comparison to the previous Phase 3 test results and it is stated:

"The most notable variation in the two Rougher samples is the reduction in supernatant released from the Phase 4 sample. At 67% solids there is an estimated 6% reduction in the percent of supernatant water released. As a result the improved water recovery due to operation at 67% solids is offset by a reduction in supernatant production and the resulting theoretical water demand from the tailings is only reduced by 3%. Individual options vary

⁹¹⁵ Mayer, ¶¶ 53, 55.

⁹¹⁶ Mayer, ¶ 56.

⁹¹⁷ Exhibit RE-576-28.28, pp. 1-2, 10.

⁹¹⁸ Exhibit RE-576-28.28, Sections 4 through 6.

⁹¹⁹ Respondent's Rejoinder on Quantum, ¶¶ 244-246.

depending on layout and operation as discussed in more detail in Section 4.”⁹²⁰

758. Respondent further relies on Appendix C to an additional Memorandum prepared by the same consulting firm on Water Balance Modelling and & Decant Return dated 16 December 2008. Appendix C contains a comparison between a scenario in which the %solids of the rougher tailings are increased to 64%, as it was done in Phase 3 tailings tests, and the scenario in which they are increased to 67%, as it was done in Phase 4 tailings tests. It is noted that “*increasing the %solids of the rougher tailings from 64% to 67% solids results in reduction in water loss of about 8% (0.033 m³/t of tailings sent to the rougher facility).*” Appendix C further states:

“Thus although the supernatant production reduces as the %solids increases, the water loss (water output – water return) also reduces as the %solids increases. For a change from 64% solids to 67% solids the reduction is approximately 0.033 m³/t of water.

For the overall project assessment this reduction in water loss needs to be compared to the relative capital and operating costs (in particular flocculant consumption) of the different thickeners being considered.”⁹²¹

759. Based on its own review of the memoranda relied on by Respondent, the Tribunal agrees with Respondent to the extent that there appears to be a correlation between increasing the percentage to which rougher tailings are thickened and a lowering of the supernatant production in the facility itself. However, the Tribunal cannot follow Respondent’s argument that the memoranda would reveal no significant decrease in the overall water demand. In particular, the Tribunal understands that the decrease of 3% reported in the 30 July 2009 Memorandum referred to the difference between Phase 3 tailings tests and Phase 4 tailings tests in which the rougher tailings tests were thickened to 64% and 67%, respectively. The same applies to the 16 December 2008 Memorandum, which also compares the results of increasing the percentage from 64% to 67%. Neither of the two Memoranda compares the results of Phase 4 tailings tests to a scenario in which no thickeners would be used and therefore they do not support Respondent’s allegation that using thickeners would not contribute to a significant decrease in the overall water demand. In addition, while the 16 December 2008 Memorandum refers to “*relative capital and operating costs ... of the different thickeners being considered,*” it does not provide any support for Respondent’s allegation that the advantages of their use would be offset by their additional costs.

760. The Tribunal further notes that Respondent’s experts Prof. Dagdelen and Mr. Owen did not respond to Mr. Mayer’s explanation why the rate of one cubic meter of water per one

⁹²⁰ Exhibit RE-576-28.28, p. 3.

⁹²¹ Exhibit RE-576-28.13, Appendix C, pp. 1-2.

tor of ore processed they had introduced would, in his opinion, overestimate the project's water needs. Neither did Respondent's expert on water-related matters, Mr. Neville, express an opinion on this matter.

761. In addition, the Tribunal finds convincing Mr. Mayer's explanation that through the process of thickening rougher tailings as well as cleaner tailings, Claimant would have been able to recover and reuse a significant amount of water, which would have decreased the amount of water to be supplied from an off-site groundwater source. Neither Respondent nor its experts have engaged in any detail with the estimates provided in the Feasibility Study and Expansion Pre-Feasibility Study based, *inter alia*, on the tests performed on the rougher tailings. While Respondent maintains that the rate of one cubic meter of water per ton of ore processed forms part of "*widely accepted guidelines*" contained in the US Geological Survey of 2012,⁹²² it has not engaged with the specific process Claimant had designed for the Reko Diq project and has not challenged any specific part of this process or a particular aspect of the estimated water needs calculated based on the tests performed. Consequently, the Tribunal sees no basis to assume that the process would not be able to achieve the estimated water recovery and/or the estimated overall water balance presented in Chapter 8 of both Studies.
762. Finally, the Tribunal has also taken note of Mr. Mayer's unchallenged testimony that in order to be conservative, the final estimate of mine water demand in the Feasibility Study and the Expansion Pre-Feasibility Study is based on the assumption that no water could be recovered from the tailings facilities.⁹²³ In the absence of any specific challenge to the process contemplated by Claimant or to the estimate of mine water demand included in the Studies, the Tribunal will base its further analysis in this section on the assumption that the amount of water needed was appropriately estimated by Claimant.

ii. Whether Sufficient Water Was Available to Meet the Mine Water Demand of the Reko Diq Project

763. As to the question whether Claimant has established that the Fan Sediments contained sufficient quantities of water to supply the Reko Diq project based on the estimated mine water demand, Claimant considers that this was confirmed by all four hydrogeological experts during the Hearing on Quantum. Respondent, on the other hand, considers that Claimant's expert Dr. Drury acknowledged that the Fan Sediments would most likely not have provided sufficient water for Reko Diq. In light of these deviating interpretations, the Tribunal will review the testimony of the Parties' experts in more detail. As noted above, the Tribunal will not take into account the opinions expressed by Mr. Holmes in the WRA Report. However, given that Respondent continues to pursue the argument that

⁹²² Respondent's Rejoinder on Quantum, ¶ 243, referring to **Exhibit RE-727**, p. 3.

⁹²³ Mayer, ¶¶ 38-39.

initially relied on Mr. Holmes' analysis and given that the Tribunal saw no basis for striking the references to his analysis made by Claimant's experts from the record, the Tribunal will also take into account the opinions expressed by Claimant's experts on the argument initially supported by Mr. Holmes.

764. Claimant's expert Dr. Drury stated during the presentation of his findings at the Hearing on Quantum that "*our conclusion is that the Fan Sediments can supply a sustainable groundwater supply to Reko Diq Mine. And the alternative supplies also have very large resources available to supply the mine as well.*"⁹²⁴ For the Fan Sediments, Dr. Drury based this conclusion on the 21-day pump test conducted by SMEC in 2008, which he described as "*an extraordinary event*" that he had never carried out before in his 45-year experience. He testified that most water supply pump tests are carried out over one to three days and that he had experienced only one exception with a 10-day pump test.⁹²⁵ Dr. Drury then explained the tests performed by SMEC at the three alternative water resources and also referred to "*a very big peer-review process*" involving internal reviewers at SMEC as well as external reviewers from Claimant, Antofagasta and third-party consultants.⁹²⁶

765. Respondent contends that during cross-examination, Dr. Drury "*expressly recognized that the Fan Sediments would most likely not have provided enough water to Reko Diq.*"⁹²⁷ It relies on the following testimony of Dr. Drury:

"Q. ... Mr. Drury, you say in Paragraph 67 of your Report that you were confident that water existed at Balochistan from a combination of groundwater around Reko Diq to supply the mine requirements.

Do you see that?

In your Expert Report and also in the SMEC Report, you don't say that the Fan Sediments would have been enough. You say that it's a combination of groundwater sources is the one that would have supply-and-demand requirement?

A. Yes.

Q. Do you agree?

A. That's what I say, yes.

Q. And you also say that, 'It's my understanding that TCC intended to initially develop the Baghicha Borefield and then augment water supplies from at least one other nearby groundwater source.'

⁹²⁴ Transcript Hearing on Quantum (Day 6), p. 1347 lines 3-7.

⁹²⁵ Transcript Hearing on Quantum (Day 6), p. 1343 line 2 to p. 1344 line 17.

⁹²⁶ Transcript Hearing on Quantum (Day 6), p. 1344 line 18 to p. 1347 line 2. *See also* Drury Presentation, pp. 8-9.

⁹²⁷ Respondent's Post-Hearing Brief on Quantum, ¶ 134.

*A. The TCC had the Fan Sediments as the primary water supply, and then there were fallback positions for Patangaz or Upper Tahlab.”*⁹²⁸

766. As pointed out by Respondent, Dr. Drury stated in his expert report:

*“My overall impression from the aquifer testing and modelling results was that there was sufficient groundwater available from a combination of the groundwater development sites around Reko Diq to supply the mine requirements. It is my understanding that TCC intended to initially develop the Baghicha Borefield (Fan Sediments) and then augment water supplies from at least one other nearby groundwater source (Patangaz and/or Upper Tahlab).”*⁹²⁹

767. The Tribunal agrees with Respondent to the extent that Dr. Drury apparently did not consider it certain that the aquifer at the Fan Sediments would by itself have provided sufficient water for Reko Diq over the entire life of the mine. In particular, the Tribunal does not understand Dr. Drury’s conclusion that the Fan Sediments could provide a “sustainable groundwater supply to Reko Diq mine” to mean that no other water sources would be needed over the life of the mine. To the contrary, Dr. Drury’s statement in his report that sufficient groundwater would be available “from a combination of the groundwater development sites around Reko Diq” and his understanding that Claimant intended to first develop the Fan Sediments and then “augment water supplies from at least one other nearby groundwater source,” together with the clarification he provided during the Hearing that the Fan Sediments were to serve as “the primary water supply,” with the other sources being “fallback positions,” confirm his recommendation in the SMEC reports that “in addition to the Fan Sediments, at least two other independent water supply sources be developed for water supply purposes,” which he understood was incorporated by Claimant into the Feasibility Study and Expansion Pre-Feasibility Study as well as the Environmental and Social Impact Assessment.⁹³⁰

768. Mr. Mayer also explained that the Fan Sediments were chosen as the primary water source but that SMEC recommended that Claimant retain its existing No Objection Certificates (NOCs) in the areas of the three alternative sources. He agreed with this advice and the NOCs were retained. Mr. Mayer further confirmed that “[t]he feasibility studies carried out by SMEC indicated that each of these areas was a viable option to supplement the Fan Sediments aquifer yields if required.”⁹³¹

769. In Respondent’s view, Dr. Drury’s testimony confirmed that the Fan Sediments would “most likely not have provided enough water to Reko Diq.” The Tribunal cannot follow this interpretation. As for the volume of water in storage, Dr. Drury explained in his expert

⁹²⁸ Transcript Hearing on Quantum (Day 6), p. 1383 line 21 to p. 1384 line 18.

⁹²⁹ Drury, ¶ 67.

⁹³⁰ Drury, ¶ 65, referring to Exhibits RE-576-8, RE-577-8 and RE-601.

⁹³¹ Mayer, ¶¶ 99, 101.

report that SMEC in its 2009 report did “not present a definitive calculation on groundwater reserve within aquifers as sufficient data across the borders was not available” and noted that a “measurement of the volume of groundwater in storage does not, by itself, indicate how much water can be extracted from the aquifer.” He explained that “the projected groundwater yield of a multilayered hydrogeological system over long-term pumping (possibly many decades) can only be made through groundwater modeling” for the discussion of which he referred to Claimant’s expert Mr. Jones from JSAI.⁹³² Dr. Drury explained that the estimate of water volume in bulk storage in the 2009 SMEC report “was a simple ranking mechanism to compare the attributes of the three main potential borefields (Upper Tahlab, Patanganz and Fan Sediments) – what is small, medium and large” based on the concept of Total Porosity. He emphasized that “[i]n the absence of an extensive knowledge of each aquifer system,” SMEC did “not discuss the volume of groundwater that can be physically extracted from the aquifer – this is a conclusion that can only be reached once the complete groundwater system is understood.”⁹³³ Dr. Drury further explained why in his view, the assumptions made in the WRA Report “considerably underestimated groundwater availability.”⁹³⁴ As the WRA Report has been struck from the record, the Tribunal does not have to address these aspects in further detail. However, based on his explanations, Dr. Drury further concluded that: “[i]f anything, SMEC may have underestimated the volume of water in storage in that: (i) clay aquitards and aquifers in Layer 1 will leak vertically to the pumped aquifers; (ii) groundwater from the deep aquifers may migrate upwards during long-term pumping periods; and (iii) additional groundwater may be available from the deep, narrow trench system.”⁹³⁵

770. Mr. Jones confirmed in his expert report that the amount of water available for extraction from the Fan Sediments is determined based on the porosity of the saturated sediments, ranging from 10% to 40% of the volume of the aquifer. Specifically with regard to the storage coefficients in respect of which Respondent claims to have identified an error in the calculation of the available water volume, Mr. Jones explained that “[t]he confined storage coefficients describe short-term water-level changes in response to pumping, in the pressurized sections of aquifer intersected by wells, but they have nothing to do with the volume of water in storage, which is a function of porosity. The confined storage coefficient equates to a porosity of 0.03% well below the physically-possible range of porosity for sedimentary materials (about 10% to 40%).”⁹³⁶ Mr. Jones further expressed

⁹³² Drury, ¶¶ 171-173

⁹³³ Drury, ¶¶ 175, 178.

⁹³⁴ Drury, ¶¶ 174-193.

⁹³⁵ Drury, ¶ 194.

⁹³⁶ Jones, ¶¶ 73-75.

the opinion that “WRA’s *physically-impossible low estimate of porosity results in a dramatic under-estimate of the amount of groundwater stored in the Fan Sediments.*”⁹³⁷

He explained:

“The confined storage coefficients are results obtained from the 21-day pump-out test that depressurized, but did not drain, the individual strata providing water to the pumping wells. They do not reflect the physical water content of materials in the aquifer. Actual draining of aquifer sediments would only begin after more time and pumping, when the water in the aquifer is no longer held under pressure.

*The calculations by WRA estimating the volume of water in storage based on the confined storage coefficients, which amount to the equivalent of 0.03% porosity, are not credible. Unconsolidated and semi-consolidated sediments (dirt) never have such a low porosity.”*⁹³⁸

771. As noted above, Mr. Holmes, on whose opinion Respondent had relied with regard to the alleged error regarding the storage coefficient, did not present a second report and, for reasons which remain unknown to the Tribunal, terminated his engagement with Respondent before the Hearing on Quantum and was no longer available for cross-examination. Together with its Rejoinder on Quantum, Respondent submitted an expert report by Mr. Neville, who reviewed in detail the 21-day pump test conducted by SMEC. In his expert report, Mr. Neville also used the term “*storage coefficient*” and presented a detailed memorandum on “[t]he *significance and magnitudes of aquifer storage coefficients*” as an appendix to his report. He did not, however, confirm the criticism raised by Mr. Holmes that the confined storage coefficients obtained through the 21-day pump-out test did not support the conclusions drawn by SMEC regarding the amount of water available in the Fan Sediments. Mr. Neville rather noted that the 21-day test had not been sufficient “*to constrain the specification of the specific yield*” and considered that the specific yield of 0.15 assumed by Mr. Jones in his model was “*not representative of the sediments that will be drained by long-term pumping*” but should have been “*smaller, on the order of 0.02.*”⁹³⁹ The dispute between the Parties regarding the specific yield and its impact on the extent of the drawdown in Afghanistan will be addressed further below.

772. In its Post-Hearing Brief on Quantum, Respondent maintained the argument, however, that Mr. Jones had incorrectly assumed in his model that the aquifer was unconfined even though it had remained confined during the 21-day test and relied on the oral testimony of Mr. Neville, who confirmed during his direct examination at the Hearing on Quantum that “[b]ased solely on the 21 days, the aquifer was responding as a confined aquifer.”⁹⁴⁰

⁹³⁷ Jones, ¶ 76.

⁹³⁸ Jones, ¶¶ 79-80.

⁹³⁹ Neville, pp. 2-3.

⁹⁴⁰ Transcript Hearing on Quantum (Day 6), p. 1641 lines 14-15.

Mr. Neville further explained the consequence of an aquifer being confined or unconfined as follows:

“The difference is in the effective storage coefficient. So, that's the term I've used. So, the effective storage coefficient--that's how water re-enters the aquifer after 21 days--is on the order of three zeros and a 1, something like that. So, the point 0--10 to the minus 4, .001.

In contrast, if the water does in the end come from vertical drainage at the water table, then the effective parameter would be if--2 percent? 15 percent? Whatever; the point is, much, much larger than the confined storage coefficient. A factor of 1,000, larger than this confined storage coefficient.

So, that means in [sic] the aquifer remains confined as it does during the 21 days, then the effective storage coefficient would be 1,000 times smaller than has been assumed in all of the analyses, whether Mr. Jones's analyses or mine. And the implications would be the following: The drawdowns--that's the declines in water levels--would be much larger. The absolute magnitudes of the drawdowns would be much larger.

Secondly, the extent of the drawdown cone--so, how much water level has declined, say, in Afghanistan would be much larger. So, we--my analysis--we predict--Mr. Jones and I confirm his results--predicted drawdowns on the order of 3 meters at the Afghani border. And with the storage coefficient that's 1,000 times lower, they would probably be on the order of--I don't know. 30 meters? 300 meters? Some--well, not 300 because that would drain the aquifer completely, but some much larger level of drawdown. So, that's one implication.

The other implication is that the feasibility of the water supply would be called into question because the depths from which--since the water levels are depressed even further, the height at which water has to be lifted to get it into a pipeline would have to be that much higher. The energy requirements would be that much higher. You'd need more pumps. You'd need more wells. You'd need more than the 22 wells because the wells would interfere with each other over the long term; right?”⁹⁴¹

773. In the Tribunal's view, Mr. Neville's testimony confirms that if the aquifer remained confined as it had during the 21-day test, the effective storage coefficient would be 1,000 times smaller and the drawdown to be expected in Afghanistan would be much larger than assumed both by Mr. Jones and by Mr. Neville himself. However, Mr. Neville provided this explanation in response to the abstract question regarding the difference between an unconfined and a confined aquifer. He did not express the opinion that the Fan Sediments would in fact remain confined in the long term. While he disagreed with Mr. Jones as to whether the effective parameter would be 2% or 15%, he in any event agreed that the relevant parameter is the specific yield, which will be addressed below,

⁹⁴¹ Transcript Hearing on Quantum (Day 6), p. 1641 line 20 to p. 1643 line 20.

rather than a much lower confined storage coefficient. During his presentation at the Hearing on Quantum, Mr. Neville explicitly stated that *“I happen to believe that a more realistic value for these sediments is significantly lower [than the 15% assumed by Mr. Jones], but it’s much bigger than the confined storage coefficient.”*⁹⁴² Against this background, the Tribunal cannot follow Respondent’s allegation that Mr. Jones, by basing his model on the assumption that water would be flowing from the upper layers of the aquifer, he over-estimated the amount of water available for extraction and thereby *“arbitrarily reduced TCC’s projected impact on the groundwater levels by a factor of 1,000.”*⁹⁴³

774. In addition, as pointed out by Claimant, Mr. Neville testified in response to the question whether there was enough water to go ahead with the project: *“I don’t think it’s a question of how much water is available. I think it’s a question of how feasible it is to get to the water.”* He then confirmed: *“I don’t think it’s a question of how much water is there. It’s a big area, and I have no doubt that the volume of water that they need is there in the sediments. They’ve certainly done a good job of showing that.”*⁹⁴⁴ Mr. Neville explained that if he had been working for Barrick, he would have provided cost estimates for the potential need of additional pumping wells and a reinjection system as well as the risk that water would have to be pumped out from deeper levels, which would have increased electricity or diesel costs. He stated:

“So, I think the water is there, but is it a question of--to me, it’s a question of how feasible it to get out [sic], and, if anything, I would want to exaggerate how much it’s really going cost.

ARBITRATOR ALEXANDROV: So, just to summarize, to make sure I understand you correctly, the answer to the question of how feasible it is to get the water out is translated into are there adequate provisions for increased costs in the feasibility studies.

THE WITNESS: (Mr. Neville) I would say so. Yeah. I would say so. And I don’t think they are insubstantial costs; right?

*ARBITRATOR ALEXANDROV: Understood.”*⁹⁴⁵

775. In response to the question whether his response related to the Fan Sediments or the whole area around Reko Diq, Mr. Neville clarified that *“from studying the SMEC work, it was clear to me that there was a recognition that the Fan Sediments alone might not be--even if the water--the volume of water is there, that it might not be feasible to get all of the mine water requirements just from the Fan Sediments. So, they were already*

⁹⁴² Transcript Hearing on Quantum (Day 5), p. 1536 lines 12-15.

⁹⁴³ Cf. Respondent’s Post-Hearing Brief on Quantum, ¶ 140.

⁹⁴⁴ Transcript Hearing on Quantum (Day 6), p. 1715 lines 13-15 and p. 1716 lines 13-17.

⁹⁴⁵ Transcript Hearing on Quantum (Day 6), p. 1717 line 5 to p. 1718 line 2.

contemplating seriously other sources of water.”⁹⁴⁶ This was confirmed by Dr. Drury who stated that the Fan Sediments was the primary source of water chosen by Claimant but that “*in any major mining water-supply project, you always have backup systems*” and SMEC therefore recommended to retain the NOCs for the other “*huge aquifer deposits in the area.*” He emphasized that “*the other ones, it’s not because we doubted Fan Sediments, but we had NOCs that we retained in case there was an issue in the future.*”⁹⁴⁷

776. In light of this testimony by the Parties’ experts, the Tribunal considers it established that there was sufficient water available for the Reko Diq project. While Claimant had chosen to develop the Fan Sediments as its primary water source, it had, upon recommendation from SMEC, decided to also retain the No Objection Certificates over the areas in which the other water sources were located. The question that remains to be answered is whether the cost estimates included in the Feasibility Study adequately accounted for the possibility that Claimant might have to resort to using other water sources besides the Fan Sediments and/or that Claimant might have to spend additional costs at the Fan Sediments because of deeper drilling or measures required to mitigate the drawdown into Afghanistan.
777. Respondent argues that Claimant does not make reference to the alternative water sources or the costs associated with having to develop them in the Feasibility Study and Expansion Pre-Feasibility Study. Dr. Drury confirmed in his expert report that for the purposes of the Feasibility Study, SMEC produced its Final Report in 2010, which was an extract of the 2009 report that focused on the Fan Sediments.⁹⁴⁸ Claimant emphasized, and this was confirmed by Mr. Mayer in his expert report,⁹⁴⁹ that all three alternative water sources were assessed to feasibility level. While Respondent disputes this, it did not provide any evidence in support of its allegation that the assessments were not sufficient for the purposes of demonstrating the availability of alternative water sources that could be used in addition to the primary water source.
778. Respondent contends that Dr. Drury “*was not able to go so far as to say that the other sources were assessed to a feasibility level.*”⁹⁵⁰ The Tribunal notes, however, that in response to the question whether he would agree that the other groundwater sources were not at a feasibility level or a pre-feasibility level, Dr. Drury expressly stated: “*No, no. Absolutely not. I reject that.*”⁹⁵¹ He testified that “[t]he Upper Tahlab was very extensively drilled, and the Saindak Borefield has been pumping now for 15 years supplying water

⁹⁴⁶ Transcript Hearing on Quantum (Day 6), p. 1721 lines 9-16.

⁹⁴⁷ Transcript Hearing on Quantum (Day 6), p. 1721 line 19 to p. 1722 line 15.

⁹⁴⁸ Drury, ¶ 66, referring to **Exhibit CE-1228**.

⁹⁴⁹ Cf. Mayer, ¶ 80.

⁹⁵⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 161.

⁹⁵¹ Transcript Hearing on Quantum (Day 5), p. 1385 lines 19-22.

to the mine, so have a 15-year pump test.” Dr. Drury also referred to “more pump tests and more drilling” carried out by SMEC as a result of which the Upper Tahlab “is very well known.”⁹⁵² As for Patangaz, Dr. Drury explained the drilling carried out by SMEC and the information from such drilling which was incorporated into the model, concluding that “[i]t was a feasibility at that location. So, I have little doubt at all that it was a very good water supply for the mine site.”⁹⁵³ Finally, as to the transportation of the water to Reko Diq, Dr. Drury testified that “*Fan Sediments was feasibility*” and the other groundwater sources were “*I would say pre-feasibility. Surveying geotech work was done.*” He confirmed his statement in the SMEC December 2009 report that “[m]ost water delivery systems for the various preferred groundwater sources, areas, and from the ocean are designed to pre-feasibility level” but also testified that “[t]he pipeline design was still happening when [he] left the project” in March 2009 and “more work was carried on for another three months.”⁹⁵⁴

779. While the Tribunal is therefore not convinced by Respondent’s allegation that Claimant failed to conduct feasibility assessments of the alternative water sources, this does not yet answer the question whether it also accounted for the costs associated with the possibility of having to develop either of these additional water sources in order to supply sufficient water to the Reko Diq project. Given that the other water sources were not discussed in the chapter on Water Management in the Feasibility Study and the chapter on Capital Costs states that “[t]he water supply pipeline estimate is based on the source of water from the Fan Sediments,”⁹⁵⁵ without making reference to alternative water sources, it indeed appears that potential costs associated with these other water sources were not included in the cost budget for the water supply in the Feasibility Study and Claimant does not argue otherwise.
780. However, this does not appear unreasonable to the Tribunal given that Claimant planned on developing the Fan Sediments as its primary water source and would resort to the other water sources only if and when required to do so. Mr. Mayer confirmed during the Hearing on Quantum that “*Fan Sediments was to be used for the whole life of the mine; however, we were going to maintain--no, not maintain, but the intention was to maintain the NOCs in the other areas in case mitigation was necessary. That mitigation could be from--I don't think it would be from a technical mitigation of supply but, you know, there's all kinds of permitting risks and things of that nature that we wanted to have some fallback*

⁹⁵² Transcript Hearing on Quantum (Day 5), p. 1386 lines 1-16.

⁹⁵³ Transcript Hearing on Quantum (Day 5), p. 1386 line 22 to p. 1387 line 21.

⁹⁵⁴ Transcript Hearing on Quantum (Day 5), p. 1386 line 22 to p. 1389 line 14.

⁹⁵⁵ **Exhibit RE-576-23**, p. 23-16.

systems. ... But certainly that the Feasibility Report is Fan Sediments for the life of the mine including construction."⁹⁵⁶

781. As pointed out by Claimant and confirmed by Respondent,⁹⁵⁷ the residual risk register included risks and associated cost estimates relating to the insufficiency of the Fan Sediments and the need to develop other water sources besides the Fan Sediments, which will be set out in further detail below. Specifically, it included the following risks: (i) "Available water resource insufficient to supply operating requirements (including slurry pipeline), resulting in production interruptions and/or additional expenses"; (ii) "Water usage by project from alternate sources than Fan Sediments (i.e. the back up supply) causes drawdowns that impact locals (Pakistan drawdown of wetlands, domestic and agriculture water supply) resulting in negative perceptions re. the project and additional compensation costs"; and (iii) "Draw down of water by others leaves insufficient water for project needs caused by the current legislation not explicitly protecting the rights to use water (quantity and duration) results in the need to develop alternative sources." In addition, the risk register also identified the risk that "A lender requires the project to engage in cross border consultation with [Afghanistan / Iran] due to the [Fan Sediments / Patangaz] water supply." These risks were captured with an additional capex and/or opex estimate and included in Prof. Davis' model.⁹⁵⁸
782. Respondent did not raise a specific argument as to why the cost estimates assigned to these risks would not fully capture the costs associated with the possibility that Claimant might have to develop an alternative water source in the future in order to supply sufficient water to the Reko Diq project.
783. In any event, the Tribunal considers it established that there was sufficient water available for the project when considering all of these potential water sources. While Claimant's experts could not exclude that Claimant might have to resort to alternative water sources at some point, there was agreement, including by Respondent's expert Mr. Neville, that the Fan Sediments and the alternative water sources would together be able to provide sufficient water to the Reko Diq project. Mr. Neville explicitly stated that "*I think the water is there, but is it a question of--to me, it's a question of how feasible it to get out, and, if anything, I would want to exaggerate how much it's really going cost.*"⁹⁵⁹

iii. Whether It Was Feasible to Extract the Water from the Fan Sediments

784. As to the feasibility of extracting the water from the Fan Sediments and the potential impact and costs associated with the extraction, the dispute between the Parties focused

⁹⁵⁶ Transcript Hearing on Quantum (Day 5), p. 1502 lines 10-22.

⁹⁵⁷ Cf. Respondent's Counter-Memorial on Quantum, ¶ 218.

⁹⁵⁸ Davis I, Workpaper 26, pp. 4, 8, 12; **Exhibit CE-952**.

⁹⁵⁹ Transcript Hearing on Quantum (Day 6), p. 1718 lines 11-14.

on the question whether the specific yield assumed by Mr. Jones in the groundwater model led to an adequate prediction of the potential effects of long-term pumping. It appears to be undisputed that the specific yield of 0.15 that Mr. Jones used in his model could not directly be derived from the results of the 21-day pump-out test.

785. According to Mr. Neville, “[t]he 21-day duration of the pumping test is not sufficient to constrain the specification of the specific yield” and, “[i]n the absence of data to constrain the analyses, the results of the Shomaker (2009) groundwater model are speculative.”⁹⁶⁰
786. As pointed out by Respondent, Dr. Drury confirmed during the Hearing on Quantum that “[t]he 21-day pump test gave you the storage coefficient and transmissivity of this confined aquifer. The specific yield relates to the upper horizons in the 21-day pump test. There was not any indication of a specific yield.”⁹⁶¹ He confirmed that it was not possible to calculate the specific yield in the 21 days and explained that “[t]he Fan Sediment is in the upper aquifer. We pumped from the--which is 50--60 or 70 meters below the surface. We're pumping from 150, 200 meters. In that 21 days, we haven't got values of specific yield. The specific yield may not be found for six months. It may be 12 months before it is determined.”⁹⁶² When asked what it tells about the aquifer that the specific yield was not determined during the 21-day pump test, Dr. Drury testified that “what it tells the aquifer is actually a very extensive aquifer. The water level drawdown from those free-pumping bores was small, and you have to remember that this aquifer from Mirjawa Hills to the Baghicha Borefield is 10 kilometers, and from Baghicha borefield to Gowd-e-Zereh another 15, so that's 25 kilometers, and 70 kilometers long. And what we are doing, we've got a little pinprick, a little pinprick of where we've actually got our bores in this big area, and we've drawn down this little point in this huge aquifer system. So, it shows that we have a very extensive aquifer. We've only made a dent in the system. The water level drawdown, away from production bore, was only 500 meters. Those which would be 1,000 meters away almost didn't respond to pumping. So, we have a very, very restricted--so, we have a huge aquifer, and we're just a little pinprick in the whole system.”⁹⁶³
787. Mr. Jones also agreed with Mr. Neville's statement that “[t]he 21-day duration of the pump test is not sufficient to constrain the specification of the specific yield.” He explained that the reason for this was that “we pumped from some confined strata, about 200 meters down in the aquifer, and we measured no response in the shallow water table in the unconfined strata and so, therefore, we don't know the specific yield.” He added

⁹⁶⁰ Neville, pp. 2, 4.

⁹⁶¹ Transcript Hearing on Quantum (Day 5), p. 1400 lines 3-7.

⁹⁶² Transcript Hearing on Quantum (Day 5), p. 1401 lines 8-14.

⁹⁶³ Transcript Hearing on Quantum (Day 5), p. 1422 line 17 to p. 1423 line 12.

that “[t]his is very encouraging news. It means that the aquifer will sustain pumping of a much greater scale than we tested.”⁹⁶⁴

788. While the Parties’ experts are therefore in agreement as to the fact that the specific yield could not be determined based on the results of the 21-day pump-out test, they disagree as to the consequences to be drawn from that knowledge as well as to whether the specific yield could reliably be determined in a different manner. First of all, the Tribunal takes note of Dr. Drury’s statement that it might have taken six or even 12 months of pumping before the specific yield would be found. Dr. Dury also testified that “[t]he 21-day pump test is an extraordinary event” and that he had “never carried out a 21-day pump test in all [his] 45 years’ experience” but that in “at least 95, 97 percent of [his] experience, one to three days’ pumping is what it carried out” with one exception where a 10-day pump test had been carried out at the request of the water authority. He emphasized that “[y]ou don’t pump 50 years to prove you have a water supply for a 50-year mine.”⁹⁶⁵

789. Mr. Mayer also testified that in his professional opinion, “21 days is an unusually long time to perform a pumpout test, much longer than is required to determine permeability and storage properties of the aquifer” and that he had “never participated in a pump-out test that lasted a full 21 days. Typically, these tests last three or four days or up to a week at most.”⁹⁶⁶

790. By contrast, Mr. Neville expressed the opinion that the data collected during the 21-day pump test demonstrated “only that three wells within the study area can be pumped for 21 days at a cumulative rate of 70 L/s.”⁹⁶⁷ Apart from the disagreement as to whether 70 l/s was the correct figure even though the pumping rates at the three wells were 40 l/s, 40 l/s and 30 l/s, respectively,⁹⁶⁸ the Tribunal is not convinced by Mr. Neville’s apparent argument that the test was not able to demonstrate anything more than the amount and rate actually pumped during the test. As pointed out by Dr. Drury, the requirement cannot be that a test would have the same duration as the life of the mine. In addition, neither Respondent nor Mr. Neville disputed Dr. Drury and Mr. Mayer’s opinion that a 21-day test was considerably longer than the usual duration of pump-out tests and thus exceeded industry standards. While Respondent pointed to the undisputed fact that the amount of water pumped during the test was much lower than the amount to be pumped over the life of the mine and alleged that “[g]iven these differences, TCC could not possibly have predicted the aquifers’ viability after such a cursory test,”⁹⁶⁹ neither Respondent nor Mr.

⁹⁶⁴ Transcript Hearing on Quantum (Day 5), p. 1441 lines 9-22.

⁹⁶⁵ Transcript Hearing on Quantum (Day 5), p. 1343 lines 3-18.

⁹⁶⁶ Mayer, ¶ 88.

⁹⁶⁷ Neville, p. 3.

⁹⁶⁸ Cf. Transcript Hearing on Quantum (Day 6), pp. 1582-1583.

⁹⁶⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 137.

Neville made any statement as to the length they would have considered appropriate for the test let alone provide any supporting authority for such an opinion.

791. Against this background, the Tribunal is not convinced that a buyer would have considered the 21-day pump-out test carried out at the Fan Sediments insufficient and/or that it would have agreed with Mr. Neville's opinion that Mr. Jones' predictions of the long-term drawdown were "*necessarily speculative*" because the specific yield was not determined during the test.
792. Consequently, the remaining question for the Tribunal to address is the dispute between Mr. Jones and Mr. Neville as to the appropriate specific yield to be used for the material in the Fan Sediments, which undisputedly affects the expected drawdown across the Afghan border and therefore could have resulted in additional costs for the project.
793. In his expert report, Mr. Neville criticized Mr. Jones for having applied a specific yield of 0.15 in the groundwater model he created in 2009. Mr. Neville expressed the opinion that "[t]he assumed value of specific yield, 0.15, is representative of coarse-grained materials, whereas the sediments that will be drained are clayey. A value of the specific yield that is smaller, on the order of 0.02, should have been assigned to the Fan Sediments." According to Mr. Neville, the assumption of a 0.15 specific yield led to an underprediction of the potential effects of pumping, specifically of the drawdown cone which would be deeper and "*significantly broader*" when using a 0.02 specific yield.⁹⁷⁰
794. Mr. Neville explained that values of the specific yield vary from almost zero to 0.50, with values of 0.2 to 0.25 being typical for coarse-grained sands and gravel and values "*on the order of 0.02*" for clays and other fine-grained materials. In support of his opinion that the "*relatively small value*" of 0.02 should have been used for the Fan Sediments, Mr. Neville presented the following tables:⁹⁷¹

⁹⁷⁰ Neville, p. 3.

⁹⁷¹ Neville, pp. 57-58.

SELECTED VALUES OF POROSITY, SPECIFIC YIELD,
AND SPECIFIC RETENTION

[Values in percent by volume]

Material	Porosity	Specific yield	Specific retention
Soil -----	55	40	15
Clay -----	50	2	48
Sand -----	25	22	3
Gravel -----	20	19	1
Limestone -----	20	18	2
Sandstone (semiconsolidated)	11	6	5
Granite -----	.1	.09	.01
Basalt (young) -----	11	8	3

Source: Heath (1983; page 9)

Texture	Average specific yield	Coefficient of variation (%)	Minimum specific yield	Maximum specific yield	Number of determinations
Clay	0.02	59	0.0	0.05	15
Silt	0.08	60	0.03	0.19	16
Sandy clay	0.07	44	0.03	0.12	12
Fine sand	0.21	32	0.10	0.28	17
Medium sand	0.26	18	0.15	0.32	17
Coarse sand	0.27	18	0.20	0.35	17
Gravelly sand	0.25	21	0.20	0.35	15
Fine gravel	0.25	18	0.21	0.35	17
Medium gravel	0.23	14	0.13	0.26	14
Coarse gravel	0.22	20	0.12	0.26	13

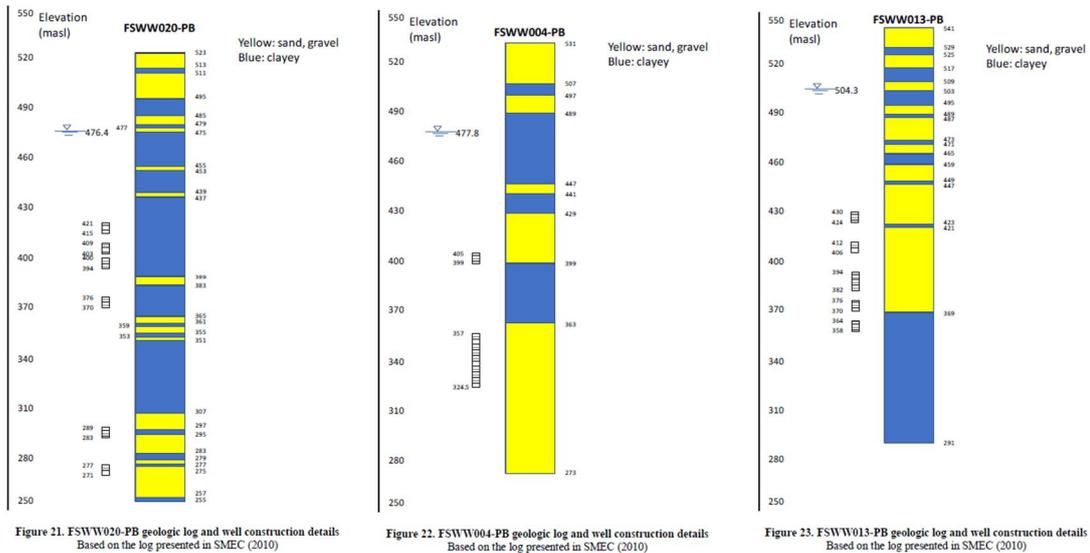
Source: Johnson (1967), reproduced in Healy and Cook (2002; page 91)

Material	Specific Yield in [l]	Reference
Clay	0.01 to 0.18	A
Gravel, fine	0.13 to 0.40	A
Gravel, medium	0.17 to 0.44	A
Gravel, coarse	0.18 to 0.43	A
Limestone	0.00 to 0.36	A
Loess	0.14 to 0.22	A
Sand, fine	0.01 to 0.46	A
Sand, medium	0.16 to 0.46	A
Sand, coarse	0.18 to 0.43	A
Sand, Eolian	0.32 to 0.47	A
Sandstone, fine	0.02 to 0.40	A
Sandstone, medium	0.12 to 0.41	A
Schist	0.22 to 0.33	A
Schist, weathered	0.06 to 0.21	B
Silt	0.01 to 0.39	A
Siltstone	0.01 to 0.33	A
Tuff	0.02 to 0.47	A

Source: Spitz and Moreno (1996; page 345)

795. Based on the borehole log and well completion details for the three production wells tested included in the SMEC 2010 report, Mr. Neville further presented an illustration of the materials found, with yellow designating the coarse-grained materials (sand, gravel), which he considers to be represented by the value of 0.15 assumed by Mr. Jones, and blue

designating the fine-grained materials (clay, clayey sand/gravel/silt), which represented 64%, 39% ad 45%, respectively, of the materials found in the three production wells:⁹⁷²



796. Mr. Neville further pointed out that the water table, which controls drainage of the sediments, is located within primarily clayey sediments at all three wells. He also refers to “[d]ata presented in the literature [which] indicate that even a relatively small amount of clay is insufficient to reduce the hydraulic conductivity of coarse-grained materials by orders-of-magnitude so that they act as barriers to groundwater flow.” He therefore concludes that a smaller specific yield, “on the order of 0.02, should have been assigned for the Fan Sediments.”⁹⁷³

797. In his further analysis, Mr. Neville examined the effects of 56 years of pumping at 730l/s (Initial Mine Development) as well as of 5 years pumping at 730 l/s followed by 30 years of pumping at 1,440l/s (Expansion), assuming a specific yield of 0.15, 0.02 and 0.05, respectively. Using a value of 0.15, the results of Mr. Neville’s analysis “approximate closely the Shomaker results” in both scenarios. Using a value of 0.02, the drawdowns “are significantly larger and extend well beyond the Shomaker predictions.” Specifically, the predictions made by Mr. Neville of the drawdowns extending into Afghanistan in the different scenarios he analyzed can be summarized as follows:⁹⁷⁴

Scenarios	Specific yield		
	0.15	0.02	0.05
730 l/s, 56 years	3-m drawdown:	3-m drawdown:	3-m drawdown:

⁹⁷² Neville, pp. 59-62.

⁹⁷³ Neville, pp. 59, 63.

⁹⁷⁴ Neville, pp. 65, 69.

Scenarios	Specific yield		
	0.15	0.02	0.05
	ca. 5km into Afghanistan	> 25km into Afghanistan	ca. 10km into Afghanistan
730 l/s, 5 years + 1,440 l/s, 30 years	3-m drawdown: ca. 5km into Afghanistan	3-m drawdown: ca. 25km into Afghanistan 10-m drawdown: ca. 5km into Afghanistan	3-m drawdown: ca. 15 km into Afghanistan

798. As Mr. Neville's report was submitted only together with Respondent's Rejoinder on Quantum, Claimant's experts did not have the opportunity to address his analysis in their expert reports. In his direct examination at the Hearing on Quantum, Dr. Drury was presented with Appendix B to the SMEC 2010 report, on which Mr. Neville had based his illustration of the composition of the three production wells.⁹⁷⁵ Dr. Drury explained why, in his opinion, the samples collected and reflected in the lithology log presented in Appendix B do "*not necessarily represent what actually is in that location*" and that he "*would not use the lithological description to apply any sort of hydrogeological aquifer characteristic.*"⁹⁷⁶ When presented with Mr. Neville's illustration, Dr. Drury first noted that "*it's a very generalized system because what Mr. Neville has done is, yellow is sand and gravel, based on lithological logs, and anything which is mentioned as fine silty or clayey is blue.*" He further pointed to the screen locations in the bore which pumped 38 liters a second and explained that "*[w]e don't get that from clay material. 38 liters a second for 21 days. So, there's obviously something wrong between what's shown in this column and the screens. And this is typical of lithology logs. ... Lithology logs don't usually express what actually is down there.*"⁹⁷⁷

799. Dr. Drury therefore disagreed with Mr. Neville's method for determining the composition of the sediments and stated: "*What you should use is the gamma log, and the gamma log is there in the geophysical--gamma measures the radiation of the sediment. Clays normally have a high gamma count because of Potassium-40, then clean sands and gravels. So, if you look at the gamma log, if it moves to the left, you're getting clean material. If it moves to the right, you're getting silty clay material.*"⁹⁷⁸ Dr. Drury then pointed to an example where the gamma log showed very low radiation that "*actually is*

⁹⁷⁵ Exhibit CE-1309.

⁹⁷⁶ Transcript Hearing on Quantum (Day 5), p. 1348 line 12 to p. 1352 line 6.

⁹⁷⁷ Transcript Hearing on Quantum (Day 5), p. 1352 line 9 to p. 1353 line 7.

⁹⁷⁸ Transcript Hearing on Quantum (Day 5), p. 1353 lines 8-18.

clean sands and gravels, even though the lithological log says silty clay and clay.” Dr. Drury also pointed to a deviation to the other side and reiterated that “the gamma log is what we always use in assessing the location of screens, not the lithological log” because “it’s a continuous measurement of in situ--because the probe is lowered down the hole 2 or 3 meters per minute. So, you get a continuous log of radiation. So, you can actually see where the clays are, where the sands are by the lithological log. And it’s uncontaminated, in that it goes down the sidewall and measures what is there.”⁹⁷⁹

800. Mr. Neville confirmed at the Hearing on Quantum that he had based his analysis on a careful review of the SMEC logs. In response to the question whether it would have been an advantage to be on site and look at the sediments himself, he testified that while this was generally desirable and good practice, it would not have been an advantage “*if they are drilling with mud, [because] then it’s really hard to tell what is coming out when. So, you need not an amateur like me, you need a real professional geologist to be doing the characterization, and I assume that the SMEC logs were done by qualified professional geologists. So, if the professional geologists says that it’s clayey, then I believe it is clayey. On the other hand, if I were standing at the drill rig and they are drilling with mud and stuff is coming up into the mud pit, then probably I wouldn’t be the best judge of what’s there.*”⁹⁸⁰ Mr. Neville did not confirm, however, that drilling with mud would affect the description in the bore log because, in his opinion, “[a] professional geologist would know exactly what they were drilling through, and that’s what it looks like they’ve identified very carefully on these drilling logs.”⁹⁸¹

801. Mr. Neville further expressed a different opinion on the relevance of gamma rays, which he described as “*a very general indicator of a clay content*” which he would not use to design well screens for which he would rather use “*grain size measurements taken on-site.*” Mr. Neville did not agree that gamma rays would tell the “*exact*” composition of sediments; he acknowledged that once the device was calibrated, he “*would take, in a general sense, what the gamma logs are suggesting, but [he] wouldn’t take them too far.*”⁹⁸² At the same time, Mr. Neville testified that he was using gamma rays “[a]ll the time,” considering it “*a very good technique in dolostone rocks that we work with in Southern Ontario for distinguishing between the limestone rocks and shales*” because of the “*enormous*” contrast showing the change in material properties. Mr. Neville further testified that he was not an expert in defining the contrast between sandier material and clayey material but that, when confronted with the gamma logs for the borehole at the

⁹⁷⁹ Transcript Hearing on Quantum (Day 5), p. 1354 lines 3-19.

⁹⁸⁰ Transcript Hearing on Quantum (Day 6), p. 1619 line 22 to p. 1620 line 21.

⁹⁸¹ Transcript Hearing on Quantum (Day 6), p. 1625 lines 10-18.

⁹⁸² Transcript Hearing on Quantum (Day 6), p. 1625 line 22 to p. 1627 line 14.

Fan Sediments, he was missing a “*sharp contrast*” but only saw a “*random signal*” or a “*random variation over the length of the borehole.*”⁹⁸³

802. Mr. Jones testified at the Hearing on Quantum that the specific yield of 0.15 he used is a “*standard literature value*” that he selected based on “[his] *examination of the cuttings in the field.*” He stated: “*I saw plenty of core screen particles. It looks to be normal sediments to me that have a normal specific yield.*” Mr. Jones clarified that he assumed the 0.15 value based on: “*My experience, my consultation of text books, my examination of the gamma logs, examination of the core. And my experience I have is different than the experience of field hydrogeologists in that I have studied in my models, I watched specific yields increase in the time scale that you observe it on.*”⁹⁸⁴ As to Mr. Neville’s emphasis on the presence of clay, Mr. Jones confirmed that “[t]here is clay in the sediments. And this idea of 2 percent specific yield is true of clay in a short-term test. That’s the water that’s initially released when the clay is depressurized, but then over time, the clay continues to be compressed and yields more water. And over a period of years, it will yield an order of magnitude more water than 2 percent.”⁹⁸⁵

803. Based on the evidence presented by the experts, the Tribunal is not convinced of the accuracy of Mr. Neville’s calculation regarding the amount of clayey material contained in the Fan Sediments and of his opinion that the material at the water table, which he considered to be particularly relevant for determining the specific yield, was primarily clayey. Mr. Neville based his analysis on the information in the lithology log contained in Annex B to the SMEC 2010 report. Following Dr. Drury’s explanation why the lithology log did not necessary represent the material actually contained at a specific depth of the borehole, Mr. Neville confirmed that when drilling with mud, it might be difficult to tell from which depth material coming out actually stemmed, and that he would not be able to make that determination even if he had been on site and therefore relied on the “*professional geologist*” for that purpose. As Dr. Drury was the responsible geologist on site, the Tribunal considers his testimony that one should not rely on the lithology log but rather on the gamma logs particularly relevant. While Mr. Neville testified that he would not rely on gamma logs for the purposes of distinguishing between clayey and sand/gravel materials, he confirmed that he was using gamma logs for distinguishing other materials with a sharp contrast in their gamma radiation. In addition, the Tribunal notes that Mr. Jones, who actually selected the specific yield, testified that he had relied not only on gamma logs but also on his examination of the core screen particles as well as on his 29-year experience of creating and studying groundwater models showing that specific yields increase over time.

⁹⁸³ Transcript Hearing on Quantum (Day 6), p. 1628 line 2 to p. 1632 line 19.

⁹⁸⁴ Transcript Hearing on Quantum (Day 5), p. 1458 line 5 to p. 1459 line 11.

⁹⁸⁵ Transcript Hearing on Quantum (Day 5), p. 1442 line 17 to p. 1443 line 2.

804. In any event, there appears to be common ground to the extent that the sediments are neither composed entirely of clay or clayey material nor that they are entirely composed of coarse-grained material. Nevertheless, Mr. Neville considered it appropriate to apply a specific yield that he considered to be representative of clay, *i.e.*, as if the sediments were 100% composed of clay. Mr. Jones, on the other hand, did not simply apply a specific yield for coarse-grained materials as suggested by Mr. Neville. According to the authorities relied on by Mr. Neville, sand and gravel are reported to have a specific yield between 0.20 and 0.25 (Heath), 0.21 and 0.27 (Johnson), or 0.01 to 0.47 (Spitz and Moreno). The Tribunal also notes that the most recent source which, according to Mr. Neville, is based on long-term drainage experiments, reports for clay a specific yield in the range of 0.01 and 0.18. Consequently, and regardless of the specific composition of the material in the Fan Sediments, the Tribunal is not convinced by Mr. Neville's opinion that a specific yield of 0.02 should have been applied to predict the effects of long-term pumping at the Fan Sediments.
805. In this regard, the Tribunal also takes note of Mr. Jones' explanation that the specific yield of clay would increase in the long term because the clay would continue to be depressed and actually yield more water over time. As pointed out by Claimant, this would also be consistent with the range of 0.01 to 0.18 reported for clay based on long-term drainage experiments. Mr. Neville testified that the long-term effect was not known because it could not be derived from the 21-day test and “[e]verything else is speculation.” He confirmed that it was a “*reasonable assumption*” that clay would drain during 56 years of pumping when the water level sinks beneath it; he added that he therefore decided to follow Mr. Jones' model, maintaining, however, what he considered to a “*more representative value of the specific yield.*”⁹⁸⁶
806. Mr. Jones disagreed with the criticism expressed by Mr. Neville: “*We see ample core screen sediments in here. Mr. Neville mentioned some long-term laboratory column experiments, but actual sediments in the ground are under great pressure, and they behave very differently. So the core screen settlements will yield, the specific yield is something like we assumed in the short-term. The fine-grained, the clay sediments will yield them only over long periods of time, but all of the sediments contain this quantity of water.*”⁹⁸⁷
807. The Tribunal notes that there is disagreement between the experts as to whether it would be reasonable to expect that the specific yield of clay increases in the long term. However, on balance, *i.e.*, also taking into account the experts' testimony on the amount of clayey material contained in the Fan Sediments and the authorities provided by Mr. Neville

⁹⁸⁶ Transcript Hearing on Quantum (Day 6), p. 1636 line 10 to p. 1637 line 19.

⁹⁸⁷ Transcript Hearing on Quantum (Day 6), p. 1705 line 17 to p. 1706 line 5.

regarding the specific yield of the different materials contained in the Fan Sediments, the Tribunal is not convinced that Mr. Jones made an unreasonable assumption regarding the specific yield or that a buyer would have considered that assumption overoptimistic. In this regard, the Tribunal also notes that while Mr. Neville repeatedly emphasized that the assumption made by Mr. Jones was not based on the results of the 21-day test because the aquifer had remained confined during this test, Mr. Neville also made clear that he did not consider it appropriate to assume that the aquifer would remain confined in the long term and be limited to the much lower confined storage coefficient yielded by the 21-day test. Accordingly, Mr. Neville's own assumption was likewise not based on these test results but on a value derived from literature and his review of the borehole logs. Given the detailed explanations provided by Dr. Drury and Mr. Jones as to the basis on which the specific yield could be determined, the Tribunal concludes that the assumption made by Mr. Jones was reasonable under the circumstances.

iv. Whether Claimant Adequately Predicted and Accounted for the Potential Effects of Long-Term Pumping at the Fan Sediments

808. On that basis, the remaining question for the Tribunal to address is whether Claimant adequately predicted the effects of long-term pumping at the Fan Sediments and whether it appropriately accounted for potential risks associated with those effects. In his expert report, Mr. Neville confirmed that when applying the specific yield selected by Mr. Jones, the results of his analysis "*approximate closely the Shomaker results*" both for the Initial Mine Development scenario and the Expansion scenario. In both scenarios, the analyses conducted by both experts thus predicted that the area in which a drawdown caused by the pumping for the Reko Diq project would exceed 3 meters would extend about 5 kilometers across the Afghan border.⁹⁸⁸
809. Mr. Neville illustrated the proximity of the results reached by the two experts as follows:⁹⁸⁹

⁹⁸⁸ Neville, pp. 65, 69.

⁹⁸⁹ Neville, pp. 66, 70.

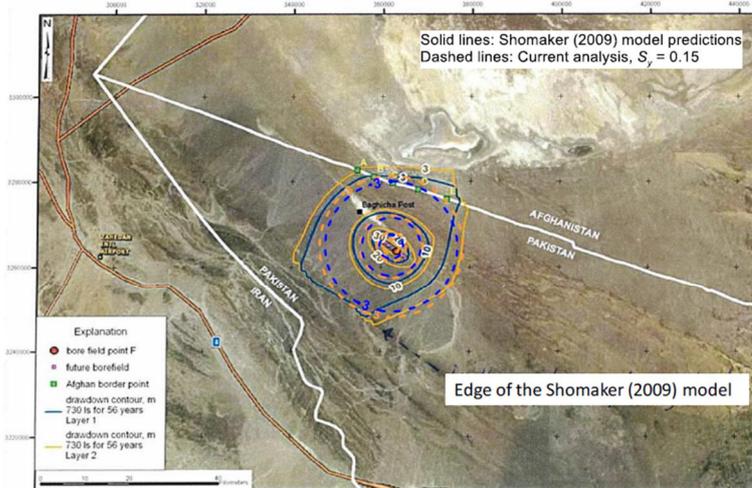


Figure 24. Predicted drawdowns after 56 years of pumping at 730 L/s
 Specific yield assumed in the Shomaker (2009) model, $S_y = 0.15$
 Simulation results superimposed on SNC-LAVALIN (2010b; Figure 8.3)

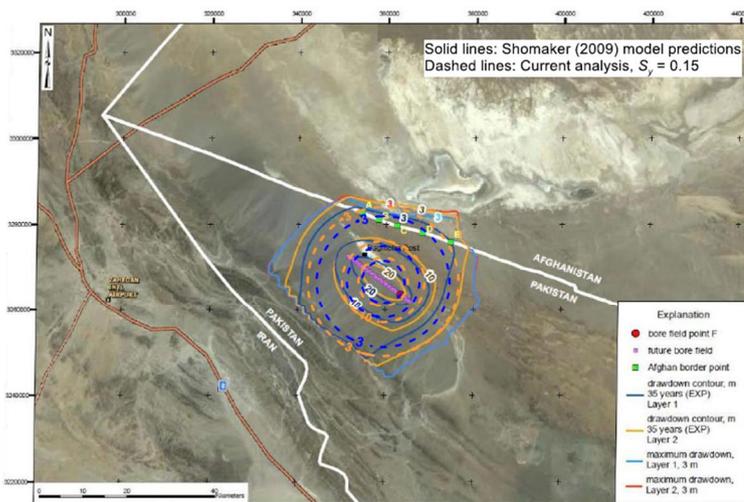


Figure 27. Predicted drawdowns after 5 years of pumping at 730 L/s followed by pumping for 30 years at 1,440 L/s
 Specific yield assumed in the Shomaker (2009) model, $S_y = 0.15$
 Simulation results superimposed on SNC-LAVALIN (2010a; Figure 8.3)

810. Respondent argues that given that the drawdown would have extended into Afghanistan, Pakistan would have been required under customary international law to notify Afghanistan in advance of the potential transboundary effects and further claims that during potential subsequent discussions between the two countries, the project could not have been developed. In support of this argument, Respondent relies on its expert Dr. Nanni who expressed the opinion that while Pakistan is not party to the UN Watercourses Convention, it would have been obliged under customary international water law to observe the three “cornerstone principles” codified in the UN Watercourses Convention, *i.e.*, equitable and reasonable utilization, obligation not to cause significant harm and general obligation to cooperate, and in order to ensure observance of these principles to provide Afghanistan “with timely notification of any planned development of the size of

the Reko Diq project before the development is authorized, together with all the documentation relating to the development, including an environmental impact assessment.” Dr. Nanni further stated that if objections were raised, negotiations would follow which “would likely be lengthy as the issues involved are often complex and sometimes of a political nature.”⁹⁹⁰

811. Claimant disputes that Pakistan is bound under customary international law to notify Afghanistan and further disputes that such a notification would have had to occur at the beginning of the project and that negotiations would have delayed the project.
812. In support of their opinion that the principles and the obligation to notify under the UN Watercourses Convention are binding on Pakistan under international law, Respondent and Dr. Nanni relied on the ILC Rapporteur on the Law of the non-navigational uses of international watercourses, who considered it “*reasonable to conclude on the basis of state practice that at least three of the general principles embodied in the convention correspond to customary norms. These are the obligations to use an international watercourse in an equitable and reasonable manner, to use such a watercourse in such a way as not to cause significant harm to other riparian states, and to notify potentially affected riparian states of planned measures on an international watercourse.*”⁹⁹¹
813. As pointed out by the ILC Rapporteur, the basis for his conclusion was an examination of State practice. While Respondent and Dr. Nanni point to the existence of the Indus Waters Treaty concluded between Pakistan and India in 1960 as evidence of Pakistan’s commitment to these principles, Claimant refers to the absence of evidence that Pakistan has ever provided Afghanistan with a notification regarding the contemplated use of shared watercourses, including in the context of the Kabul river system. Claimant pointed Dr. Nanni to two sections of a report on the “*Water management of the Kabul River Basin in Afghanistan and Pakistan,*” which Dr. Nanni had provided with her expert report. In the regional overview, it is stated:

“Pakistan has data on the Kabul River, but not of tributaries that flow into the autonomous region of FATA. It does not share data on the Kabul River with any ministries in Afghanistan. Provincial governments in border areas do not exchange hydrological data or meet with their trans-boundary counterparts to discuss water-related issues, according to our investigations in Paktia, Khost and Kunar provinces in Afghanistan and Baluchistan and Khyber Pakhtunkhwa in Pakistan.”⁹⁹²

814. In the section of precedents for collaboration, it is further stated:

⁹⁹⁰ Nanni, ¶¶ 13, 16-17, 57.

⁹⁹¹ Exhibit NAN-7, p. 260.

⁹⁹² Exhibit NAN-18, p. 5.

“Afghanistan’s recent parallel agreements and discussions with neighbouring states are worth noting because the absence of a treaty with Pakistan is often attributed to Afghanistan’s lack of internal capacity. The failure to collaborate in the last decade can equally be seen as a collateral effect of bad relations between the two countries.

...

Despite declarations made by both Afghan and Pakistani leaders at the Islamabad Conference of 2009 to strengthen relations, collaboration has not materialised in the water sector. Engineers on both sides of the Af-Pak border confirm they do not share any hydrological data with their riparian partner, nor are there any joint flood-protection strategies or joint dam feasibility studies.”⁹⁹³

815. When confronted with these statements, Dr. Nanni maintained that to her understanding, *“they are trying to come together with Afghanistan parties to start discussions on the possibility to agree on the Kabul.”* In response to the question whether she agreed that the practice of Pakistan and Afghanistan showed that they do not consider that they have a customary law obligation to notify each other and to cooperate, Dr. Nanni further stated:

“I’m not sure it’s universal--it can be stated like this: The two countries are now--specifically, Pakistan is experiencing a difficult period. There is animosity between the two countries that I think I mentioned in my Report. There is contention created by the Durand Line established by the British.

So, there is this type of relationship. But I believe that, eventually, this all will end up with fruitful cooperation and an agreement.”⁹⁹⁴

816. Dr. Nanni also stated that she was not aware of Pakistan having provided a notification for use of a groundwater source to Afghanistan or to Iran with which Pakistan shares the Upper Tahlab aquifer being used to supply the Saindak mine.⁹⁹⁵ The Tribunal is aware that Dr. Nanni also noted that this factual question had not been within the scope of her current research. However, taking into account the apparent lack of cooperation between Pakistan and Afghanistan with regard to the Kabul river basin and in the absence of any evidence that Pakistan considers itself bound by customary international law to provide Afghanistan or Iran with notification of the contemplated use of a shared water source, the Tribunal is not convinced that Pakistan would have considered itself under an obligation to provide such notification with regard to Claimant’s contemplated use of the Fan Sediments.

817. In this regard, the Tribunal also notes that as Dr. Nanni confirmed during the Hearing on Quantum, the examples of agreements on groundwater sources she had provided

⁹⁹³ Exhibit NAN-18, p. 14.

⁹⁹⁴ Transcript Hearing on Quantum (Day 6), p. 1682 line 1 to p. 1687 line 17.

⁹⁹⁵ Transcript Hearing on Quantum (Day 6), p. 1687 line 18 to p. 1688 line 18.

concerned very large aquifer systems with a large number of users.⁹⁹⁶ By contrast, the Fan Sediments had no users because, as Claimant submitted and Respondent did not dispute, the water was not potable and not suitable for irrigation or agricultural use. According to Mr. Mayer, this aspect formed an important consideration for Claimant's decision to develop the Fan Sediments as its primary water source:

*"I made this decision after consultation with the experts conducting the water studies, in-house Barrick experts, the permitting team, project team members, and management. This decision was supported by the following considerations: 1) the indication of sufficient water supply from the pre-feasibility studies; 2) the absence of existing groundwater users from the Fan Sediments aquifer in Pakistan; 3) the depth of the groundwater in the area targeted for development making physical access to Fan Sediments aquifer water difficult; 4) the poor quality of the groundwater, which is not suitable for human consumption, livestock, or agriculture; and 5) the suitability of the water-quality for use in the beneficiation process for the mine."*⁹⁹⁷

818. As an additional consideration, the Tribunal considers it relevant that, in the Initial Mine Development scenario, Mr. Jones' groundwater model predicted the first drawdown at the Afghan border to occur after 30 years of pumping and the maximum drawdown of about five meters to occur 17 years after the end of mining.⁹⁹⁸ In the Expansion scenario, the model predicted the maximum drawdown at the Afghan border to occur 20 years after the end of mining; Mr. Jones did not state at what point in time the first drawdown at the Afghan border would occur.⁹⁹⁹
819. Respondent maintains that Claimant "*would have caused transboundary effects in the short term,*" i.e., already during the three-year construction phase, and relies on Mr. Neville's testimony that "[a]fter 21 days, the aquifer responded as if it were still confined, so the responses would actually be observed relatively quickly."¹⁰⁰⁰ However, as noted above, Mr. Neville did not testify that he actually expected the aquifer to remain confined in the long term but rather followed Mr. Jones' assumption that it would be unconfined and only disagreed with the specific yield assumed by Mr. Jones. Mr. Neville further specifically stated that he did not investigate the "*question of timing*" but rather "*looked at the long-term results,*" i.e., at the "*end of operations.*" When asked whether he could give an opinion on the timing, he made the statement quoted by Respondent "*if I limited*

⁹⁹⁶ Transcript Hearing on Quantum (Day 6), p. 1688 line 19 to p. 1690 line 22.

⁹⁹⁷ Mayer, ¶ 85.

⁹⁹⁸ Jones Presentation, p. 7; **Exhibit RE-576-24.04**, Appendix A, pp. A-1 to A-2.

⁹⁹⁹ Jones, ¶ 87; **Exhibit RE-576-24.04**, p. B-1.

¹⁰⁰⁰ Respondent's Post-Hearing Brief on Quantum, ¶ 157 and note 352, *quoting from* Transcript Hearing on Quantum (Day 6), p. 1708 lines 4-10.

myself to just that data” and otherwise noted that “*beyond the 21 days, we’re all speculating.*”¹⁰⁰¹

820. On that basis, the Tribunal considers it reasonable to conclude that any drawdown into Afghanistan would have occurred only several years or even decades into the future. The Tribunal has taken note of Dr. Nanni’s testimony that she would still provide a notification to a neighboring State even if it was known that the effects would occur only 30 years into the future in order to place “*the other countries in the position to opt for an exit strategy.*”¹⁰⁰² While the Tribunal appreciates Dr. Nanni’s opinion that this is a “*very important issue,*” the Tribunal does not find it convincing that notice would have to be given decades in advance before it was known whether and to what extent any effect would occur. In particular, given Dr. Nanni’s explanation that the notification should include information regarding the possible adverse effects, it does not appear plausible to the Tribunal that notice should be given at such an early point in time and before it was known, *e.g.*, whether and, if so, when the expansion scenario would materialize.
821. Finally, the Tribunal also notes that Claimant was considering the use of mitigation measures in order to avoid or mitigate any impact across the Afghan border. As Dr. Drury explained during his direct examination, the drawdown could have been mitigated by a “*mythical aquifer injection, which is, basically, you actually engineer the aquifer by injecting water into the aqua system in a location where it is sensitive. So, if you’ve got water levels drawing down and you don’t want the water level to extend beyond a certain point, you can actually inject water in bores, across a line. And so, the bores--so the water level on the outside of the injection is still steady state, but on the inside, drawdown still occurs.*” Dr. Drury noted that SMEC had recommended this mitigation measure in its 2009 report and “*that trial has been carried out.*” According to Dr. Drury, it is a “*very common*” measure which he had also used for Barrick Coal in Bangladesh and Oakland’ coal mine.¹⁰⁰³
822. Mr. Mayer stated, in response to the question whether he looked into the costs and feasibility of the option to use aquifer injection and its suitability to avoid the issue of entering into the Afghanistan aquifer: “*Yeah. It is something that, against, it was proposed as a possible mitigation measure, if required. And so the process would be the Feasibility Study’s done, we have the project definition, we have our cones of depression. Those cones go to the environmental and permitting group, and they would come back with a recommendation that we would need to find a mitigation strategy. But as far as is it feasible? It certainly is, and it would require ... injecting water along a line or, you know,*

¹⁰⁰¹ Transcript Hearing on Quantum (Day 6), p. 1706 line 18 to p. 1708 line 21.

¹⁰⁰² Transcript Hearing on Quantum (Day 6), p. 1662 lines 4-20.

¹⁰⁰³ Transcript Hearing on Quantum (Day 5), p. 1355 line 11 to p. 1357 line 14.

*even infiltrating water along a series of trenches to basically just create a little mound of water.”*¹⁰⁰⁴ Mr. Mayer further confirmed that this option was still under consideration at the time the SMEC feasibility report was completed. He added that “*after this study we would have gone forward with the recommendations. I think there were other recommendations outside of that. I think there was to drill some deeper holes and other things that SMEC had proposed, and those things would have taken place in that next phase of work we had planned, which was the ... EPCM phase.*”¹⁰⁰⁵ Mr. Mayer stated that he did not have a cost estimate for this solution but stated that “*it would not be a large cost, you know, in comparison to the ... cost of the Project.*” Referring to the estimate for development of the Fan Sediments of USD 95 million, he stated that they had “*contingency within the estimate that would cover off, you know, this.*”¹⁰⁰⁶ Mr. Mayer then explained:

“What generally happens is you agree to monitoring and generally like triggers. ... You develop the groundwater model and--with the information that's available, and we had quite a bit of information here with the testing--and that model makes projections and it--most likely a system, a trigger and mitigation system would have been developed based on the model projections.

And then monitoring would be put in place and we would actually monitor. Not based on a model, but actually monitoring levels. We would monitor levels, and the levels got to a point where the agreed-upon triggers were, then it usually goes: Increase the frequency of monitoring, develop mitigations system, implement mitigation system, generally, like three triggers such as that. That is typically how it is done.

... And the last bit of that is that we would update the model like probably early on every quarter, take the information that we collect from the pumping and look at it, update the model and, you know, depending on if it's on or off, if it's doing pretty good, you know, we'd decrease the frequency of that.

So, yeah, and typically ... what would happen, again, you know, is that, if the ... permitting side never got to the point of recommending that the cross-border issue required mitigation, okay.

If they--and I'm not saying is that that was a final decision or anything. I just think that things were cut short before that decision was arrived at. But if it was an issue, then the trigger system would be developed and the mitigation issues would have been developed, you know. And I'd put it this way, you know.

As far as costs go, it would not be a large cost, you know, and it wouldn't be--it would be a small amount of water that we'd have to inject. But

¹⁰⁰⁴ Transcript Hearing on Quantum (Day 5), p. 1521 line 11 to p. 1522 line 2.

¹⁰⁰⁵ Transcript Hearing on Quantum (Day 5), p. 1522 line 12 to p. 1523 line 4.

¹⁰⁰⁶ Transcript Hearing on Quantum (Day 5), p. 1523 lines 8-17.

*comparatively of having to go off to Tahlab or Patangaz or Hamun or the ocean, it would be economical, yeah.”*¹⁰⁰⁷

823. Mr. Neville testified that while he did not consider mitigation measures in his expert report, there were “*a few big issues*” regarding aquifer injection, such as where the water would come from and how much the water would have to be treated before reinjecting it. He stated that “*there’s a long history of unsuccessful reinjections systems*” because “*wells clog usually very rapidly*” and “*very elaborate water treatment*” is needed. He noted that “*these systems require a lot of care and feeding*” in that they have to be monitored carefully over the long term and concluded that “*when you look in the literature, you see as many successful implementations of groundwater reinjections as you don’t.*”¹⁰⁰⁸
824. Dr. Drury confirmed that there is a “*maintenance issue*” but maintained that there are “*some very, very successful aquifer injection systems*” and expressed the opinion that “[t]he ones which fail are the ones which are normally poorly run.”¹⁰⁰⁹ Dr. Drury further testified that “[b]ased on experience elsewhere,” he assumed that the cost for an injection solution would be “*in the \$10 to \$20 million range*” but noted that “*it has not been costed*” and “*it’s not inexpensive. And there’s also a long-term monitoring and maintenance program, so you need people employed to carry out the maintenance program as well.*”¹⁰¹⁰
825. Based on the testimony of the experts, the Tribunal considers it established that aquifer injection was considered as a potential mitigation measure at the time, which could have been employed if and when it turned out that there would be a considerable impact on Afghanistan territory. In the Tribunal’s view, this supports the conclusion that a potential drawdown into Afghanistan would not have prevented Claimant from using water from the Fan Sediments. On the other hand, Mr. Mayer and Dr. Drury confirmed that no cost estimate was included for this potential mitigation measure. While Mr. Mayer considered that the cost would have been included in the cost estimate of USD 95 million for the development of the Fan Sediments, the Tribunal is not entirely convinced by this testimony, given that Dr. Drury stated that the solution could have increased costs by USD 10-20 million and there would have been additional cost for the maintenance program. It should be noted, however, that the 11% contingency on the overall capital costs included an 11.75% contingency regarding off site fresh water, *i.e.*, an amount of USD 11.3 million.¹⁰¹¹

¹⁰⁰⁷ Transcript Hearing on Quantum (Day 5), p. 1524 line 15 to p. 1526 line 14.

¹⁰⁰⁸ Transcript Hearing on Quantum (Day 6), p. 1710 line 14 to p. 1712 line 19.

¹⁰⁰⁹ Transcript Hearing on Quantum (Day 6), p. 1713 line 12 to p. 1714 line 8.

¹⁰¹⁰ Transcript Hearing on Quantum (Day 6), p. 1720 lines 3-10.

¹⁰¹¹ **Exhibit RE-576-23**, Table 23.20.

826. As noted above, the residual risk register included the risk that a “*lender requires the project to engage in cross border consultations with Afghanistan due to the Fan Sediments water supply.*”¹⁰¹² However, this risk was assigned only an opex impact but no capex impact and apparently did not include the possibility that Claimant might have to install a monitoring and/or mitigation system.
827. In addition, Claimant identified the following risks to which it had not assigned an capex or opex estimate: (i) “*Cross border consultation & mitigation in Afghanistan caused by the use of water sources resulting in schedule delay and/or community/government opposition or demands*”; and (ii) “*Water usage by project causes drawdowns that have impact in [Iran / Afghanistan] resulting in diplomatic challenges.*”¹⁰¹³ As for the first risk, Claimant was planning to mitigate it through a potential “*ground-truthing*” field inspection of the affected area in Afghanistan; if impacts turned out to be negligible, it would notify the relevant authorities and if they were significant, it would “*perform public consultation and develop mitigation/compensation.*” It was noted that the risk rating was “*based on reputational or regulatory consequences, not financial or operational.*”¹⁰¹⁴ Prof. Davis incorporated this risk into his model as a risk that could cause project start-up delay.¹⁰¹⁵ As for the second risk, Claimant referred to the development and implementation of a community and government relations strategy; the action step “*Confirm that water drawdowns in Afghanistan are minimal*” was marked as completed.¹⁰¹⁶ Accordingly, Prof. Davis recorded this risk as “*not material.*”¹⁰¹⁷
828. In the Tribunal’s view, this confirms that Claimant did not include the costs of having to install a monitoring and/or mitigation system because it had concluded that the predicted water drawdown in Afghanistan would be “*minimal*” and thus did not anticipate at the time that there was a significant risk of having to implement these mitigation measures. While this risk assessment may have changed in the future, the Tribunal is not convinced that, based on the information available as of the valuation date, a buyer would have reached a different conclusion and required the addition of further contingency to account for the possibility of having to mitigate drawdowns in Afghanistan.
829. Consequently, the Tribunal concludes that neither of the issues raised by Respondent would have affected the feasibility of Claimant’s plan for the supply of water to the project. While it appears to the Tribunal that Claimant has not accounted for the potential extra costs associated with having to implement an aquifer injection system to mitigate possible drawdown effects into Afghanistan, the Tribunal does not consider that this

¹⁰¹² Davis I, Workpaper 26, p. 4; **Exhibit CE-952.**

¹⁰¹³ **Exhibit CE-952.**

¹⁰¹⁴ **Exhibit CE-952.**

¹⁰¹⁵ Davis I, Workpaper 27, p. 2.

¹⁰¹⁶ **Exhibit CE-952.**

¹⁰¹⁷ Davis I, Workpaper 27, p. 4.

would have affected the value of the Reko Diq project from the perspective of a buyer in November 2011.

6. Whether Claimant Has Established That It Had a Feasible Plan for Dealing with the Security Concerns Raised by Respondent

a. Summary of Claimant's Position

830. Claimant submits that it *“fully recognized and addressed the relevant security risks, including those associated with transporting the slurry concentrate by pipeline to the port of Gwadar.”*¹⁰¹⁸
831. Claimant refers to the chapters on security and risk included in both the Feasibility Study and the Expansion Pre-Feasibility Study as well as the *“comprehensive Risk Register in which risks were catalogued, assigned a mitigation strategy, and tracked with respect to progress.”*¹⁰¹⁹ According to Claimant, the costs associated with the security plans were accounted for in the operating and capital cost estimates, with *“significant contingencies totaling more than half a billion dollars”* built into the capital expense estimates.¹⁰²⁰
832. Claimant notes that based on the documentary record and the testimony of Mr. Livesey, the Tribunal held in its Decision on Jurisdiction and Liability that *“it is plausible that not all risks can be fully assessed and quantified at such an early stage of the project and that the risk mitigation strategy evolves over time and the further development of the project. Therefore, the Tribunal sees no reason to assume a failure on the part of TCCP to adequately address security risks in the Feasibility Study.”*¹⁰²¹ In Claimant's view, Respondent is attempting to recycle the same arguments, which the Tribunal has already rejected in the liability phase.¹⁰²²
833. Claimant emphasizes that Respondent's expert Mr. Davies confirmed in his expert report that Claimant's security plan for the central facilities at Reko Diq was *“acceptable”* and that mining operations could have proceeded with a *“significant but tolerable level of risk after mitigation had been implemented.”* He further considered that the security budget for the central facilities *“appears to be appropriate”* and noted that *“[m]any of these measures are in-line with what would be expected of an operating company at this stage of the project cycle.”*¹⁰²³ Claimant also refers to its own expert Mr. Ridley, who led the

¹⁰¹⁸ Claimant's Quantum Post-Hearing Brief, ¶ 128; Claimant's Quantum Reply, ¶ 592.

¹⁰¹⁹ Claimant's Quantum Post-Hearing Brief, ¶ 132, referring to Exhibits RE-124, RE-134 and RE-136.

¹⁰²⁰ Claimant's Quantum Post-Hearing Brief, ¶ 132, referring to Exhibit CE-97, pp. 1-78, 1-80 and 1-84; Claimant's Quantum Reply, ¶¶ 593-594.

¹⁰²¹ Claimant's Quantum Reply, ¶ 595, quoting from Decision on Jurisdiction and Liability, ¶ 1253.

¹⁰²² Claimant's Quantum Reply, ¶¶ 596, 600.

¹⁰²³ Claimant's Quantum Post-Hearing Brief, ¶¶ 129-130, quoting from Davies I, pp. 4, 10, 11; Claimant's Quantum Reply, ¶¶ 597-599.

International SOS Security Risk Assessment in 2006 and, after again visiting the site and reviewing Mr. Davies' critique, concluded that "*TCC's security plan was workable, within expectations and financially viable.*"¹⁰²⁴ Claimant also emphasizes that the 2006 assessment was carried out before any mitigation measures and determined that "[d]espite the fact that Pakistan represents a significant risk to specific assets and business operations, strategic planning and supported procedures will ensure a permissible operations environment for businesses."¹⁰²⁵

834. With regard to the contemplated slurry concentrate pipeline, Claimant notes that it decided to use the pipeline based on "*extensive trade-off studies showing that a slurry pipeline would be both the safest and most economical option.*" Claimant refers to the Bankable Feasibility Report prepared by Pipeline Systems Inc. (PSI), which was based, *inter alia*, on an in-person survey of the pipeline route and expressly included security considerations in the design of the pipeline, such as that the pipeline would be entirely underground and avoid sensitive areas.¹⁰²⁶ Claimant quotes from Mr. Mayer who supervised the work carried out by PSI and concluded that "[t]he Bankable Feasibility Report exceeds what I would expect from a pipeline bankable feasibility design study, and is consistent with design studies I have approved and gone on to execute for other pipeline projects."¹⁰²⁷
835. Claimant emphasizes that Mr. Davies did not present any example of an attack on a slurry pipeline but only relied on case studies regarding oil and gas pipelines. According to Claimant, these present "*fundamentally different security risks*" as they are more vulnerable to attack than a slurry concentrate pipeline because they: (i) "*tend to be above ground, or are buried only a few inches below the surface, making them easy to locate and access along their entire length;*" (ii) "*they contain flammable materials that magnify the effect of any explosion*"; (iii) "*[r]epairs are often costly and lengthy*"; and (iv) there is an "*economic incentive for those able to steal the contents.*"¹⁰²⁸ Specifically with regard to the "politically charged" Sui gas pipeline in Balochistan, Claimant also refers to Mr. Livesey's testimony that "*the Sui has [sic] pipeline and the rest of the gas infrastructure in Balochistan does not pay any royalty or revenue to Balochistan itself, so it's naturally a target because it's seen by the Balochis as being a non-Balochi project. It's being seen*

¹⁰²⁴ Claimant's Quantum Post-Hearing Brief, ¶ 131, quoting from Ridley, ¶ 50; Claimant's Quantum Reply, ¶ 601.

¹⁰²⁵ Claimant's Quantum Reply, ¶ 598, quoting from **Exhibit CE-1279**, p. 13.

¹⁰²⁶ Claimant's Quantum Post-Hearing Brief, ¶ 134, referring to **Exhibit RE-576-6.01**, p. 16 and Mayer I, ¶ 121; Claimant's Quantum Reply, ¶¶ 618-619, 622 referring to Livesey V, ¶¶ 12-14, 22-24, **Exhibit RE-576-6.01**, p. 5, and Mayer I, ¶ 70.

¹⁰²⁷ Claimant's Quantum Reply, ¶ 620, quoting from Mayer I, ¶ 68.

¹⁰²⁸ Claimant's Quantum Post-Hearing Brief, ¶ 135, referring to Mayer I, ¶ 125; Ridley, ¶¶ 58-59; Transcript Hearing on Quantum (Day 6), p. 1826 and (Day 1), p. 255; Claimant's Quantum Reply, ¶¶ 603, 607, 610, referring to Davies I, pp. 35-36, 57-65.

*as something that is not adding value to them necessarily.*¹⁰²⁹ By contrast, Claimant argues that the slurry pipeline would be an “*unlikely target for Baloch nationalist attack*” as it would run exclusively through Baloch territory and transport slurry of a project in which Balochistan would have held a 25% participation.¹⁰³⁰

836. By contrast, Claimant contends that there would have been “*no real incentive*” for insurgents to attack the slurry concentrate pipeline because: (i) the pipeline would be “*difficult to locate, access, or breach,*” taking into account the desert environment and Claimant’s army patrols, the small size of the pipeline and its burial “*several feet underground*” as well as its “*flexible composition of high density polyethylene lined carbon steel enveloping slurry in a cylindrical container*”; and (ii) any damage would cause “*minimal, if any, downtime*” as the pipeline would be easier to repair than an oil and gas pipeline due to its simple design and, once a breach would be detected through an electronic monitoring system, the concentrate flow could be discontinued so that “*little, if any, of the product would be lost.*”¹⁰³¹ Claimant also argues that the slurry concentrate would be “*almost commercially useless to anyone but TCC*” because it would have to be refined at appropriate facilities which are “*in short supply*” in Balochistan.¹⁰³²
837. Claimant notes that the assessments made by Mr. Mayer and Mr. Ridley are supported by the experience with an above-ground slurry concentrate pipeline in Indonesia, which was “*repaired and restored promptly after an attack.*” Claimant quotes from an OPIC Memorandum reporting that after an attack with a hacksaw on adjacent slurry and fuel pipelines, “*within a few hours both pipelines had been repaired and returned to full operation,*” and after a separate attack, “*repairs were completed and the pumping of slurry was resumed*” the following afternoon and “*no slurry was lost through that pipeline.*” According to Claimant, the financial impact of the disruption was thus “*minimal.*”¹⁰³³
838. Claimant notes that Mr. Davies referred in his second report to the “*aggregated consequences of disruption*” and agreed during the Hearing on Quantum that the main motivation of any insurgent would be to cause downtime and thus financial damage. Therefore, Claimant maintains that “*the sheer difficulties of causing any disruption, and the minimal economic impact of any such disruption, would have rendered the concentrate pipeline an unattractive target.*”¹⁰³⁴

¹⁰²⁹ Claimant’s Quantum Reply, ¶ 605, quoting from Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1255 line 10 to p. 1256 line 3.

¹⁰³⁰ Claimant’s Quantum Reply, ¶ 606.

¹⁰³¹ Claimant’s Quantum Post-Hearing Brief, ¶¶ 136-138, referring to **Exhibit RE-576-6.01**, Mayer I, ¶¶ 126-127 and Livesey V, ¶¶ 20-21; Claimant’s Quantum Reply, ¶¶ 607-609, 611-616, referring to Ridley, ¶¶ 59, 62-69, 7, and Mayer I, ¶¶ 73-74.

¹⁰³² Claimant’s Quantum Reply, ¶ 604, referring to Ridley, ¶ 60.

¹⁰³³ Claimant’s Quantum Post-Hearing Brief, ¶ 139, quoting from **Exhibit SRM-70**, pp. 29-34.

¹⁰³⁴ Claimant’s Quantum Post-Hearing Brief, ¶ 140, quoting from Davies II, p. 18 and referring to Transcript Hearing on Quantum (Day 6), pp. 1827-1828.

839. Claimant further claims that the “*low risk of an occasional disruption of the slurry pipeline with its minimal financial impact*” would have been preferable over the annual cost of USD 20.5 million for the 6,820 man-force proposed by Mr. Davies to guard the pipeline. In any event, however, Claimant emphasizes that even that cost together with the other security measures proposed by Mr. Davies would not have rendered the project uneconomic. It refers to its expert Prof. Davis, who calculated that the proposed security costs would have reduced the value of the project from USD 8.5 billion to USD 8.1 billion, without accounting for the reduced probability of shutdowns and interruptions that would have resulted from these increased mitigation measures, and confirmed that “[t]he project could easily support the additional costs and remain valuable.”¹⁰³⁵
840. Claimant submits that based on PSI’s design of the pipeline, it evaluated and created mitigation plans for the remaining security risks and quotes from Mr. Ridley’s opinion that “*TCC adequately considered and addressed the existing, relevant and foreseeable security threats specific to the contemplated slurry concentrate pipeline,*” and that Claimant’s approach “*was consistent with international standards and related hierarchy of controls, which in turn contributed to the security risks being minimised as far as reasonably practicable.*”¹⁰³⁶
841. With regard to Respondent’s reliance on a statement in the PSI report that “[n]o safety and security has been included in the estimate due to the unknown issues related to Pakistan,” Claimant refers to Mr. Livesey’s testimony that PSI is “*not a pipeline security company, so the security risk issues are transferred across to security which, primarily for this project was handled by Barrick’s global security VP and his team in Toronto. And it was input from them that added security into the CAPEX and OPEX in the Feasibility Study under G&A.*”¹⁰³⁷ Claimant submits that its security plan involved strategic partnerships with Balochistan and a “*network of relationships with service infrastructure providers and the socio-economic participants*” and notes that the Feasibility Study also set out that “[t]he concentrate pipeline route, choke and valve stations, and Panjgur drivers’ rest stop will be patrolled by a light truck, a driver, and a guard on 24 h/d, 7 d/w basis. The three stations will be monitored by CCTV and access control and alarm systems.”¹⁰³⁸ Claimant also emphasizes that its security plan would

¹⁰³⁵ Claimant’s Quantum Post-Hearing Brief, ¶¶ 141-142, referring to Mayer I, ¶ 128 and Ridley, ¶ 90 and quoting from Davis II, ¶ 185; Claimant’s Quantum Reply, ¶¶ 644-645.

¹⁰³⁶ Claimant’s Quantum Reply, ¶ 623, quoting from Ridley, ¶¶ 51-52.

¹⁰³⁷ Claimant’s Quantum Reply, ¶¶ 624-625, quoting from Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1262 lines 7-13.

¹⁰³⁸ Claimant’s Quantum Reply, ¶ 625, quoting from Exhibits CE-98, p. 2-9 and CE-255, p. 19-40.

have continued to evolve over time adapting to changing circumstances and accounting for factors such as new technology throughout the life of the project.¹⁰³⁹

842. According to Claimant, the cost estimates included in the Feasibility Study were “*commensurate with the known information and pre-operational stage of the project.*” Claimant contends that “*normal security costs and precautions*” were included in PSI’s estimate and “*extraordinary*” security costs were addressed in other sections of the Feasibility Study. Specifically, Claimant refers to the Concentrate Transportation Trade-Off Study prepared by SLI which “*included the costs for the excluded items,*” including “[e]xtraordinary security for Stations or Pipeline and associated facilities.”¹⁰⁴⁰ Claimant submits that based on the recommendation of the recommendation of Barrick’s Senior Vice President & Operations Officer Mr. Wall and his team, “*an additional layer of security precautions and costs, such as alarm systems, CCTV monitoring and patrolling vehicles and Chokidars was added to PSI’s initial recommendations*” the costs of which are reflected in the capital and operating expense estimates of the Feasibility Study.¹⁰⁴¹
843. By contrast, Claimant considers the cost estimates provided by Mr. Davies “*exaggerated and unrealistic,*” arguing that they are exclusively based on case studies which do not include any example from the mining sector and ignore specific characteristics of the area. Claimant quotes from Mr. Ridley’s opinion that “*S-RM’s unscientific process resulted in vastly inflated cost estimates, which are divorced from the realities on the ground and offer no useful comparison.*”¹⁰⁴² Specifically with regard to the estimate of USD 20.5 million in OPEX for 6,800 men to guard the pipeline, Claimant notes that Mr. Davies himself admits that this “*might appear to be a grossly inflated figure*” and acknowledges that Claimant could use less manpower if it used surveillance technology and a detection and alerting system for which Mr. Davies also included a cost estimate of USD 1.5-2 million.¹⁰⁴³
844. As for Mr. Davies’ estimate of USD 20-25 million for security hardware to protect the central production facilities, Claimant argues that this would not have been necessary and in even counter-productive and submits that Mr. Davies in any event did not provide sufficient information to show how he arrived at that figure.¹⁰⁴⁴ In Claimant’s view, the same applies to Respondent’s reliance on “*security challenges*” of the Saindak mine,

¹⁰³⁹ Claimant’s Quantum Reply, ¶¶ 626, 633, quoting from Ridley, ¶ 79.

¹⁰⁴⁰ Claimant’s Quantum Reply, ¶¶ 628-630, referring to **Exhibit RE-119**, p. 71 and quoting from **Exhibit RE-138**, p. 16.

¹⁰⁴¹ Claimant’s Quantum Reply, ¶ 631, referring to **Exhibits RE-124**, pp. 19-20, 19-40, 19-43 and **RE-576-24**, pp. 24-32 to 24-33, **CE-97**, Table 1.31, Livesey V, ¶¶ 16-24, and Transcript Hearing on Jurisdiction and Liability (Day 5), pp. 1164-1165, 1251-1252, 1262.

¹⁰⁴² Claimant’s Quantum Reply, ¶¶ 632, 634, quoting from Ridley, ¶ 84

¹⁰⁴³ Claimant’s Quantum Reply, ¶ 635, quoting from Davies, pp. 72, 74, 76.

¹⁰⁴⁴ Claimant’s Quantum Reply, ¶¶ 636-637, referring to Ridley, ¶¶ 100-101

which according to Claimant, in any event has taken a “*profoundly different approach to security than that adopted by TCC,*” with a history of negative community relations and the use of a “*disproportionate security force*” which worsened its security situation.¹⁰⁴⁵

845. Finally, Claimant emphasizes that Respondent did not raise any security-related concerns about Claimant’s pipeline plans prior to this arbitration even though the GOB was informed about the pipeline as an option as early as December 2007. Claimant also refers to Respondent’s plans starting at the end of 2010 to construct a natural gas pipeline which, in Claimant’s view, would have been more vulnerable to attack than the proposed slurry pipeline. With regard to the Sui gas pipeline invoked by Respondent, Claimant notes that the company continues to operate profitably and expand its pipeline network, which it considers as evidence of the viability of its slurry concentrate pipeline.¹⁰⁴⁶
846. In any event, Claimant contends that Prof. Davis’ model “*fully accounts for any security costs.*” Specifically, Claimant refers to Prof. Davis’ inclusion of a 0.5% annual likelihood of permanent pre-mature mine shut-down of Reko Diq due to acts of extreme political violence, which, according to Prof. Davis, “*reduces the value of the investment by US\$ 1.4 billion, or 14% relative to a scenario where this risk would be absent.*”¹⁰⁴⁷ According to Claimant, this is “*an extremely conservative assumption*” given that Mr. Davies acknowledged that there is little risk that potential attacks would permanently shut down operations. Claimant also argues that Prof. Davis’ 0.5% probability has a “*strong evidentiary basis*” as it is derived from the market pricing of political violence insurance provided by OPIC and conservatively uses the “*high end of the rate range.*” Claimant rejects the arguments raised by Respondent’s experts and maintains that OPIC rates are “*true market rates*” and “*the best indication of the underlying probability of political violence occurring,*” regardless of whether or not Claimant would have been able to actually buy OPIC insurance.¹⁰⁴⁸ Claimant also dismisses Mr. Brailovsky’s and Prof. Wells’ reference to the separate insurance for business income as irrelevant because even if an investor were to pay an additional premium, “*the probability and hence rate charged for political violence insurance should not change,*” as confirmed by the fact that the rates for the insurance of assets and business income are the same.¹⁰⁴⁹
847. Claimant further rejects that the analysis made by Dr. Burrows in his second report based on Pakistan’s sovereign yield spread reflects the political risk in Pakistan as the spread includes numerous risks that are inapplicable to the project. Claimant also refers to the scholarly papers on which Dr. Burrows relied in his analysis and contends that confirm

¹⁰⁴⁵ Claimant’s Quantum Reply, ¶¶ 639-640, quoting from Ridley, ¶ 114 and Mayer I, ¶ 76.

¹⁰⁴⁶ Claimant’s Quantum Reply, ¶¶ 646-653.

¹⁰⁴⁷ Claimant’s Quantum Post-Hearing Brief, ¶¶ 143-144, quoting from Davis II, ¶ 178.

¹⁰⁴⁸ Claimant’s Quantum Post-Hearing Brief, ¶¶ 394-401.

¹⁰⁴⁹ Claimant’s Quantum Post-Hearing Brief, ¶¶ 402-403, referring to **Exhibit CE-1145**.

that the method is improper for the present purposes. Claimant considers this confirmed by the fact that the country risks ratings relied on by Dr. Burrows have stayed nearly constant during the investment period while Pakistan's sovereign yield spread "*has varied widely for reasons unrelated to political risk.*"¹⁰⁵⁰ Claimant also notes that it requested the full underlying data and regression analysis allegedly performed by Dr. Bekaert and was provided with a partial response which revealed that the analysis was produced before Dr. Burrows' first report. In any event, Claimant submits that the document produced by Respondent does not contain the underlying data or explain the method used by Dr. Bekaert for his regression analysis, thereby preventing Prof. Davis from fully testing it. According to Claimant, the Tribunal should therefore not give any weight to this analysis.¹⁰⁵¹

848. In Claimant's view, the Hearing on Quantum raised further questions undermining the reliability of the analysis as the 2015 paper co-authored by Dr. Bekaert did not contain the data used in the regression analysis but Dr. Burrows initially testified that he had relied on an earlier paper from 2014 and then claimed that Dr. Bekaert had updated the model for him, which apparently produced "*completely different*" results from the results presented in the 2015 paper.¹⁰⁵²
849. Claimant also refers to Prof. Davis' testimony that based on the data he received and tested, "*the model doesn't work for Pakistan*" but is "*off roughly 100 percent, on average.*" Claimant also refers to Prof. Davis' illustration of the lack of correspondence between Pakistan's sovereign yield spread and political risk which "*move completely independent from each other*" and demonstrate that "[t]he sovereign spread is moving around for reasons other than political risk."¹⁰⁵³
850. In addition to the 0.5% annual probability, Claimant notes that Prof. Davis incorporated into his model the risks included in the risk register, which included risks raised by Mr. Davies as well as "*many*" risks that he failed to identify.¹⁰⁵⁴ Claimant refers to "*substantial premiums*" for insurance protecting against the effects of political violence, terrorist attacks, and other security threats in the total amount of nearly USD 9 million per year and adjustments made by Prof. Davis to reflect the residual risk of various

¹⁰⁵⁰ Claimant's Quantum Post-Hearing Brief, ¶¶ 405-413, referring to Transcript Hearing on Quantum (Day 8), p-2357, Exhibits CE-1564, p. 2 and CRA-55, p. 472, and Davis Presentation, p. 37.

¹⁰⁵¹ Claimant's Quantum Post-Hearing Brief, ¶¶ 417-419, referring to Exhibit CE-1784.

¹⁰⁵² Claimant's Quantum Post-Hearing Brief, ¶¶ 420-424, referring to Transcript Hearing on Quantum (Day 9), p. 2847.

¹⁰⁵³ Claimant's Quantum Post-Hearing Brief, ¶¶ 429-432, referring to Transcript Hearing on Quantum (Day 9), pp. 2355-2357, and Davis Presentation, pp. 35-36.

¹⁰⁵⁴ Claimant's Quantum Post-Hearing Brief, ¶ 145, referring to Davis I, Workpaper 25 (SEC05, SEC24, SEC26 and SEC27); Claimant's Quantum Reply, ¶ 643.

security threats reducing the cash flows by USD 13.9 million per year during the first five years of operations and USD 5.7 million per year thereafter.¹⁰⁵⁵

b. Summary of Respondent's Position

851. Respondent considers it undisputed that Claimant was planning to build a mine in “*one of the most dangerous places in the world*” and that the security situation in Balochistan has worsened from 2006 to 2011 and continuing thereafter. However, Respondent contends that Claimant “*made little to no effort to identify and address the security risks that the Reko Diq project faced, largely ignored the threat of sabotage on the pipeline, and completely understated the costs to adequately secure the mine's operations.*”¹⁰⁵⁶
852. Respondent notes that Balochistan's political and security context is described as “*hellish complexity*” and that the political risk in Pakistan is referred to as “*Extreme.*”¹⁰⁵⁷ Respondent also refers to its expert Prof. Rais who outlined the dangers posed by Balochistan's geographical location located between Afghanistan and Iran, with the Chagai district being a known smuggling corridor, as well as the presence of Taliban and other militant groups which have been linked to a growing number of violent attacks and the fact that only 5% of Balochistan are under police control. Respondent notes that Claimant has not disputed the data regarding the number of attacks or Prof. Rais' description of the sources of conflicts in the region and the increased incidents or violence.¹⁰⁵⁸ Respondent further explains that the conflict in Balochistan is multi-dimensional and that there would not have been any single group or authority with whom Claimant could have negotiated on the slurry pipeline; in addition, the communities are not necessarily receptive to Western models of community investment and development.¹⁰⁵⁹
853. Respondent claims that none of the documents to which Claimant has pointed in this arbitration support that Claimant adequately considered and addressed the security risks for the project. According to Respondent, none of the cited trade-off studies directly address security risks and Mr. Ridley's “*independent*” security assessment in 2006 “*completely ignored*” the security risks and mitigation plans for the slurry pipeline.¹⁰⁶⁰

¹⁰⁵⁵ Claimant's Quantum Reply, ¶¶ 249-250, referring to Davis I, ¶ 189, 173, and Workpaper 26.

¹⁰⁵⁶ Respondent's Post-Hearing Brief on Quantum, ¶ 166; Respondent's Rejoinder on Quantum, ¶ 288, referring to Rais, ¶¶ 30, 33, 37-42; Respondent's Counter-Memorial on Quantum, ¶¶ 256-257.

¹⁰⁵⁷ Respondent's Counter-Memorial on Quantum, ¶ 259, quoting from Davies I, p. 13 and Exhibit RE-586, p. 2.

¹⁰⁵⁸ Respondent's Post-Hearing Brief on Quantum, ¶¶ 200-202, referring to Transcript Hearing on Quantum (Day 6), pp. 1781-1793; Respondent's Rejoinder on Quantum, ¶ 266, referring to Rais, ¶¶ 12, 24 and Davies II, pp. 13-14.

¹⁰⁵⁹ Respondent's Counter-Memorial on Quantum, ¶¶ 262-264.

¹⁰⁶⁰ Respondent's Post-Hearing Brief on Quantum, ¶¶ 167-169, referring to Exhibits RE-576-30.01 and RE-728 and Transcript Hearing on Quantum (Day 6), p. 1734 lines 14-22 and p. 1735 lines 1-22; Respondent's Rejoinder on Quantum, ¶¶ 260, 263, referring to Exhibit RE-576-30.02.

Similarly, Respondent submits that the contingency in the Feasibility Study to which Claimant has pointed does not make reference to security issues but rather, by its own definition, addresses only technical engineering issues and unit costs, and specifically excludes “*labour disputes, change in scope or price escalation.*”¹⁰⁶¹ As for the chapter on security, Respondent argues that it “*only superficially deals with security for the pipeline,*” which is focused on theft and fraud and not on acts of sabotage or terrorism.¹⁰⁶² Respondent further notes that the socio-economic baseline conducted along the transport corridors, including the pipeline route, referred to “*security related considerations, more specifically the hostility of the local people towards outsiders*” as a limitation to the study as well as “*limited police presence in the surveyed villages along the transport corridor.*”¹⁰⁶³

854. As for Claimant’s reference to its Risk Register, Respondent acknowledges that it “*at least mentions security issues*” but maintains that it “*underscores TCC’s almost flippant approach.*” In Respondent’s view, the mitigation measures identified in response to the highest security are ineffective given that the residual risk rating following mitigation is still high and the likelihood of the threat occurring remains the same.¹⁰⁶⁴ Respondent further claims that Claimant fails to account for the impact to CAPEX and OPEX for most of the risks, including the highest security risks (SEC01, SEC03, SEC05 and SEC08), and fails to accurately add up the impact of unmitigated exposure in its risk register.¹⁰⁶⁵
855. Respondent contends that Claimant “*only planned to secure the central mining site to a minimum adequate level, avoiding best practices while leaving other areas of the mining operations vulnerable,*” in particular the pipeline as a “*critical infrastructure piece*” to bring the concentrate out of the country.¹⁰⁶⁶
856. According to Respondent, the pipeline is “*the greatest weakness of the project*” but the Feasibility Study is “*almost dismissive of the threat.*” With regard to Claimant’s plan to secure the pipeline, Respondent notes that Claimant originally estimated 730 FC personnel to provide security for the project but decided to “*drastically cut to 200 FC personnel without further explanation.*” While noting that the original estimate pre-dated the decision to transport the copper concentrate via pipeline, Respondent maintains that Claimant should instead have increased the number following its decision to use a pipeline, due to the “*dramatically*” increased footprint of project which went through the

¹⁰⁶¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 169, quoting from **Exhibit 576-23**, p. 23-45.

¹⁰⁶² Respondent’s Rejoinder on Quantum, ¶ 258, referring to **Exhibit RE-576-19**, pp. 19-i to 19-ii and 19-27.

¹⁰⁶³ Respondent’s Rejoinder on Quantum, ¶ 260, quoting from **Exhibit RE-751**, pp. 1-7 and 4-9.

¹⁰⁶⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 170, referring to **Exhibit RE-576-20.01**, p. TCCA042249; Respondent’s Rejoinder on Quantum, ¶ 259.

¹⁰⁶⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 170, referring to **Exhibit CE-952**.

¹⁰⁶⁶ Respondent’s Rejoinder on Quantum, ¶ 257.

*“highest threat areas.”*¹⁰⁶⁷ In Respondent’s view, both the water supply pipeline and the slurry pipeline would have been *“vulnerable to even rudimentary attacks”* and thus have presented opportunity that would have drawn insurgents from the region.¹⁰⁶⁸

857. Respondent also presents what it describes as *“some selected examples of negative attitudes expressed towards TCC’s plans by a diverse range of actors,”* such as protests against the hiring of non-locals over locals for the Reko Diq project in 2008 and against the dismissal of local workers in 2009 and 2011 as well as several petitions filed with the Pakistan Supreme Court regarding the GOB’s collaboration with Claimant. Respondent also considers that Claimant made *“elementary errors”* leading to *“very negative perception within the communities”* in the context of hiring people from outside the local area and declining to meet with local tribes along the pipeline route.¹⁰⁶⁹

858. Respondent argues that the pipeline is an attractive target for insurgents. Referring to its expert Mr. Davies, Respondent submits that *“the history of attacks on Balochistan’s infrastructure projects and transportation corridors make it highly likely that the pipeline would have been targeted”* and further contends that the pipeline would go through some of the most dangerous districts in Pakistan. Respondent refers to videos of attacks in Balochistan it has submitted as evidence which demonstrate in its view that insurgents were capable and had the intention to conduct sabotage and inflict maximum damage.¹⁰⁷⁰ In Respondent’s view, the video also demonstrates that the GOB’s involvement in the project might actually increase the attractiveness as a target given the tension between the nationalist groups and the States and as evidenced by attacks on government-owned pipelines such as the Sui gas pipeline.¹⁰⁷¹ Respondent also refers to security issues faced by PSI during its trip to survey the pipeline route and an attack on Claimant’s community relations team during a field trip on ESIA related work.¹⁰⁷²

859. In response to Claimant’s arguments, Respondent submits that: (i) the pipeline would be easy detect given the planned installation of above-ground markers and burial offers insufficient protection; (ii) the material of the pipeline would be no different from those used in oil and gas pipelines and Claimant was not planning to encase the pipeline in

¹⁰⁶⁷ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 171-173, referring to Exhibits CE-1327, p. 12 and RE-576-19, p. 19-25.

¹⁰⁶⁸ Respondent’s Counter-Memorial on Quantum, ¶¶ 266-268, referring to Davies I, pp. 32, 48.

¹⁰⁶⁹ Respondent’s Counter-Memorial on Quantum, ¶¶ 274-279, referring to Davies I, pp. 31, 43 and notes 103-107.

¹⁰⁷⁰ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 175-176, 180-181, referring to Transcript Hearing on Quantum (Day 6), p. 1799 lines 13-16 and Exhibit SRM-85; Respondent’s Rejoinder on Quantum, ¶ 269, referring to Exhibit RE-766.

¹⁰⁷¹ Respondent’s Rejoinder on Quantum, ¶¶ 270, 287, referring to Rais, ¶¶ 2, 27, 37; Respondent’s Counter-Memorial on Quantum, ¶¶ 269-270, referring to Davies I, note 107 and p. 22.

¹⁰⁷² Respondent’s Rejoinder on Quantum, ¶¶ 271-273, referring to Exhibit RE-576-6.01, p. 65.

concrete over its entire length or to use reinforced concrete and, therefore the pipeline would not be “*particularly blast resistant*” to withstand the explosives used by insurgents in Balochistan; and (iii) pipeline repairs would not be as simple as Claimant has stated given the security issues preventing technical teams from making the repairs.¹⁰⁷³

860. Respondent also rejects the argument that oil and gas pipelines are more susceptible to attacks because of their content and argues that “*the primary driving force of the attacks is not to steal the contents, but to sabotage operations,*” which would make Claimant’s slurry pipeline “*just as susceptible to delays and financial loss.*” Respondent acknowledges that “there have been more incidents involving gas and oil pipelines” but maintains that this is due to the fact that “*it is a more established industry with more pipelines and greater opportunity for sabotage.*”¹⁰⁷⁴ In addition, Respondent argues that while the copper concentrate may not be flammable as oil and gas “*the end result is not much different when an attack occurs*” with regard to delays and downtime impacting operations.¹⁰⁷⁵
861. Respondent contends that Claimant failed to fully account for these security risks, including the aggregate impact on the mining operation, and thereby also prevented “*any accurate determination of TCC’s tolerance level to withstand repeated attacks.*” It further refers to Mr. Davies’ testimony that these types of attacks have caused other commercial operations to be halted for long periods or suspended indefinitely.¹⁰⁷⁶ Again referring to Mr. Davies, Respondent submits that in this environment, the question is not if but when an attack might occur.¹⁰⁷⁷
862. Respondent alleges that Claimant’s security plans were “*outdated, missing information, and generally incomplete,*” given that: (i) the SOS International assessment in 2006 undisputedly did not evaluate the pipeline route or security threats at Port Gwadar and no supplemental risk assessment was prepared to address these issues or the increasing level of separatist insurgent activity between 2007 and 2011; (ii) Mr. Ridley could not confirm that the Hearing on Quantum that Claimant’s international security documents complied with the relevant ISO 31000 standards, stating that he was “*no actually making a summary judgment as to the overall ISO 31000 as it pertains to TCC*” and Mr. Ridley received only “*some*” of the “*weekly*” security reports and testified that he would not be surprised if an attack of Claimant’s own personnel would not be included in these reports which,

¹⁰⁷³ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 177-179, 182, referring to Davies II, pp. 28-29 and Transcript Hearing on Quantum (Day 6), p. 1810 lines 1-9 and p. 1804 lines 10-18; Respondent’s Rejoinder on Quantum, ¶¶ 267-268, referring to Davies II, pp. 23-28.

¹⁰⁷⁴ Respondent’s Rejoinder on Quantum, ¶¶ 264-265, referring to Davies II, pp. 17, 2, 11 and Rais, ¶¶ 2, 27.

¹⁰⁷⁵ Respondent’s Rejoinder on Quantum, ¶ 268, referring to Davies II, p. 15.

¹⁰⁷⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 183, referring to Davies I, pp. 64-65.

¹⁰⁷⁷ Respondent’s Post-Hearing Brief on Quantum, ¶ 184, referring to Transcript Hearing on Quantum (Day 6), p. 1809 lines 5-10.

according to Respondent, renders them “*essentially useless.*”¹⁰⁷⁸ According to Respondent, the security documents contain “*further flaws, almost too many to address in the space allotted*” and Claimant “*could never have expected a third-party buyer to accept the security situation, plans, or costs as reflected in TCC’s documents.*”¹⁰⁷⁹

863. As to the costs included by Claimant for its security plans, Respondent alleges that they are “*so paltry as to be embarrassing.*” Referring to Mr. Davies, Respondent contends that the Feasibility Study does not include adequate security costs for the pipeline and notes that the pipeline’s feasibility study expressly excludes security cost, stating that “[n]o safety and security has been included in the estimate due to the unknown issues related to Pakistan. These issues need to be understood to provide a better cost estimate for this important task.” PSI further stated in the CAPEX estimate that it “*does not include any extraordinary provisions for security either during construction of the facilities described here or for the completed facilities after construction of for [sic] day to day operations.*” Respondent further submits that while Claimant insisted that these costs are included in other sections of the Feasibility Study, it has not been able to point to a specific page showing the amount. Specifically with regard to the “*extraordinary*” security costs recorded in Chapter 19 on Security, Respondent claims these are “*simply a CCTV monitoring system and security access system at each of the three pumping stations, leaving hundreds of kilometers of the pipeline in between unsecured.*”¹⁰⁸⁰
864. In response to Mr. Livesey’s testimony that security costs for the pipeline are reflected in various budgetary items, Respondent maintains that it is impossible to tell from these budgets how security is included in these general headings. Respondent also notes that G&A for OPEX includes one item addressing security which amounts to USD 2.5 million per year to secure the entire project. In Respondent’s view, this is insufficient.¹⁰⁸¹ In addition, Respondent notes that Claimant did not assign any CAPEX or OPEX impact to the “*likely*” risk of “*a direct violent attack in-country by any hostile force*” even though Mr. Cusworth stated that it should be assigned an impact before and after mitigation.¹⁰⁸²

¹⁰⁷⁸ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 185-189, referring to Transcript Hearing on Quantum (Day 6), pp. 1737-1738, 1745-1748, 1753-1758; Respondent’s Rejoinder on Quantum, ¶ 263, referring to Davies I, pp. 7-8.

¹⁰⁷⁹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 190-191.

¹⁰⁸⁰ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 192-193, referring to Davies I, p. 68 and **Exhibit RE-576-19**, pp. 19-20, 19-40, and 19-43, and quoting from **Exhibit RE-576-6.01**, p. 64; Respondent’s Rejoinder on Quantum, ¶¶ 276-277; Respondent’s Counter-Memorial on Quantum, ¶ 257.

¹⁰⁸¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 194, referring to Transcript Hearing on Quantum (Day 2), p. 405 lines 3-7 and **Exhibit RE-576-24**, p. 24-28.

¹⁰⁸² Respondent’s Post-Hearing Brief on Quantum, ¶ 195, quoting from **Exhibit CE-952 (SEC03)** and referring to Transcript Hearing on Quantum (Day 3), p. 857 lines 2-3.

865. Respondent refers to an estimate of Mr. Davies who recommends that approximately 6,820 security personnel to provide a high level of resilience and estimates that the following costs would be necessary: (i) approximately USD 20-25 million in CAPEX for the necessary security hardware to protect the central facilities; (ii) an additional USD 13.68 million in CAPEX for the necessary vehicles support for the pipeline's armed manpower teams; and (iii) approximately USD 20.52 million per year in OPEX for the necessary manpower to ensure pipeline security.¹⁰⁸³ Respondent considers that this number is "*not overwhelming force*" and confirmed by the example of a proposed pipeline running through Afghanistan that would be protected by similar manpower.¹⁰⁸⁴ According to Respondent, Claimant's security budget did not reflect any of these costs, which reduce Claimant's valuation by almost USD 400 million, nor did it give consideration to alternative technologies for securing the pipeline or the costs associated with the downtime caused by potential attacks.¹⁰⁸⁵ Respondent clarifies that downtime is also not accounted for in Mr. Davies' estimate, nor did he seek to determine the costs of "*inevitable delays that would have occurred in the start-up of the security effort.*"¹⁰⁸⁶
866. In Respondent's view, the important point is that Claimant has not conducted "*a thorough assessment to allow a determination of the project's tolerance level for aggregate losses that it would suffer from multiple attacks.*" In the absence of an adequate risk mitigation plan, Respondent considers it a "*completely reasonable approach*" for Mr. Davies to resort to case studies from similar threat environments.¹⁰⁸⁷
867. Respondent further points to the Saindak mine which, in its view, "*has been able to run a mining operation in Balochistan because it has limited its footprint to a manageable area, avoided pipeline transport all together, and ensured community engagement and participation in the project.*" Respondent also notes that it is primarily a socio-economic project of the GOB which "*naturally gives a higher tolerance level than a purely commercial operation*" with only a minority interest of the GOB in a portion of the resource. Despite these differences, Respondent submits that Saindak has suffered numerous attacks and therefore invested "*significant resources*" into protecting its assets, including "*large security forces and CSR efforts.*"¹⁰⁸⁸

¹⁰⁸³ Respondent's Post-Hearing Brief on Quantum, ¶ 196, referring to Davies I, pp. 74, 76; Respondent's Counter-Memorial on Quantum, ¶ 281-.

¹⁰⁸⁴ Respondent's Post-Hearing Brief on Quantum, ¶ 197, referring to Transcript Hearing on Quantum (Day 6), p. 1807 lines 5-22.

¹⁰⁸⁵ Respondent's Rejoinder on Quantum, ¶¶ 278, 288, referring to Davies II, p. 9 and Brailovsky/Wells, Section 3.7.2.

¹⁰⁸⁶ Respondent's Counter-Memorial on Quantum, ¶¶ 282.

¹⁰⁸⁷ Respondent's Post-Hearing Brief on Quantum, ¶¶ 198-199.

¹⁰⁸⁸ Respondent's Post-Hearing Brief on Quantum, ¶¶ 203-204, referring to ul Haque, ¶¶ 15-18; Respondent's Rejoinder on Quantum, ¶ 284; Respondent's Counter-Memorial on Quantum, ¶¶ 270.

868. In addition, Respondent refers to Mr. Davies' testimony that any insurance coverage that Claimant would likely have obtained would not have extended to business interruption and be limited to physical damage and repair. Respondent considers the results of Mr. Davies' inquiry confirmed by the statement in the Feasibility Study that insurance would be unavailable or too expensive.¹⁰⁸⁹
869. In response to Claimant's reference to the adjustments made by Prof. Davis to account for residual risks, in particular the 0.5% annual probability of a permanent shutdown, Respondent considers that none of the projects he referred to are located in a comparable environment in terms of security risks and the proposed pipeline route. Respondent further notes that OPIC insurance on which Prof. Davis based his estimate would not have been available to Claimant and considers it likely that no private insurance options or rates would have been available. As for the insurance premiums referred to by Claimant in the Feasibility Study, Respondent maintains that these do not take into account political risk but exclude "*terrorism*" as well as "*war and civil war.*" Finally, Respondent claims that the adjustments made by Prof. Davis to cost and production quantities fail to account for the risks of sabotage and direct attacks.¹⁰⁹⁰
870. Respondent concludes that any third-party buyer would have had access to the same information that Pakistan presented in this arbitration and "*would likely have refrained from going forward*"; however, if it had decided to proceed, it could not have relied on Prof. Davis' valuation model which, according to Respondent, "*does not account for the cumulative effect of attacks, the impact of security costs on the financials of the project as management saw it in 2010-2011, and a realistic view of the insurance market.*"¹⁰⁹¹

c. Tribunal's Analysis

871. At the outset of its analysis of the issues regarding Claimant's security plan for the Reko Diq project and, in particular, for the slurry pipeline, the Tribunal recalls that Respondent also raised the argument that TCCP failed to adequately address the security risks of the pipeline already in the liability phase of this proceeding. The Tribunal discussed this argument, together with the argument that TCCP failed to fully assess the water source of the project, in the context of its analysis of whether any of the grounds invoked by the Licensing Authority in its Notice of Intent to Reject the Mining Lease Application and/or by Respondent in the arbitration justified the denial of the Mining Lease Application in November 2011. Similarly to the alleged failure to fully assess the water source, the

¹⁰⁸⁹ Respondent's Post-Hearing Brief on Quantum, ¶ 205, referring to Transcript Hearing on Quantum (Day 6), p. 1835 line 19 to p. 1638 line 3 and **Exhibit RE-576-2**, p. 2-10.

¹⁰⁹⁰ Respondent's Rejoinder on Quantum, ¶¶ 279-283, referring to Davies II, p. 40, **Exhibits RE-729, CE-1145, RE-576-29**, p. 29-17 and **RE-576-30**, p. 30-20.

¹⁰⁹¹ Respondent's Post-Hearing Brief on Quantum, ¶ 206.

alleged failure to adequately address the security risks of the pipeline was one of the reasons that Respondent raised for the first time in this arbitration. While finding that Respondent should not be allowed to rely on reasons additional to those invoked in the Notice of Intent to Reject, the Tribunal in any event found that none of these additional reasons, including the reason invoked with regard to the security of the pipeline, would justify the denial of the Mining Lease Application.¹⁰⁹²

872. At liability stage, Respondent already invoked the statement made in the Bankable Feasibility Report on the pipeline prepared by the pipeline construction company PSI:

*“The safety and security only includes minor support for the offices. No safety and security has been included in the estimate due to the unknown issues related to Pakistan. These issues need to be understood to provide a better cost estimate for this important task.”*¹⁰⁹³

873. In its Decision on Jurisdiction and Liability, the Tribunal noted that the security risks had been subject to an extensive discussion with Mr. Livesey, who explained during the Hearing on Jurisdiction and Liability that PSI is “*not a security company so the security risk issues are transferred across to security which, primarily for this project was handled by Barrick's global security VP and his team in Toronto. And it was input from them that added security into the CAPEX and OPEX in the Feasibility Study under G&A.*”¹⁰⁹⁴ The Tribunal further took note of Mr. Livesey’s reference to the chapter on security in the Feasibility Study, including a paragraph describing security measures for the pipeline, and his explanation regarding Claimant’s strategy of developing three levels of strategic partnership, which was reflected in the “*Business Strategy*” of the Feasibility Study.¹⁰⁹⁵ In addition, Mr. Livesey provided explanations as to why they “*felt [that their] level of risk was much lower than in the gas pipelines*” such as the Sui gas pipeline. In particular, Mr. Livesey emphasized that, by contrast to the Sui gas pipeline, Claimant would have been paying royalty to Balochistan, sought to have the GOB as an equity stakeholder and planned to engage with local communities to provide ongoing support for the project. Mr. Livesey also explained the basis on which Claimant had concluded that the pipeline was a cheaper and safer option than using trucks or railway for transportation of the concentrate, which included the consideration that pipeline patrols could be sourced from

¹⁰⁹² Decision on Jurisdiction and Liability, ¶¶ 1231-1233.

¹⁰⁹³ **Exhibit RE-119 / Exhibit RE-576-6.01**, p. 71.

¹⁰⁹⁴ Decision on Jurisdiction and Liability, ¶ 1249; Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1262 lines 7-13.

¹⁰⁹⁵ Decision on Jurisdiction and Liability, ¶ 1250; **Exhibit CE-98 / RE-576-2**, p. 2-9; **Exhibit CE-255 / RE-576-19**, p. 19-40.

local people while the trucking fleet would have to be sourced from outside of Balochistan.¹⁰⁹⁶

874. The Tribunal noted in its Decision on Jurisdiction and Liability that there were some “*residual risks*,” including security risks, which were identified in the chapter on asset valuation but for which no value was included in the economic valuation of the project.¹⁰⁹⁷ Referring to the scope of its analysis at liability stage, the Tribunal did not agree with Respondent that TCCP therefore failed to adequately address the security risks but considered it plausible that not all risks could be fully assessed or quantified at such an early stage of the project and that the risk mitigation strategy would evolve over time and the further development of the project.¹⁰⁹⁸ Also noting that the GOB had never raised any concerns regarding the security of the pipeline, even though it had been aware of this option since December 2007, and that security risks were not mentioned in the Notice of Intent to Reject, the Tribunal was not convinced that this additional reason invoked by Respondent in the arbitration played any role in the decision-making process of the Licencing Authority in November 2011.¹⁰⁹⁹
875. By contrast to the allegation that TCCP failed to fully assess the water source for the project, the allegation that it failed adequately to assess the security risks for the pipeline did not form part of Respondent’s Reconsideration Request which it filed shortly after submission of its Counter-Memorial on Quantum. However, the Tribunal agrees with Respondent to the extent that its more general note regarding the scope of its findings in the Decision on Jurisdiction and Liability is worth recalling in the present context as well. Specifically, the Tribunal noted that it “*did not make a finding in the liability phase that the Feasibility Study fully reflected the true value of the project at the time. It only assessed the arguments presented by Respondent at the time in support of its position that denial of the Mining Lease Application was based on justifiable reasons.*”¹¹⁰⁰ Similarly to the issues regarding water and metallurgy, which were explicitly discussed in the Decision on Respondent’s Reconsideration Request, neither of the Parties presented any opinions from independent experts on the security plan for the pipeline or the project in general in the liability phase as they have now done in the quantum phase. Consequently, the Tribunal will also make its findings on security based on the Parties’ completed written submissions and the hearing of the fact and expert witnesses during the Hearing on Quantum.

¹⁰⁹⁶ Decision on Jurisdiction and Liability, ¶¶ 1251-1252; Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1255 line 10 to p. 1256 line 3, p. 1264 line 18 to p. 1265 line 12 and p. 1274 line 11 to p. 1275 line 9.

¹⁰⁹⁷ Exhibit RE-133 / RE-576-28, p. 28-30.

¹⁰⁹⁸ Decision on Jurisdiction and Liability, ¶ 1253.

¹⁰⁹⁹ Decision on Jurisdiction and Liability, ¶¶ 1253-1255.

¹¹⁰⁰ Decision on Respondent’s Reconsideration Request, ¶ 99.

876. The Tribunal notes that while the allegation in the liability phase was limited to the security risks regarding the slurry concentrate pipeline which was supposed to transport the concentrate from Reko Diq to Port Gwadar, Respondent's argument in the present phase is broader in that it alleges that Claimant generally failed to address the security risks that the Reko Diq project faced. However, the debate between the Parties and their experts again focused on the slurry pipeline. Two further aspects were, rather briefly, mentioned, *i.e.*, the central facilities at Reko Diq and the water supply pipeline from the Fan Sediments to Reko Diq. The Tribunal will therefore first address Claimant's security plan for the project's central facilities and then turn to the security plan for the off-site facilities and, in particular, the slurry concentrate pipeline.

i. Whether Claimant Adequately Accounted for the Security of the Project's Central Facilities at Reko Diq

877. As for the central facilities, Respondent contends that Claimant "*only planned to secure the central mining site to a minimum adequate level, avoiding best practices*" and considers the security plan for the central facilities of "*low average standard.*"¹¹⁰¹ Respondent's expert Mr. Davies stated in his first report:

*"Chagai district, in which Reko Diq is situated, experiences a low frequency of serious security incidents compared to many other districts in Balochistan. The apparent reasons for this are subtle and are explained in Section Two of our report. In theory, this isolates Reko Diq from the worst effects of the Baloch separatist insurgency and, as a result, mining operations at Reko Diq itself could probably have proceeded with a significant but tolerable level of risk after mitigation had been implemented."*¹¹⁰²

878. Mr. Davies further considered that there were "*some positive elements in TCC's approach to security planning,*" which included that "[t]he strategy for protecting the central facilities at Reko Diq met what we would consider to be an acceptable standard." Mr. Davies also referred to Claimant's "*sensible measure*" to fly in non-local workers into Reko Diq, the issuance of weekly and monthly security reports which he considered to be "*of an average standard compared across the security management industry,*" the commissioning of a Security Risk Assessment by SOS International and the conducting of risk workshops, which included a focus on security risks. Mr. Davies concluded that "*[m]any of these measures are in-line with what would be expected of an operating company at this stage of the project cycle. However, in overview we would characterise the security content of TCC's Feasibility Study as achieving a low-average standard compared to industry peers.*"¹¹⁰³ While noting that Claimant's security plans were

¹¹⁰¹ Respondent's Rejoinder on Quantum, ¶ 257.

¹¹⁰² Davies I, p. 4.

¹¹⁰³ Davies I, p. 10.

generally “*of an acceptable standard,*” Mr. Davies criticized an absence of any plans for the security of the export pipeline. Similarly, while Mr. Davies further considered that “[t]he security budget for the central facilities appears to be appropriate, although we interpret the standards for fencing to be below what is normally implemented for critical national infrastructure facilities,” he then criticized the budget for protecting the export pipeline as “*grossly inadequate.*”¹¹⁰⁴

879. Based on case studies set out in detail in his report, Mr. Davies provided a summary of his “*cost estimates for security in this type of high threat environment,*” which included an item “*Security hardware to protect central production facilities*” with an CAPEX estimate of USD 20-25 million, noting that “[t]his is based on a higher standard of protection than that described in TCC’s FS and it aligns with other benchmarked projects in comparable threat environments that have implemented a CNI approach to security risk mitigation.”¹¹⁰⁵

880. Mr. Davies derived this estimate from a case study of oil producing field in Oman. Following an outline of the “*key line components of the mitigation strategy,*” Mr. Davies stated that “[t]he specifications are broadly aligned with those described in TCC’s FS, although they are more clearly defined because they reference internationally recognised standards.” He noted that “[t]he main difference is the standard of perimeter fencing.” Mr. Davies stated that the overall cost for these components slightly exceeded USD 50 million, which he considered to be “*at the high end of the range*” due to the standards imposed by the Government of Oman and therefore concluded that “*a CAPEX in the region of US\$ 20 – 25 million would be reasonable balanced against the realistic level of threat. This is therefore the figure we suggest as a benchmark for the Reko Diq project,*” i.e., the “*likely costs of the security hardware to protect the central facilities.*”¹¹⁰⁶

881. Claimant’s expert Mr. Ridley agreed with Mr. Davies’ conclusions that Claimant’s “*strategy for protecting the central facilities at Reko Diq met ... an acceptable standard*” and that “*mining operations at Reko Diq itself could probably have proceeded with a significant but tolerable level of risk after mitigation had been implemented.*”¹¹⁰⁷ He noted that this was in line with the determination in SOS International’s Security Risk Assessment in 2006 that “[d]espite the fact that Pakistan represents a significant risk to specific assets and business operations, strategic planning and supported procedures will ensure a permissible operations environment for businesses.”¹¹⁰⁸ Mr. Ridley further

¹¹⁰⁴ Davies I, pp. 10-11.

¹¹⁰⁵ Davies I, p. 76.

¹¹⁰⁶ Davies I, pp. 71-72.

¹¹⁰⁷ Ridley, ¶ 38.

¹¹⁰⁸ Exhibit CE-1279, ¶ 1.1.1.

agreed with Mr. Davies' conclusion that "[t]he security budget for the central facilities appears to be appropriate."

882. As for Mr. Davies' estimate of additional CAPEX costs for security hardware to protect the central production facilities, Mr. Ridley explained why, in his opinion, the higher costs were unnecessary and even counterproductive:

"A higher standard of perimeter fence would have been unnecessary under the circumstances. In the IMD Feasibility Study, TCC provided for a 2 m high chain link perimeter fence 'with the capability of being upgraded to a medium security fence that would include razor wire coils on top and bottom, if deemed necessary.' TCC intended the perimeter fence to serve as 'a site demarcation boundary to prevent unintentional intrusion, and will serve as a deterrent for intentional pedestrian or vehicle intrusion.' Any sensitive areas received higher protection, including high security areas surrounded by 'two parallel 3 m high chain link fences with a 10° angled fence facing outwards and a 5 m wide patrol road in between' with 'a 0.75 m barbed tape coil on top and two 0.90 m coil of flat wrap barbed tape on the bottom.' Applying S-RM's proposed level of security to the entire perimeter added little value, while also harming community relations and caused human rights issues by restricting access for local Bedouins and migrant travellers passing through the areas."¹¹⁰⁹

883. Mr. Ridley further considered that Mr. Davies did not provide sufficient information for his conclusion that a figure of USD 20-25 million would have been appropriate or what costs this figure would include.¹¹¹⁰

884. At the outset of his second report, Mr. Davies noted that he had provided "*an objective and balanced commentary on TCC's approach to security risk assessment and mitigation. Where the facts and methodology are appropriate, I have chosen not to question TCC's work. For example, I am content to leave undisturbed TCC's overall security plan at the mine's central facilities and the general approach used in the ESIA.*"¹¹¹¹ Specifically with regard to the protection of Reko Diq's central facilities, he clarified the following:

"I regard TCC's security plans for the central facilities as reaching a minimum acceptable standard, as measured against industry peers. TCC's approach to security planning is not revolutionary, but merely adheres to common practices (and not necessarily 'best' practices) in the extractive industries. For example, my explanation of perimeter protection standards at paragraph 3.3.2 below, makes it clear that TCC, advised by International SOS, intended to implement a level of protection below accepted UK and EU norms. I accept that this does not necessarily imply a 'kill point' for the project, for reasons I have explained in my First Expert Report. However, it

¹¹⁰⁹ Ridley, ¶ 100, quoting from **Exhibit RE-576-19**, p. 19-13.

¹¹¹⁰ Ridley, ¶ 101.

¹¹¹¹ Davies II, pp. 7-8.

does lead me to question whether TCC understood fundamental principles in aligning mitigation with threat.”¹¹¹²

885. Mr. Davies restated his critique regarding a “*low standard of perimeter protection*” below “*the currently established benchmark in the UK and the European Union*” and maintained his conclusion that “*TCC’s plans for the central facilities were ‘a low-average standard compared to industry peers’. TCC was accepting common practice, not pursuing best practice.*”¹¹¹³ Mr. Davis further stated that “[i]n the case of the central facilities, because protecting a static site is a straightforward security management task, I accept that the plan would most likely have developed. Over time, TCC may have achieved a tolerable balance of risk versus mitigation. It can also reasonably be argued, that companies can absorb high consequences, resulting from attacks on central facilities, if their risk tolerance is high enough.”¹¹¹⁴
886. Based on the opinions offered by the Parties’ experts, the Tribunal considers it common ground that Claimant’s security plans for protecting the project’s central facilities at Reko Diq met an acceptable standard. While Mr. Davies clarified in his second report that he considered specifically the plans for the central facilities to be of “*low-average standard*” (in his first report, Mr. Davies had used this term to describe the security content of the Feasibility Study as a whole, *i.e.*, including the plans for the pipeline), he also stated that he was “*content to leave undisturbed TCC’s overall security plan at the mine’s central facilities*” and identified only one specific criticism regarding the standard of the perimeter fence. In this regard, the Tribunal notes that Mr. Davies did not engage in his second report with the arguments raised by Mr. Ridley that the Feasibility Study also included higher protection for sensitive areas and that a higher perimeter would have added little value and even harmed community relations. Mr. Davies also did not provide any additional information as to how he had arrived at his estimate of additional CAPEX required to implement the higher security standard he considered appropriate. In the absence of any further substantiation, the Tribunal is not convinced that a buyer would have included the additional CAPEX estimate of USD 20-25 million in its valuation of the Reko Diq project.
887. The Tribunal has no reason to believe that a buyer in November 2011 would have considered Claimant’s security plans for protecting the central production facilities at Reko Diq, including the cost estimates, insufficient. In addition, the Tribunal notes that Mr. Davies explicitly accepted in his second report that the security plan for the central facilities “*would most likely have developed*” and that “[o]ver time, TCC may have achieved a tolerable balance of risk versus mitigation.” In the Tribunal’s view, it is

¹¹¹² Davies II, p. 8.

¹¹¹³ Davies II, pp. 11-12.

¹¹¹⁴ Davies II, pp. 12-13.

plausible and confirmed by the record that Claimant would have continued to develop its security plans and risk mitigation strategies and that it would also have been able to react to a potential change in the assessment of certain risks. Consequently and given the absence of a substantiated challenge regarding the cost estimates included in the Feasibility Study for the central facilities, the Tribunal concludes that Claimant's security plans for the project's central facilities would have been considered adequate for a project at the development stage of Reko Diq.

ii. Whether Claimant Adequately Accounted for the Security of the Project's Off-Site Facilities, in Particular the Pipeline to Port Gwadar

888. With regard to the security of the off-site facilities, the criticisms raised by Respondent and its expert concerned primarily the slurry concentrate pipeline from Reko Diq to Port Gwadar. However, the Tribunal notes that Respondent also referred to the water supply pipeline from the Fan Sediments to Reko Diq and considered that “[b]oth of these pipelines would have been vulnerable to even rudimentary attacks using rockets, grenades, or improvised explosive devices (IEDs), all of which are common weapons in Balochistan.”¹¹¹⁵
889. Mr. Davies noted in the context of a summary he provided on opinions expressed by “experienced and non-aligned mining investors and senior executives” on the insurability of the Reko Diq project that these individuals considered “[m]ost aspects of the project would have been insurable, but WTPV risks looked very negative with respect to the export pipeline, and to a more or less equal extent the water supply pipeline.”¹¹¹⁶ Mr. Davies did not provide any further assessment or opinion on the costs estimated by Claimant for protecting the water supply pipeline. In his second report, Mr. Davies restated his concerns regarding the vulnerability of the slurry pipeline and noted that “the known threats in the operating area ... apply to other commercial operations outside the perimeters of the central facilities, not just the slurry pipeline.”¹¹¹⁷ He did not provide any further assessment regarding the security risks affecting other commercial operations such as the water supply pipeline.
890. On that basis, the Tribunal considers that while it has no basis for calling into question specific cost estimates with regard to the water supply pipeline, it will bear the argument in mind that certain risks affecting the slurry pipeline could likewise have affected the water supply pipeline (or other commercial operations outside Reko Diq) and that such risks should therefore be addressed with regard to both pipelines in a valuation of the Reko Diq project.

¹¹¹⁵ Respondent's Counter-Memorial on Quantum, ¶ 267.

¹¹¹⁶ Davies I, p. 24.

¹¹¹⁷ Davies II, p. 7.

891. Consequently, the Tribunal will now turn to the dispute between the Parties as to whether Claimant had a feasible plan to address the security risks affecting the slurry pipeline from Reko Diq to Port Gwadar and whether the Feasibility Study and/or Prof. Davis adequately accounted for these risks in their estimate of the associated cost impact.
892. In October 2009, the company Pipeline Systems Incorporated (PSI) completed a Reko Diq Concentrate Pipeline Bankable Feasibility Study, which was appended to the Feasibility Study. In this report, PSI provided an estimate of the total capital costs “for the Reko Diq Copper concentrate pipeline and associated facilities in PSI’s scope,” which amounted to USD 318.6 million for the route to Port Gwadar. PSI expressly noted that “[i]tems that are not included in the capital cost estimates” were, *inter alia*, “Extraordinary security for Stations or Pipeline and associated facilities.”¹¹¹⁸ In Chapter 16 on Pipeline CAPEX and OPEX, PSI clarified that “[t]his capital cost estimate does not include any extraordinary provisions for security either during construction of the facilities described here in or for the completed facilities after construction or for day to day operations.”¹¹¹⁹ Specifically with regard to the four pump stations along the pipeline route, PSI noted that its estimate “includes a minimum security provision, which could be considered normal for most remote locations. We believe that this level of security for this project may be inadequate considering the local political environment; the owner may decide to take extraordinary precautions to protect these facilities.”¹¹²⁰ In addition, PSI made the statement on which Respondent had also relied in the liability phase of the arbitration:

*“Safety and Security - The safety and security only includes minor support for the offices. No safety and security has been included in the estimate due to the unknown issues related to Pakistan. These issues need to be understood to provide a better cost estimate for this important task.”*¹¹²¹

893. Based on these express statements, it can be considered common ground that the capital cost estimate provided by PSI did not include costs for “extraordinary security” and that, as indicated by PSI itself, it was therefore appropriate to include additional security costs accounting for “the local political environment” and “the unknown issues related to Pakistan” in the estimate for capital and operating expenses in the Feasibility Study. In this regard, Claimant again referred to Mr. Livesey’s testimony at the Hearing on Jurisdiction and Liability that security risk issues were not within the expertise of PSI and were therefore “transferred across to security which, primarily for this project was handled by Barrick’s global security VP and his team in Toronto. And it was input from

¹¹¹⁸ Exhibit RE-576-6.01, p. 11.

¹¹¹⁹ Exhibit RE-576-6.01, p. 64.

¹¹²⁰ Exhibit RE-576-6.01, p. 71.

¹¹²¹ Exhibit RE-576-6.01, p. 71.

*them that added security into the CAPEX and OPEX in the Feasibility Study under G&A.*¹¹²²

894. As pointed out by Claimant, the Copper Transportation Trade-off Study, which was also appended to the Feasibility Study as Appendix 30.02, noted in the chapter on the slurry concentrate pipeline that the capital and operating costs for the concentrate pipeline and associated facilities prepared by PSI excluded certain items such as “*Extraordinary security for Stations or Pipeline and associated facilities*” and stated that “*SLI has prepared and included the costs for the excluded items.*”¹¹²³

895. This separation of tasks is confirmed in the Feasibility Study’s chapter on capital costs:

“The capital cost estimates of the pipeline have been based on the pipeline route alignment developed using Google Earth and verified during the field trip as much as possible and the pipeline design developed by PSI during a feasibility study that is detailed in this report.

Provisions for security during construction of the facilities and for the completed facilities after construction of for day to day operations have been included by SLI.”¹¹²⁴

896. Specifically with regard to security for the pumping stations which PSI had considered potentially inadequate, it is noted that “[a]dditional fencing has been added by SLI for security purposes.”¹¹²⁵ As pointed out by Respondent, the Feasibility Study further incorporated – without any changes – the statement made by PSI on “*Safety and Security*” which is quoted in paragraph 892 above. However, given that a whole section of PSI’s report was incorporated into this particular section of the Feasibility Study and taking into account the other references that SLI in fact did include additional security provisions for the slurry pipeline, the Tribunal considers it plausible that the PSI statement was only a remnant that Claimant omitted to amend.

897. Based on a comparison of the capital cost estimate prepared by PSI and the capital cost estimate included in the chapter on capital costs in the Feasibility Study, it is apparent that the costs for the security provisions included by SLI were not directly added to the capital cost estimate for the pipeline. Specifically, PSI concluded that the sub-total capital cost (before EPCM and contingency) were USD 232.2 million plus 3.8 million for spares and commissioning, *i.e.*, approximately USD 236 million. PSI also recommended a contingency of USD 47.2 million.¹¹²⁶ As per the Contingency Summary contained in the chapter on capital costs in the Feasibility Study, Claimant included a capital cost estimate

¹¹²² Transcript (Day 5), p. 1262 lines 7-13.

¹¹²³ **Exhibit RE-138**, p. 12.

¹¹²⁴ **Exhibit RE-576-23**, p. 23-19.

¹¹²⁵ **Exhibit RE-576-23**, p. 23-25.

¹¹²⁶ **Exhibit RE-576-6.01**, p. 64.

for “*Slurry Pipeline (PSI)*” of USD 236.3 million and a contingency of USD 47.3 million.¹¹²⁷

898. However, it is stated in the Feasibility Study that the owner’s cost estimate includes, *inter alia*, the following information and project data: “*security costs estimate: manpower readiness (December 2009) by TCC.*”¹¹²⁸ While the owner’s cost does not include a specific line item for security, it is explained that the line item “*field general expenses*” representing 36% of the owner’s cost includes an estimate of USD 2.06 million for security contractors, which is based on information provided by TCC’s security team, and also provides a breakdown of this estimate.¹¹²⁹
899. Claimant further pointed to the chapter on security in which it is stated that “[t]he off-site facilities security system will encompass the following: three slurry pipeline pump stations; and raw water pump station plus booster pump station.” It is further stated that “[t]he defined security system equipment and materials are included in the cost estimates for this FS. The security system is to ensure security access and control and the CCTV system design to ensure the integrity of the mine and off site facilities.” The chapter then provides a detailed description of the integrated CCTV (closed circuit television) and access control system, access cards and detection system.¹¹³⁰ As part of the chapter on Security Action Management Plans, reference is made to a Product Transportation Plan including the following measures:

“Product will be sent via concentrate pipeline direct to Port Gwadar via four pump stations, one on site and three pump stations on the pipeline.

These pump stations will be secured by a high security fence and manned by a team led by a TCC security officer and three supervisors working 24 h/d, 7 d/wk. They will be assisted by two levies per shift and locally employed Chokidars/watchmen.

The access road will be patrolled by a security officer and levies in a vehicle supplied by TCC. They will be stationed at each pump station.

Each vehicle will be supplied with adequate communications to enhance their effectiveness. These security vehicles will be fitted with GPS monitoring capability.

Slurry will be subject to density monitoring/process control as it leaves the mill site and arrives at any offsite dewatering facilities.

¹¹²⁷ Exhibit RE-576-23, Table 23.20.

¹¹²⁸ Exhibit RE-576-23, p. 23-30.

¹¹²⁹ Exhibit RE-576-23, p. 23-36 and Table 23.12.

¹¹³⁰ Exhibit RE-576-19, pp. 19-20 to 19-23.

All vehicles entering TCC areas will need to go through security clearances/scanning at security checkpoints outside/within perimeter fenced areas.

Further detail can be found in Section 9, Infrastructure and Services.”¹¹³¹

900. Specifically with regard to the construction phase, it is stated that the concentrate and water pipelines and pumping stations will be monitored as follows:

“Concentrate Pipeline

The concentrate pipeline, and pumping stations will be patrolled by a patrol consisting of a light truck, a driver, and a guard on a 24 h/d, 7 d/wk basis. In addition, the valve and choke stations will be monitored by an alarm system.

Water Pipeline and Pumping Stations

The water pipeline and pumping stations will be monitored by a Chokidars, who will be supported by patrol consisting of a light truck, a driver, and a guard between the Fan Sediments and site. In addition, the pumping stations will be monitored by an alarm system.”¹¹³²

901. As for the operations phase, similar statements are made:

“Concentrate Pipeline and Panjgur Rest Stop

The concentrate pipeline route, choke and valve stations, and Panjgur drivers’ rest stop will be patrolled by a light truck, a driver, and a guard on a 24 h/d, 7 d/wk basis. The three stations will be monitored by CCTV and access control and alarm systems.

Water Pipeline and Pumping Stations

The water pipeline and pumping stations will be patrolled by a roving patrol. The pump stations will be monitored by an alarm system.”¹¹³³

902. The Tribunal has not been provided with any indication that the capital costs for the security measures described in the chapter on security were not included in the capital cost estimate provided in the Feasibility Study.

903. In addition to capital costs, Mr. Livesey also testified that security costs were added to the OPEX estimate under G&A. As pointed out by Claimant, the G&A Operating Cost Breakdown includes a line item “*Security*” which is accounted for with USD 0.06 per ton of ore milled over the life of operations.¹¹³⁴ In absolute terms, Claimant estimated that G&A costs would include annual costs of 2.3 to 2.5 million per year for security.¹¹³⁵ The following explanation was provided with regard to the “*security*” line item:

¹¹³¹ Exhibit RE-576-19, p. 19-27.

¹¹³² Exhibit RE-576-19, p. 19-37.

¹¹³³ Exhibit RE-576-19, p. 19-40.

¹¹³⁴ Exhibit RE-576-1, Table 1.31 and Exhibit RE-576-24, Table 24.5.

¹¹³⁵ Exhibit RE-576-24, Table 24.12.

“It is envisaged that the security forces required during operations phase will be a combination of TCC personnel supervising a security contractor, plus Frontier Corps (FC) personnel and police support (Levies).

For the purposes of the OPEX estimate, the security staff was estimated to be comprised of:

- *TCC personnel: a security country manager, site managers, superintendent, senior security officers, senior supervisors, supervisors, control room operators, security drivers and guards. A total payroll of 115 people;*
- *Security contractor: a third party service administered by TCC personnel and composed mainly of supervisors and guards. A total of 67 people with a cost of \$3 750/person/a;*
- *Frontier Corps (FC): a Federal military force with personnel recruited mostly from the tribal areas and with officers from the Pakistani Army. A force of 200 persons was included in the estimate. A total of \$96 600/a was allocated to supporting the government personnel (it is assumed that sporadic lodging and catering is included in this cost);*
- *Police Corps: all operational activities of the Balochistan police force are being supervised and monitored from the central police office in Quetta. A total of \$91 500/a was allocated for supporting the government personnel (this includes sporadic lodging and catering); and Chokidars / Watchmen: composed of patrol and guard personnel. A total force of 44 persons at a total annual cost of \$75 900/a was allocated for this item.*

An allowance was made to include security audits performed by a national contractor.”¹¹³⁶

904. Against this background, the Tribunal cannot follow the argument that the capital and operating cost estimates in the Feasibility Study did not include any security costs for the pipeline. To the contrary, the chapter on security set out the security measures that Claimant was planning to implement for the slurry pipeline (as well as for the water supply pipeline) and the chapters on capital and operating costs included corresponding estimates for the costs associated with implementing these measures.

905. The question that remains to be answered is whether these estimates and the underlying security measures that Claimant was planning to implement would have been considered adequate and sufficient by a buyer in November 2011.

906. Mr. Davies stated in his first report that in his opinion, Claimant included “*wholly inappropriate and impractical planning and budgetary assumptions for pipeline security in the Feasibility Study.*” He noted that “[p]ipeline security is not explicitly mentioned in the applicable line items of TCC’s Risk Register (i.e. SEC 03 & SEC 10), and we therefore assume that TCC did not formally assess the security risks to the export pipeline.” Based

¹¹³⁶ Exhibit RE-576-24, pp. 24-32 to 24-33.

on the case studies presented in his report, Mr. Davies considered it mistaken to assume that buried pipelines would be less vulnerable to sabotage and that natural gas pipelines would be more “*politically charged*” than other types of pipelines. In his opinion, “*TCC’s apparent failure to appreciate the threats to the export pipeline and the aggregated consequences of sabotage would have introduced a very significant probability of project failure.*”¹¹³⁷

907. Mr. Davies raised concerns with regard to what he considered to be an “*absence of any plans dealing with the security of the export pipeline. We accept that construction and operation of the pipeline would happen later in the project, but we would expect at least some meaningful planning estimate to have been conducted, in order to support considerations about the feasibility of perhaps the most important part of the project plan.*” Specifically, Mr. Davies considered that the “*Security Execution Plan for Transportation Rout [sic] Survey*” was no more than a survey of the pipeline route in October 2008 and labelled the quality of the document “*concerning.*” Mr. Davies also expressed the opinion that “[*t*]he budget for protecting the export pipeline is grossly inadequate. We assert that this is because TCC’s security department seriously misunderstood the inherent vulnerabilities of pipelines in high threat environments and thus could not provide a sensible cost estimate for protecting the pipeline.”¹¹³⁸
908. Based on a case study of an oil export pipeline in the Kurdish region of Iraq, Mr. Davies provided an estimate of what he considered necessary to protect the slurry pipeline from Reko Diq to Port Gwadar. He stated that the “*key line components of the pipeline protection strategy*” for the Iraq oil pipeline included “[*o*]ne permanent guard post every 2km,” with “[*e*]ach guard post [*being*] manned by 20 soldiers,” resulting in “*approximately 450 soldiers for the pipeline’s 45km length*” and an approximate cost of USD 8.2 million per year. According to Mr. Davies, such cost is “*in line with expectations, based on similar projects in moderate to high threat environments*” and referred to another case study he had presented on a zinc mining project in Yemen which included a 4km water pipeline guarded by 60-75 soldiers at a time. He considered the total manpower requirement “*realistic in the absence of an automated alarm triggering system.*”¹¹³⁹
909. On the assumption that there is a linear relationship between troop levels and length of the pipeline, Mr. Davies scaled up the troop levels deployed in Iraq to the length of the Reko Diq pipeline and concluded on “*6,820 personnel to secure the entire pipeline.*” Mr. Davies himself noted that “[*a*]t first glance this might appear to be a grossly inflated figure” but considered it supported by the “*9,000*” personnel deployed to protect the Sui

¹¹³⁷ Davies I, p. 4.

¹¹³⁸ Davies I, pp. 10-11.

¹¹³⁹ Davies I, pp. 72-73.

gas pipeline. Mr. Davies further noted that two Pakistani army officers serving with the Frontier Corps provided the same estimate for dealing with this task but that they had also “*considered the task to be ‘impossible’ in practice, owing to their own experiences of Baloch insurgents. Apart from the impractical scope of the defensive task, the officers’ main objection was the threat to patrols and resupply movements off-road in the vicinity of the pipeline.*” Mr. Davies also noted that “[i]n the absence of effective technology such as surveillance UAVs (drones) and Distributed Sensing, the manpower required to ensure adequate levels of protection will grossly breach the reasonable component of the ALARP principle.”¹¹⁴⁰

910. Mr. Davies himself considered that the cost resulting from his estimate of required manpower was “*of course unrealistic*” and therefore considered that Claimant “*should have considered options that combined detection and alerting technology with a more flexible armed response based on more intelligent deployment of personnel.*” He nevertheless provided a calculation of the “*costs of relying on manpower alone to provide adequate protection to the export pipeline*” based on pay scales advised by a serving officer and estimated that costs for soldiers, weapons and vehicles would together require an additional CAPEX of USD 13.68 million and an additional OPEX of USD 20.52 million per year.¹¹⁴¹
911. Mr. Davies then considered alternative options for protecting the pipeline “*without reducing mitigation below a tolerable level*” but considered that: (i) “*reducing troop deployment numbers to save costs would clearly not be justifiable*”; (ii) employing drone technology would have been “*unlikely ... to offer significant cost reductions*” given the constraints against this technology and the unavailability of commercial drone technology in November 2011; and (iii) “*transferring the risk to insurance is unrealistic based on TCC’s own admission.*” Mr. Davies therefore concluded that “*given such an unfavourable balance between risk and cost of mitigation, terminating the activity appears to be the most viable course of action*” and “*other means of exporting product should be considered potentially more viable than the pipeline.*” Noting that “*rail transport is too inherently vulnerable to sabotage to be seriously considered as a viable option, and in this respect rail compares closely to pipelines,*” Mr. Davies concluded that “[b]ased on our own experience, we consider than large and less frequent convoys, packaged with robust defensive armed escorts, offer the optimum cost versus mitigation balance.”¹¹⁴²
912. In his summary of costs, Mr. Davies included the CAPEX and OPEX estimates for a 6,820 men force but noted that “[t]his level of cost may well be considered unrealistic. If

¹¹⁴⁰ Davies I, p. 73.

¹¹⁴¹ Davies I, p. 74.

¹¹⁴² Davies I, p. 75.

so, then S-RM contends that the export pipeline option is potentially unviable.” Mr. Davies also provided a CAPEX estimate of “< 1.0M” for the use of a distribution sensing system and of “0.5 – 1M” for surveillance UAVs.¹¹⁴³

913. Mr. Ridley raised several criticisms with regard to Mr. Davies’ assessment, in particular that Mr. Davies failed to analyze the available documentation of Claimant’s risk security assessment but instead relied on unrelated and often unidentified sources as well as “irrelevant case studies” all of which concerned oil and gas pipelines.¹¹⁴⁴ In his opinion, “TCC adequately considered and addressed the existing, relevant and foreseeable security threats specific to the contemplated slurry concentrate pipeline.” Mr. Ridley further considered that Claimant’s evaluation of residual risk was in line with international standards and “contributed to the security risks being minimised as far as reasonably practicable.”¹¹⁴⁵ Mr. Ridley further considered that “while TCC’s security planning frames the threat perception in terms of the foreseeable future, TCC also provided for a progressive roll out and scale of implementation that would correspond with the evolution and development of the project. This level of flexibility would have allowed TCC to adjust its approach to meet changing levels and types of security risks throughout the life of the project.” Mr. Ridley stated that Claimant’s security cost estimates were based on “careful consideration of the security threats and an evolving strategy to meet them” for which he considered there to be “ample proof.” He added that his “advice in November 2011 would have been that the project could proceed from a security perspective.”¹¹⁴⁶
914. With regard to Mr. Davies’ cost estimates, Mr. Ridley reiterated that Mr. Davies’ case studies did not include any example from the mining sector, noting Mr. Davies’ statement that S-RM did not have experience with mining projects of this scale. In his opinion, “guard posts would not need to be any closer than an average of 100 kilometers apart” and “[o]ut of an abundance of caution, [Mr. Ridley] would have recommended at least five mutually supporting security posts along the entire length of the proposed pipeline.” Describing further precautions he would have recommended but also considered sufficient, Mr. Ridley stated that these “could be implemented at a fraction of the cost that S-RM proposes, remaining well within TCC’s budget.”¹¹⁴⁷ By contrast, Mr. Ridley considered that Mr. Davies’ estimate of required manpower was “more reminiscent of the days of the Berlin wall than of any modern security approach in order to protect a buried slurry concentrate pipeline” and noted that Mr. Davies himself admitted the possibility of using surveillance technology such as a detection and alerting system to trigger an

¹¹⁴³ Davies I, p. 76.

¹¹⁴⁴ Ridley, ¶¶ 32-36.

¹¹⁴⁵ Ridley, ¶¶ 51-52.

¹¹⁴⁶ Ridley, ¶¶ 79-81.

¹¹⁴⁷ Ridley, ¶¶ 83-89.

armed response before a breach occurs and estimated a cost of USD 1.5-2 million. Mr. Ridley further stated that Mr. Davies' approach "*contravened specific consideration and prevention strategy noted in numerous community relations assessments not to use armed military personnel as a substitute for civilian security personnel due to potential human rights violations—thereby opening the project up to further risks, rather than reducing them.*" In his opinion, the estimate was also superficial as it ignored the four different types of terrain and visibility calling for a different range within which outposts should be placed and failed to take into account relevant cost savings.¹¹⁴⁸

915. Mr. Ridley concluded:

*"Thus, in my professional opinion, S-RM's cost estimates are not credible. As a security professional, I would never advise or employ S-RM's proposed strategy, and would never suggest establishment of so many fixed locations and the expenditure of such high levels of capital. Better, more cost efficient options would entail mobile assets, frequent patrolling, leveraged technologies, more competent personnel and active, experienced oversight—all of which are more in line with TCC's proposal than with SRM's inflated estimates."*¹¹⁴⁹

916. In his second report, Mr. Davies maintained his concerns regarding the protection measures contemplated by Claimant for the slurry pipeline which, in his opinion, "*were intended to mitigate theft and casual interference, not sabotage by skilled insurgents using explosives.*"¹¹⁵⁰ He further continued to "*attach little value to TCC's protection plan*" for the pipeline based on the "*basic observations*" that: (i) Claimant "*did not draw the right lessons from the insurgency in Balochistan and from other examples of pipeline sabotage,*" expressly referring to the attack on the slurry pipeline of the Freeport Grasberg Mine in Indonesia referenced in PSI's draft report; and (ii) Claimant continued to rely on the "*inappropriate*" plan to bury the pipeline to make it resilient against sabotage. Mr. Davies further emphasized that the "*leveraged technologies*" offered by Mr. Ridley were not included in Claimant's "*extraordinary*" security costs referred to by Claimant and there was no evidence that such mitigation measures were considered by Claimant at the time.¹¹⁵¹ As a second observation, Mr. Davies pointed out that the decision to construct the pipeline was taken only after the Security Risk Assessment had been carried out by International SOS and that he would have expected "*to see an equally detailed supplementary security risk assessment for the pipeline's proposed route(s).*" In the absence of evidence that there was "*an adequate level of scrutiny*" and based on his review of the proposed mitigation measures, Mr. Davies maintained the opinion that

¹¹⁴⁸ Ridley, ¶¶ 90-98.

¹¹⁴⁹ Ridley, ¶ 115.

¹¹⁵⁰ Davies II, p. 2.

¹¹⁵¹ Davies II, pp. 9-10.

*“TCC’s proposed mitigation plan for the pipeline is well below what I would consider reasonable, when measured against the potential threats.”*¹¹⁵²

917. In the Tribunal’s view, Mr. Davies’ statements in his second report confirm that the main issue in dispute between the Parties is whether Claimant sufficiently accounted for the risk of sabotage and/or attacks on the pipelines by insurgent groups in Balochistan. While there is common ground regarding the presence of insurgent groups in Balochistan and the existence of a risk that critical infrastructure of the project might be subject to an attack, the Parties and their experts have fundamentally deviating views regarding the level of risk affecting specifically the slurry pipeline and the security measures that could or should have been implemented to address this risk.
918. In this regard, the Tribunal notes that while Mr. Davies included in his first report an estimate of costs required to deploy 6,820 armed guards for protection of the pipeline, he noted himself that “[t]his level of cost may well be considered unrealistic” and did not recommend that these measures should be adopted in reality. However, Mr. Davies then took the opinion that the level of risk could not be mitigated to a tolerable level without such prohibitive costs and therefore concluded that the pipeline was not a viable option.
919. The Tribunal is not convinced by this opinion. In particular, Mr. Davies himself presented as an alternative to such a large number of armed guards the use of surveillance UAVs and distributed sensing systems and provided an CAPEX estimate of below USD 2 million for both measures. While Mr. Davies emphasized that these measures were not included in the cost estimates of the Feasibility Study, the Tribunal considers it plausible that the security plan would have continued to evolve over time and the development of the project, as Mr. Ridley also expressly confirmed. Mr. Davies pointed out that UAV surveillance was still evolving in 2011 but this does not mean that a buyer would therefore have ignored, or would have expected Claimant to ignore, an evolving technology that would likely become commercially available in the future. Mr. Davies also did not explain why he did not consider it a viable option to implement a distributed sensing system, except to reiterate that this system was not included in the Feasibility Study.
920. The Tribunal also takes note of Mr. Ridley’s opinion that “[o]ut of an abundance of caution, [he] would have recommended at least five mutually supporting security posts along the entire length of the proposed pipeline” and his reference to certain additional options regarding the communication and detection system that Claimant could have used. In Mr. Ridley’s opinion, these precautions “would have sufficed to protect the pipeline and could be implemented at a fraction of the cost that S-RM proposes, remaining well within TCC’s estimated budget.”¹¹⁵³ Mr. Davies has not provided a

¹¹⁵² Davies II, p. 10.

¹¹⁵³ Ridley, ¶¶ 87-89.

deviating estimate for the costs of Mr. Ridley's proposed security measures but the Tribunal considers the relatively marginal dimension of additional costs involved confirmed and in line with Mr. Davies' estimate for detection and surveillance technology.

921. In any event, the Tribunal is not convinced that the level of risk affecting the slurry pipeline was so high that that it would have rendered the slurry pipeline an unviable option if the implemented security measures did not serve to fully mitigate the risk of an attack. The Tribunal wishes to emphasize that it has taken Respondent's submissions as well as the opinions provided by Prof. Rais and Mr. Davies regarding the security situation in Balochistan, and specifically the districts through which the pipeline would go, very seriously. In particular, the Tribunal does not wish to take the complex situation outlined by Prof. Rais lightly nor does it wish to brush away the concerns that the slurry pipeline would have been subject to a considerable level of threat from insurgents and possibly even terrorists. However, the Tribunal also considers it established that the security situation was assessed and analyzed by Claimant's security team, supervised by Barrick's Global Security Vice President as well as by third-party consultants such as Mr. Ridley, and that mitigation measures were being developed and corresponding cost estimates were included in the Feasibility Study.
922. While Mr. Davies considered it a fundamental mistake to assume that burial of the pipeline would protect it against attacks, the Tribunal notes that Claimant and Mr. Ridley referred to various other arguments as to why it was concluded at the time that the slurry pipeline would be less vulnerable to attacks than oil and gas pipelines, such as the Sui gas pipeline. In particular, Claimant also pointed to: (i) the design and material of the pipeline and the relative ease of repairing it; (ii) the absence of flammable and combustible content; and (iii) the slow flow of the concentrate which could be discontinued and drained from the pipeline in case of a breach, all of which would reduce the damage inflicted and thus the incentive to attack in the first place.
923. In his direct examination at the Hearing on Quantum, Mr. Ridley referred to the only example of an attack on a slurry concentrate pipeline (in Indonesia in 1986) to which Mr. Davies had pointed in his second report. Mr. Ridley explained that he was personally involved in investigating the incident and reviewing the damage done to the pipeline at the Freeport Grasberg Mine. In response to the question what the impact of the incident involving the pipeline was to the operations of the mine, he testified:

"Negligible. The pipelines are routinely closed or suspended for both maintenance, repairs. And, in this instance, it was both negligible because the operations continued in other parts of the production.

The pipeline itself is merely a means of transportation from A to B. And the primary motivation of those people that were targeting the pipeline itself was

to extract the copper and gold concentrate. And, as a result, it was quickly responded, repaired to.

Take into consideration that this was an above-ground exposed pipeline, and even then, the overall disruption was minimal.

Q. When you say ‘minimal,’ what does that mean in terms of downtime?

A. In terms of the directly affected or associated reasons for closure, maybe a few hours, and it was either simply repaired or operations in pumping continued, even though it was breached. I used ‘breached’ as an exotic term for a hole because most of the holes that were put into the pipeline were using kitchen implements: Saws, picks, axe, anything they could get their hands on.”¹¹⁵⁴

924. Mr. Ridley further confirmed that the Grasberg Mine has “*been running for 50 years. The pipeline itself was installed in the late ‘70s ... and it still remains both active and profitable today.*”¹¹⁵⁵

925. Claimant also pointed to the description of the incident in Indonesia in OPIC Memorandum of Determinations of 1986 on which Mr. Davies had also relied for reference to this incident in his second report:

“At approximately 10:00 p.m. February 19 the slurry and fuel pipelines were severed by hacksaw in several locations resulting in a substantial loss of slurry, containing copper, silver and gold ores, and diesel fuel. Fires were set at the breaks along the fuel line. A party of police and security personnel was fired on while attempting to approach the site of the fuel fires. Shortly thereafter, the alleged saboteurs fled, the fires were extinguished, and within a few hours both pipelines had been repaired and returned to full operation.

...

The [second] strike came the night of April 24. Both the slurry and the diesel fuel pipelines were again cut, related valves and plumbing were vandalized, a flush tank was drained, electrical wires were cut, the access road was blocked by felled trees and boulders and mobile construction equipment tires were burned. Several segments of the slurry pipeline were carted off. This time, because company officials responded to the rumors by interrupting the pumping of slurry, no slurry was lost through that pipeline. However, substantial diesel fuel was lost and again fires were set along the fuel line. Again security and repair crews were met with gunfire as they approached the sites of the damage. Police and GOI military personnel assisted in securing the area. One alleged saboteur was shot and killed by the security forces. By 2:30 p.m. in the afternoon of April 25 repairs were completed and the pumping of slurry was resumed.”¹¹⁵⁶

¹¹⁵⁴ Transcript Hearing (Day 6), p. 1730 line 21 to p. 1731 line 22.

¹¹⁵⁵ Transcript Hearing (Day 6), p. 1732 lines 3-6.

¹¹⁵⁶ Exhibit S-RM-70, p. 33.

926. With regard to this description, Mr. Davies confirmed during his oral testimony that the Grasberg slurry pipeline was not buried and that, by contrast to the diesel-fuel running pipeline running next to it, “*a concentrate wouldn’t burn.*” In response to the question whether he would agree that the downtime for damage to a slurry pipeline is not very long, Mr. Davies testified as follows:

“When repairing a pipeline or any other component, there are two things which enter into consideration. The first is the technical requirement, that will take a certain amount of time; and the second is whether the area is permissive or nonpermissive.

Now, what I also said in my Second Report is that OPM militants—‘militants,’ I’m not even sure that’s the right word—are at the bottom of the scale of capability. This I see as a disruptive sabotage-type event by unprofessional, disorganized, disaggregated threat actors. I would not draw any parallel in terms of the capability of these threat actors across to highly professional, highly organized insurgents in Balochistan.

I would characterize Baloch separatist insurgents along with, you know, the capability that we see, you know, demonstrated by Al-Qaeda in Yemen, Al-Qaeda in the Islamic Maghreb, and other groups which are characterized as terrorist organizations but which are effectively guerrilla armies, and that’s a matter of labeling, but I’m at pains here to point out that OPM, the saboteurs in this case, are at the bottom end of the scale in terms of capability; hence, you know, easy access to an above-service pipeline using hacksaws, lighting fires, this is—you know, this is really bottom-end stuff.”¹¹⁵⁷

927. Mr. Davies confirmed that by contrast to the incident in Indonesia which was caused by striking workers, the risk in Balochistan being discussed was “*the possibility of people coming along and detonating part of the pipeline out in the country somewhere and then going away again so that they wouldn’t be caught, not actually occupying the line of the pipe.*” Mr. Davies further confirmed that it was about “*considering the balance between what would be the cost of maintaining ... an army of 7,000 people on the line and what would be the cost of mending it from time to time, something which can really only sort of be ascertained by experience.*” Mr. Davies emphasized that he had not seen in Claimant’s documentation an assessment of the aggregate loss caused by an attack and the number of attacks likely to be expected, which would have provided an “*order of magnitude*” feel to understand the risk tolerance of the project.¹¹⁵⁸ Mr. Davies confirmed, however, that the pipeline could be restored very quickly “[i]f you have access to the pipeline in a more or less permissive environment, yes.” He also confirmed that Claimant

¹¹⁵⁷ Transcript Hearing (Day 6), p. 1838 line 22 to p. 1840 line 8.

¹¹⁵⁸ Transcript Hearing (Day 6), p. 1840 line 22 to p. 1843 line 5.

was planning to use a fibre optic cable that “*would shut down the pumps as a reactive measure*” in case the pipeline was breached.¹¹⁵⁹

928. Based on the explanations provided by the Parties’ experts, the Tribunal is not convinced that an attack of the slurry concentrate pipeline in Balochistan would have caused major damage and thus would have required or even justified the implementation of security measures at the cost proposed by Mr. Davies. He expressly confirmed that, if breached, the pipeline could be mended relatively quickly and there would also be relatively little loss of slurry given the automatic shutdown of the pumps. Therefore, and while noting that the additional cost proposed by Mr. Davies would have reduced the value of the project by USD 400 million according to Prof. Davis’ model,¹¹⁶⁰ and would therefore in any event not have rendered the project economically unfeasible, the Tribunal is not convinced that a buyer would have added costs of this magnitude in its valuation of the project. In this regard, the Tribunal also notes that the contingency for the project included a contingency of 20% for the slurry pipeline, *i.e.*, USD 47.3 million. In the Tribunal’s view, it is therefore plausible that, as Mr. Ridley has testified, additional security measures for the pipeline such as the distributed sensing system proposed by Mr. Davies or the communication and detection system proposed by Mr. Ridley would have remained within Claimant’s estimated budget.
929. In addition, the Tribunal considers that if the frequency of attacks and/or the severity of damage turned out to be higher than anticipated, Claimant would have been able to adapt its security plan and react to the new level of threat. That Claimant had identified and assessed the risks in this regard is demonstrated by Claimant’s residual risk register which included, *inter alia*, the following risks: (i) “*TCC Security staff Implicated in human rights abuses resulting in reputational damage*”; (ii) “*Direct violent attack incountry by any hostile force resulting in injuries, death, business disruption*”; (iii) “*Criminal extortion & kidnap caused by criminal groups possibly resulting in personnel harm, reputational and financial loss*”; (iv) “*Theft of explosives & blasting accessories - linked to CPL13 leading to restrictions on our ability to operate, disruptions and reputational and financial loss*”; (v) “*Sabotage of Equipment Structures (IMD) e.g. Interference with blasts, tailings thickener, etc. resulting in disruptions and financial loss*”; (vi) “*Disruption in supply chain caused by unrest situations resulting in business interruption*”; (vii) “*Interruption of goods and concentrate supply chain on roads, rail, ports, sea caused to any terrorism/civil unrest resulting in disruption and financial loss*”; and (viii) “*Inability to secure the supply routes for stores and concentrate for the construction and operations*”

¹¹⁵⁹ Transcript Hearing (Day 6), p. 1843 line 16 to p. 1844 line 14.

¹¹⁶⁰ Davis II, ¶ 185.

phase, causes delays and increases costs.” Claimant had further identified risk mitigation strategies to address these risks and reported on their progress.¹¹⁶¹

930. Respondent pointed out that Claimant did not assign a CAPEX or OPEX impact to a number of security-related risks, including the risks quoted in items (i) through (iv) above. As the Tribunal noted already in its Decision on Jurisdiction and Liability, the Tribunal continues to consider it plausible that not all risks could be fully assessed and quantified at such an early stage of the project and that the risk mitigation strategy would evolve over time and the further development of the project.¹¹⁶² While the Tribunal was concerned at the liability stage only with the question whether this amounted to a failure of TCCP justifying a denial of the Mining Lease Application, the Tribunal now has to assess whether a buyer of the Reko Diq project in November 2011 would have assigned a quantifiable impact to these risks and, if so, by how much this would have reduced the value of the project. In this regard, the Tribunal will review whether Prof. Davis has adequately quantified the residual security-related risks.

iii. Whether Prof. Davis Has Adequately Quantified Residual Security-Related Risks

931. As pointed out by Claimant, Prof. Davis reviewed the residual risk register in preparing his valuation of the project. Prof. Davis explained that for the risks for which Claimant had estimated a financial impact, he used the impact estimated by Claimant to calculate the cash flow impact of these risks. As for the risks for which Claimant did not estimate a financial impact, Prof. Davis classified them in four categories, *i.e.*, material risks that could cause: (i) the early termination of the project; (ii) delays in starting project construction; (iii) temporary interruption of operations. The fourth category included risks with no material impact.¹¹⁶³

932. As for the four security-related risks for which Claimant has not estimated a financial impact, Prof. Davis classified the three risks regarding human rights abuses, criminal extortion and kidnap, and theft of explosives and blasting accessories in the third category, *i.e.*, as material risks that could cause temporary interruption of operations.¹¹⁶⁴ In this regard, Prof. Davis noted that Claimant had planned to purchase business interruption insurance with a coverage of USD 1 billion of lost income which was to cover a total production interruption for a year and more moderate loss for up to two years. On that basis, he assumed that the risks classified in that category (to the extent that no separate cash flow adjustment was made) would be covered by this business

¹¹⁶¹ Exhibit RE-576-20.01.

¹¹⁶² Cf. Decision on Jurisdiction and Liability, ¶ 1253.

¹¹⁶³ Davis I, Appendix D.

¹¹⁶⁴ Davis I, Workpaper 27.

interruption insurance the premium of which was included in the project costs.¹¹⁶⁵ Prof. Davis further noted that he had also adjusted production amounts to account for the risk of business interruptions lasting less than 30 days as these would not be compensated by insurance and explained how he had arrived at his estimate of the annual financial loss due to production interruptions.¹¹⁶⁶ This estimate was not challenged by Respondent or its experts.

933. Respondent placed particular emphasis on the fact that Claimant had not estimated a financial impact for the risk of “*Direct violent attack incountry by any hostile force resulting in injuries, death, business disruption.*” Prof. Davis classified this risk in the first category, *i.e.*, as a material risk that could lead to early termination of the project.¹¹⁶⁷ Prof. Davis further explained that he “*incorporate[d] the risk of early project termination in the simulation by assuming that in each year, starting with the first year of construction, there is 0.5% probability that the project ends prematurely.*”¹¹⁶⁸ In his first report, Prof. Davis already confirmed that this risk category “*includes events caused by either extreme political violence or government action*” and made explicit reference to the risk pointed to by Respondent.¹¹⁶⁹ He further stated that the magnitude of this risk can be quantified based on the price of insurance protecting against such events and referred to “*a range of indicative prices for political violence coverage*” provided by the Overseas Private Investment Corporation (OPIC), which “*includes coverage for losses caused by declared and undeclared war, hostile actions by national or international forces, revolution, insurrection, civil strife, terrorism, and sabotage.*” Noting that the high end of this range was USD 0.53 per year for each USD 100 of insured asset value and based on his “*understanding of past experience with large projects,*” Prof. Davis decided to “*use a likelihood of permanent premature shut-down at Reko Diq due to such acts of 0.5% annually.*”¹¹⁷⁰
934. Respondent’s experts Mr. Brailovsky and Prof. Wells stated in their first report that “[t]he ½ percent annual complete stoppage probability hardly covers these eventualities,” *i.e.*, “*the very real possibility that production will be interrupted for substantial periods from time to time, but perhaps permanently, by the armed forces in the region.*”¹¹⁷¹ They did not, however, engage with the considerations underlying Prof. Davis’ assumption nor did they express an opinion which alternative percentage they would have considered more appropriate in the circumstances.

¹¹⁶⁵ Davis I, Appendix D, ¶¶ 23-24.

¹¹⁶⁶ Davis I, Appendix D, ¶ 24; Davis II, ¶ 186.

¹¹⁶⁷ Davis I, Workpaper 27.

¹¹⁶⁸ Davis I, Appendix D, ¶ 15.

¹¹⁶⁹ Davis I, ¶ 189.

¹¹⁷⁰ Davis I, ¶ 189.

¹¹⁷¹ Brailovsky/Wells I, ¶ 34.

935. In response, Prof. Davis placed emphasis on the impact of assuming an annual 0.5% probability of permanent shut down:

“The annual 0.5% probability of shut down included in my model amounts to an 18% cumulative probability of shut-down due to political violence over the course of the 39- year mine life in the expanded case.²²¹ It is even higher, 26%, when the IMD mine life option is selected.²²² Even accounting for the fact that in some simulations the Project would shut down early for other reasons, resulting in a shorter than planned mine life, 14.6% of the 200,000 simulations result in Project shut down caused by this factor alone. It reduces the value of the investment by \$1.4 billion, or 14% relative to a scenario where this risk would be absent (the fair market value of TCC’s share would be \$9.9 billion instead of \$8.5 billion.)”¹¹⁷²

936. In their second report, Mr. Brailovsky and Prof. Wells engaged in more detail with Prof. Davis’ assumption. In their opinion:

“The fact is that for every particular year the average probability is only 0.073%, not 0.5%. This is so because, as Brattle indicates in the quote above, only 14.6% of the cases are affected by the 0.5% occurrence, but not the remaining 85.4%, so one has to take the weighted average of 0% and 0.5%. Note that closures for ‘extreme political violence and government action’ are restricted so that they can occur only after production starts, considerably reducing their effect, but there is no reason why such an event cannot occur even in the first year of development.”¹¹⁷³

937. Mr. Brailovsky and Prof. Wells considered the relevant question to be: “*what is the expected mean or average life of the project given the Bernoulli distribution proposed by Brattle with a probability of 0.5%?*” and noted that the mean expected life was not much shorter than the nominal life, “*which makes little sense in a project situated in Balochistan.*” In their opinion, “*an investor might be satisfied with ... a mean expected life of about half or less of the nominal life,*” which would imply an annual probability of between 3.5% (30-year project) and 5% (20-year project).¹¹⁷⁴

938. Mr. Brailovsky and Prof. Wells also addressed Prof. Davis’ reliance on the indicative rates provided by OPIC and pointed to the statements made by OPIC above the indicative rates:¹¹⁷⁵

¹¹⁷² Davis II, ¶ 178.

¹¹⁷³ Brailovsky/Wells II, ¶ 131.

¹¹⁷⁴ Brailovsky/Wells II, ¶¶ 132-133.

¹¹⁷⁵ Exhibit CE-1145.

Indicative Rates

In certain cases, OPIC Insurance rates may fall outside of the ranges shown in the table below, depending on the particular risk profile of the project. It is also possible that the ranges shown also could be adjusted and affect rates for potential insurance contracts. However, once an insurance contract is executed, the rates in that contract are fixed for the contract's term.

OPIC insurance contracts generally require that premiums be paid annually in advance.

OPIC insurance may not be available for certain coverages, or there may be limitations for underwriting or other reasons. Investors should consult the country list page regarding availability in particular countries.

Coverage	Active/Current	Standby
Inconvertibility	\$0.18–\$0.42	\$0.20
Expropriation	\$0.28–\$0.60	\$0.20
Political Violence*		
Business Income	\$0.21–\$0.53	\$0.20
Assets	\$0.21–\$0.53	\$0.20

* Discounted rates may be available for small businesses and/or a combination of coverages.

** Investors should contact OPIC directly for information on pricing for Non-Honoring of a Sovereign Guaranty and Oil and Gas coverages.

939. They further noted that, as can be seen in the above excerpt, OPIC provides two types of insurance against political violence, *i.e.*, for business income and assets, with a maximum rate of USD 0.53 for each of them. In their opinion, the two types of insurance are not mutually exclusive but “*at least partially additive*” given that OPIC states in its Handbook as a footnote to its rates for “*Manufacturing Services*” that “[d]iscounted rates may be available for combined business income and assets political violence coverages.”¹¹⁷⁶ Mr. Brailovsky and Prof. Wells further considered that Prof. Davis should also have included the maximum rate for the risk of “*Inconvertibility*” (USD 0.42) and of “*Expropriation*” (USD 0.60), which would add up to a total rate of USD 2.08 or, assuming a 10% discount on the combined political violence insurance, a total rate of USD 1.97 per USD 100 of insured value.¹¹⁷⁷ In addition, they considered that Prof. Davis used the wrong reference as the OPIC Handbook includes a table specifically for natural resources (except oil and gas), which provides the following rates:¹¹⁷⁸

¹¹⁷⁶ Brailovsky/Wells II, ¶ 135, quoting from **Exhibit BW-69**, p. 29 (note to the first table).

¹¹⁷⁷ Brailovsky/Wells II, ¶ 135, referring to **Exhibit CE-1145**.

¹¹⁷⁸ **Exhibit BW-69**, p. 30.

INFRASTRUCTURE/NATURAL RESOURCES (Except Oil and Gas)		
Annual Base Rates per \$100 of Coverage		
Coverage	Active/Current	Standby
Inconvertibility	\$0.25–\$0.45	\$0.20
Expropriation	\$0.55–\$0.85	\$0.20
Political Violence		
Business Income	\$0.30–\$0.55	\$0.20
Assets	\$0.40–\$0.75	\$0.20

940. In any event, Mr. Brailovsky and Prof. Wells note that OPIC insurance is available only for US businesses, insures only up to 90% of the investment and with a time limit of 20 years. Considering that “[c]ommercial insurance rates ... would likely be much higher,” they concluded that “calculations of probabilities of political risk events based on OPIC rates are simply not relevant.”¹¹⁷⁹

941. Finally, they relied on an analysis performed by Respondent’s expert Dr. Burrows in his second report which resulted in an “implied annual probability of loss in Pakistan in November 2011” between 4.6% and 8.2%. They calculated that when changing only this assumption in Prof. Davis’ model, this range of probabilities would lead to a value of between USD 1.539 billion and minus USD 895 million.¹¹⁸⁰ They conclude:

“These results are consistent with those of both the SNC-Lavalin study and the unmodified Brattle Report when appropriate discount rates are applied. It seems that a fatal flaw in the Brattle analysis is the whopping underestimation of the risk of ‘early termination due to extreme political violence or government action.’ A proper calculation of the probabilities of this risk, which is no other than country risk, leads to more sensible results from the ‘modern’ DCF.”¹¹⁸¹

942. Dr. Burrows, who had not expressed an opinion on the 0.5% annual probability in his first report, stated in his second report that this estimate of “Pakistan country risk” is “absurdly low and based on a seriously flawed reasing of available data.”¹¹⁸² He provided the following reasons for his opinion: (i) OPIC insurance rates may fall outside the range of indicative rates and do not reflect the level of private insurance; (ii) OPIC’s political risk coverage does not reflect all country risk and provides several limitations as a result of which it does not measure the full extent and range of risk faced by private investors; and (iii) OPIC states in its financial accounting statements for 2012 that its political risk

¹¹⁷⁹ Brailovsky/Wells II, ¶ 138.

¹¹⁸⁰ Brailovsky/Wells II, ¶ 139.

¹¹⁸¹ Brailovsky/Wells II, ¶ 140.

¹¹⁸² Burrows II, ¶ 53.

insurance premiums are approximately 0.9% of its “*current exposure to claim*” and highlights that projects in, *inter alia*, Pakistan, “*often entail more risk.*”¹¹⁸³

943. Dr. Burrows further refers to a methodology that Prof. Davis used in a different arbitration proceeding for the calculation of the “*probability of closure due to political risk*” for Peru. Noting that he “*obtained data on Pakistan from one of the study’s authors (Geert Bekaert) covering the time period from 2006 to 2011,*” Dr. Burrows stated that he followed the same methodology to calculate the probability for Pakistan, resulting in a range of 4.6% to 8.2%, which would result in cumulative loss probability over 30 years of 75.8% to 92.3%.¹¹⁸⁴ Dr. Burrows added that, in his opinion, the large deviation from the probability assumed by Prof. Davis could not be due to his exclusion of unlawful actions, considering it “*unlikely that unlawful actions by Respondent would account for much, if any, of the gap*” between their respective estimates.¹¹⁸⁵

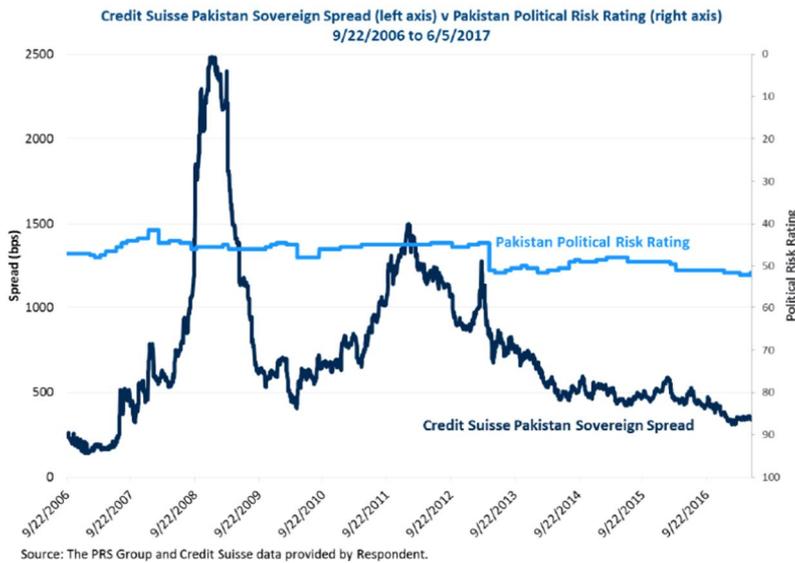
944. The Tribunal notes that the timing of the introduction of Respondent’s experts’ detailed arguments on the 0.5% annual probability formed the subject of several debates between the Parties and the Tribunal, including at the Hearing on Quantum. Prof. Davis had included already in his first report his analysis of the 0.5% annual probability while Respondent’s experts presented their detailed arguments in opposition only together with Respondent’s Rejoinder on Quantum. This was the case, in particular, of the analysis made by Dr. Burrows based on data he stated to have obtained from Dr. Bekaert but did not fully provide to Claimant or Prof. Davis for analysis. Apart from the question whether and to which extent Claimant was prejudiced by the introduction of a new analysis in the Rejoinder, Prof. Davis expressed the opinion at the Hearing on Quantum that the methodology applied by Bekaert *et al.* did not work for Pakistan as it is based on a country’s sovereign spread which, in Pakistan’s case, is not driven by political risk and therefore not an indicator that can be used for this purpose. Noting that he had not been provided with all relevant data underlying Dr. Burrows’ analysis, Prof. Davis testified that he had tested the data he did receive and considered that “*the problem is that the model just doesn’t work for Pakistan.*” Following a detailed explanation as to why he considered that the model did not adequately predict either Pakistan’s sovereign spread or the political risk included in that spread, Prof. Davis also illustrated with the following graph why in his opinion, Pakistan’s sovereign spread “*embodies very little information on political risk in Pakistan*”.¹¹⁸⁶

¹¹⁸³ Burrows II, ¶¶ 54-56, quoting from **Exhibit CRA-53**, p. 7.

¹¹⁸⁴ Burrows II, ¶ 57 and Appendices 13 and 14.

¹¹⁸⁵ Burrows II, ¶ 58.

¹¹⁸⁶ Transcript Hearing on Quantum (Day 8), p. 2355 line 10 to p. 2357 line 9; Davis Presentation, p. 37; **Exhibit CE-1783A**.



945. Prof. Davis provided the following additional explanation as to why he used the Bekaert methodology in the arbitration *Bear Creek v. Peru* but not in this case:

“Well, in Bear Creek, we were not instructed to ignore expropriation risk, and so we needed to adjust the Project cash flows or discount them downward for that asymmetric risk. There was political turmoil at the time of the valuation. A new President was coming into office. It was not clear how he was going to treat mining entities, and so we sought to capture as a discount to my valuation in that approach an index. So, we used Bekaert, his conversion of sovereign spread to a political risk discount or country-risk discount for Perú. I think it was 1.4 percent there. And we liked it because Perú was in the original sample in his paper. Pakistan was outside the original sample, so they hadn't really proven that the model worked for Pakistan. And the other reason is, we didn't have any kind of detailed analysis like we had here with the Risk Register and all the possibility risks and how frequently they could happen and what the impact would be.

There was no Risk Register for the Perú case. So, we needed to use a blunter instrument, and we elected to go with the Bekaert adjustment of 1.4 percent to the cash flows to try to encompass all of these things that were missing, basically, from the Feasibility Study and were not available to us.”¹¹⁸⁷

946. Dr. Burrows rejected Prof. Davis' opinion that the study “doesn't work for Pakistan,” arguing as follows:

“Well, the study, as he knows, was a cross-sectional study. It wasn't a study of Pakistan. It was a study of political risk--how political risks related to the Sovereign Bond Yield across the world, as a cross-sectional study.

¹¹⁸⁷ Transcript Hearing on Quantum (Day 8), p. 2506 line 2 to p. 2507 line 7.

So, if worked for Perú, it works for Pakistan. You can't make the Statement that it would work for Perú and not work for Pakistan. It wasn't a study--it wasn't a longitudinal study of Pakistan. It was a cross-sectional study.”¹¹⁸⁸

947. Dr. Burrows further considered that Prof. Davis had misapplied the Bekaert methodology because he had applied the percentage of the predicted spread accounted for by political risk to the *predicted* observed spread of Pakistan instead of the *actual* observed spread. In his opinion, a correct analysis would result in the following contribution of political risk to the sovereign yield spread:¹¹⁸⁹

Contribution of political risk to sovereign yield spread

(in basis points)	Sep-06	Nov-11	Change
Based on <u>Narrow Measure</u> of Political Risk Spread			
Percentage of the predicted spread accounted for by political risk ^[1]	64%	45%	
Actual observed sovereign spread ^[2]	240	1,149	+909
Portion of actual sovereign yield spread due to political risk	154	515	+361
			40%
Based on <u>Wide Measure</u> of Political Risk Spread			
Percentage of the predicted spread accounted for by political risk ^[1]	100%	80%	
Actual observed sovereign spread ^[2]	240	1,149	+909
Portion of actual sovereign yield spread due to political risk	240	916	+676
			74%

[1] Provided by Prof. Bekaert. [2] Provided by Prof. Bekaert, EMBI+ Spread for Pakistan. Source: Submitted reply to CE-1777; Bekaert data; CE-1777.
16 Private and Confidential

CRA Charles River Associates

948. During his cross-examination, Dr. Burrows maintained that the Bekaert *et al.* study contained relevant data for Pakistan but also testified that “*when we asked [Dr. Bekaert] for results for Pakistan, he updated his model*” and confirmed that “*to the best of his recollection,*” the data provided was not reflected in the data reported in the Bekaert *et al.* study.¹¹⁹⁰ Dr. Burrows acknowledged the differing developments of Pakistan’s sovereign yield spread and its political risk rating in the chart presented by Prof. Davis but maintained his opinion that this was irrelevant because Dr. Bekaert “*was doing a cross-section analysis. He was taking advantage of fluctuations across countries and trying to use that to explain how sovereign yield spread across countries is affected by political*

¹¹⁸⁸ Transcript Hearing on Quantum (Day 9), p. 2766 line 19 to p. 1768 line 6.

¹¹⁸⁹ Transcript Hearing on Quantum (Day 9), p. 2767 line 7 to p. 2768 line 13; Burrows Presentation, p. 16.

¹¹⁹⁰ Transcript Hearing on Quantum (Day 9), pp. 2843-2848; **Exhibit CE-1784**.

risk spread. He wasn't doing a longitudinal analysis of any one country.” He also rejected the argument that, by testing whether the model could predict the sovereign yield spread itself, Prof. Davis had tested it as to its validity for Pakistan, claiming that this test “*contradicted the test that the authors of the paper said was the way to test the model.*”¹¹⁹¹

949. Based on its review of the opinions offered by the Parties’ experts and the supporting documentation provided by the Parties, the Tribunal is not convinced that the analysis brought forward by Dr. Burrows based on data he had received from Dr. Bekaert provides a reasonable estimate for the annual probability of permanent shut down that Prof. Davis should have included in his valuation model. Besides taking note of Dr. Burrows’ confirmation that Dr. Bekaert “*updated his model*” with new data for Pakistan which was not included in his published study and apparently not shared with Claimant or Prof. Davis, the Tribunal is not convinced that the model would produce valid results for Pakistan. In particular, the Tribunal cannot follow Dr. Burrows’ argument as to why he considered the differing development of the sovereign yield spread and the political risk rating irrelevant. Even if the model was based on an analysis across various countries, the Tribunal does not understand how this would render the relationship between the spread and the rating in the particular country in question irrelevant. The Tribunal also does not find it convincing that Dr. Burrows dismisses Prof. Davis’ test of the validity of the model for Pakistan and simply assumes that the model either works for all countries or for none of them. In particular, the Tribunal cannot follow Dr. Burrows’ argument that Prof. Davis’ test contradicted the Bekaert *et al.* study. While the authors state that the ratio of the spread accounted for by political risk is to be applied to the “*actual observed spread,*”¹¹⁹² they do not state that it would be invalid to test whether the model could also predict the observed spread itself.

950. As an additional consideration, the Tribunal notes that if the range of political risk produced by the Bekaert model is applied as the annual probability of permanent shutdown, this results, according to Dr. Burrows, in a cumulative probability of 75.8% to 92.3% that the project would have to be shut down during the first 30 years of the life of the mine. In the Tribunal’s view, such an assumption is not warranted or justified by the circumstances in Balochistan. This would even exceed the assumption made by Mr. Brailovsky and Prof. Wells that an investor would expect the mean expected life of the project to be “*about half or less*” of the nominal life, which the Tribunal also does not find convincing. They do not provide any authority or other support for their statement

¹¹⁹¹ Transcript Hearing on Quantum (Day 9), pp. 2849-2857; **Exhibit CE-1783A**.

¹¹⁹² **Exhibit CRA-55**, p. 484.

that “*an investor might be satisfied*” with this assumption for a project situated in Balochistan.¹¹⁹³

951. The Tribunal also cannot follow the argument raised by Mr. Brailovsky and Prof. Wells that Prof. Davis’ 0.5% annual probability in reality corresponds to only 0.073% because “*only 14.6% of the cases are affected by the 0.5% occurrence, but not the remaining 85.4%, so one has to take the weighted average of 0% and 0.5%.*”¹¹⁹⁴ Prof. Davis stated that “*14.6% of the 200,000 simulations result in Project shut down caused by this factor [i.e., the annual 0.5% probability] alone.*”¹¹⁹⁵ In the Tribunal’s view, this cannot reasonably be understood to mean that the 0.5% annual probability is applied only to 14.6% of the simulations; it is rather applied to all simulations and results in 14.6% early terminations.
952. Given that the Tribunal is not convinced by either of the alternative assumptions made by Mr. Brailovsky and Prof. Wells or Dr. Burrows, the question that remains to be answered is whether Prof. Davis’ reliance on the indicative rates provided by OPIC for insurance against political violence for assets can be considered adequate. While the Tribunal has taken note of the caveats expressed by OPIC, in particular that actual rates might fall outside of the range of the presented indicative rates, and of the undisputed fact that OPIC insurance itself would not have been available to Claimant, the Tribunal considers that these indicative rates are in any event the best estimate of what the financial impact of either taking out political violence insurance or otherwise making a corresponding deduction from the project value by a buyer would have been. In the absence of any more specific data on rates for Pakistan, the Tribunal also considers it plausible to apply the maximum rate of the indicative range.
953. However, as pointed out by Mr. Brailovsky and Prof. Wells, Prof. Davis decided to apply only the rate for insurance of asset value and did not consider an additional rate for insurance of business income. Mr. Brailovsky and Prof. Wells also pointed out that OPIC provides rate specifically for “*infrastructure/natural resources (Except Oil and Gas)*” which, *inter alia*, provides a rate of up to 0.75 for insurance against political violence for assets.¹¹⁹⁶ By contrast, the Tribunal is not convinced by the argument that Prof. Davis should also have included the rate for “*Inconvertibility*” or “*Expropriation*” in order to determine the annual probability of a permanent mine shut down. Prof. Davis explained that he was instructed not to make adjustments for the risk of illegal government conduct, such as the risk of uncompensated expropriation.¹¹⁹⁷ As noted in the OPIC Handbook,

¹¹⁹³ Cf. Brailovsky/Wells II, ¶ 133.

¹¹⁹⁴ Brailovsky/Wells II, ¶ 131.

¹¹⁹⁵ Davis II, ¶ 178.

¹¹⁹⁶ Exhibit BW-69, p. 30.

¹¹⁹⁷ Davis I, ¶ 190.

currency inconvertibility coverage also insures against government action or inaction preventing the transfer of investment returns from insured investments.¹¹⁹⁸

954. The Tribunal has not been provided with any argument as to why the present assessment of Claimant's damages, which must eliminate Respondent's Treaty breaches, should account for risks caused by the host Government's unlawful conduct. In this regard, the Tribunal also notes that specifically for natural resources projects, OPIC "[a]dditionally" offers insurance against "*the unlawful withdrawal or breach by the host government of mineral exploration and development rights, and other legal rights vital to the success of a particular project.*" In the Tribunal's view, the availability of such additional insurance clarifies that the rates for "*political violence*" insurance do not cover the types of risks or breaches that the present assessment is intended to eliminate.
955. On balance, the Tribunal therefore concludes that while it considers the basis for Prof. Davis' assumption reasonably reliable as an indicator for the risks he intended to capture, it is not entirely convinced that the rate he came up with fully captures these risks. The Tribunal notes that Prof. Davis also drew on his experience with past projects but did not provide any further detail in this regard, including after Mr. Brailovsky and Prof. Wells had raised detailed criticisms with regard to the particular indicative rate on which he had relied. In particular, Prof. Davis did not provide any explanation as to why he based his estimate only the "*assets*" rate and did not consider it appropriate to refer to the "*business income*" rate even though a permanent shutdown would also, if not primarily, result in a loss of future cash flows that would otherwise have been generated by the mine. Prof. Davis also did not provide any indication as to why he did not refer to the range of insurance rates for "*assets*" of infrastructure and natural resources projects (except oil and gas) even though there can be no dispute that Reko Diq would qualify as such a project.
956. The Tribunal does not wish to go as far as to consider it established that Prof. Davis should have combined the rates for "*assets*" and "*business income*" for the purposes of determining the annual probability of permanent shutdown. However, the Tribunal recalls in particular that even on the assumption that it was appropriate for Prof. Davis to rely (only) on the "*assets*" rubric of OPIC insurance rates, the maximum indicative rate for infrastructure and natural resources projects amounts to 0.75. On that basis, the Tribunal considers it reasonable to conclude that a buyer would have applied a higher annual probability of permanent shutdown than assumed by Prof. Davis in his valuation model, more specifically a probability in the range of the maximum rate of 0.75 for infrastructure and natural resources projects.
957. The Tribunal has not been provided with a sensitivity analysis by either of the Parties' experts on the impact of assuming a higher annual probability of annual shutdown based

¹¹⁹⁸ Exhibit BW-69, p. 18.

on indicative OPIC insurance rates other than the rate relied on by Prof. Davis. In the absence of a sensitivity analysis based on an annual shutdown probability in the range of 0.75%, the Tribunal considers that the most reasonable assumption is to start from Prof. Davis' explanation that the 0.5% probability reduced the value of the project by USD 1.423 billion and to increase this amount by 50%, *i.e.*, USD 711.5 million, in order to reflect the Tribunal's considerations above. Consequently, the Tribunal concludes that an additional amount of USD 711.5 million has to be deducted from the value of Claimant's investment

7. Whether Claimant Has Established That It Had a Feasible Plan for Compliance with Environmental Regulations and Obtaining a Social License to Operate

a. Summary of Claimant's Position

958. Claimant submits that its approach to identifying, assessing and managing potential environmental and social risks of the project was consistent with international best practices and in line with what lenders and regulators would have expected for the Reko Diq project at this stage.¹¹⁹⁹ Claimant notes that the ESIA process was coordinated by Mr. Cessford of SRK Consulting UK Ltd who confirms that none of the criticisms raised by Respondent are material enough to have an effect on the quality of the ESIA.¹²⁰⁰ Claimant also refers to the testimony of Mr. Livesey and Ms. Cessford to argue that the ESIA process reflected a dynamic collaboration between Claimant, its owners and third-party consultants and that the final ESIA ensured compliance with the most stringent standards in the industry.¹²⁰¹
959. Claimant contends that the ESIA addressed "*the full range of issues that could potentially be impacted by TCC's proposed mine*" and that the ESIA process was completed over three years before it was submitted to Balochistan together with TCCP's Mining Lease Application. Claimant emphasizes that no concern was raised with regard to any issue covered in the ESIA before this arbitration, including in the Notice of Intent to Reject, and there is no evidence that the ESIA was ever reviewed by Balochistan before this arbitration; only in the quantum phase of this arbitration did Respondent start to allege that the ESIA failed to comply with local law or international standards and would have prevented Claimant from seeking financing.¹²⁰²
960. According to Claimant, Respondent's experts Ms. Filas and Dr. Connor fail to quantify the impact of the alleged shortcomings and also do not take into account the additional

¹¹⁹⁹ Claimant's Quantum Post-Hearing Brief, ¶ 146; Claimant's Quantum Reply, ¶ 696.

¹²⁰⁰ Claimant's Quantum Reply, ¶ 697, *referring to* Cessford, ¶¶ 32, 93, 145.

¹²⁰¹ Claimant's Quantum Reply, ¶ 699 *referring to* Livesey IX, ¶ 74 and Cessford, ¶¶ 82-86.

¹²⁰² Claimant's Quantum Reply, ¶¶ 700-702, 705-706.

adjustments made by Prof. Davis to account for risks associated with possible environmental and social impacts.¹²⁰³ In addition, Claimant argues that the complaints raised by Respondent's experts should be dismissed because: (i) contrary to the statements made in their reports, Ms. Filas and Dr. Connor performed only "*a superficial review of only a portion of the record selected in advance by Pakistan's counsel, and then became uncritical advocates for Pakistan's positions, including on issues outside their experience or competence*"; (ii) the Parties' experts are in agreement on "*the core issues concerning the rigor and reliability of the work conducted by TCC and its consultants,*" with Respondent's experts only disputing the conclusions reached which could have been resolved through an iterative process; and (iii) Respondent's allegations of shortcomings or flaws are contradicted by Claimant's expert Ms. Cessford and the "*extensive contemporaneous analyses reflected both in the documents Pakistan's experts reviewed and those that they ignored.*"¹²⁰⁴

961. With regard to the documents reviewed by Respondent's experts, Claimant refers to Ms. Filas' testimony that she had personally reviewed only "*a good number of them,*" which she did not "*go through ... in detail,*" and that she had decided not to review "*thousands of pages*" stating that she could judge from the context of the document that it "*wasn't going to contribute to [her] opinion.*" According to Claimant, Dr. Connor also confirmed that she did not inquire about or verify the accuracy and veracity of the documents provided to her.¹²⁰⁵ In addition, Claimant notes that neither expert asked to be provided with additional documents and refers to Ms. Filas' statement that she did not see the need for such a request for her "*high-level*" review as well as Ms. Connor's statement that it was irrelevant if the socio-political and security risks that she considered to be not adequately addressed in the ESIA were discussed in "*35 other places*" in Claimant's studies.¹²⁰⁶
962. Referring to Ms. Filas' labelling of Claimant's ESIA as only a "*plan-for-a-plan*" and her argument that instead a detailed Environmental and Social Management System (ESMS) would have been required, Claimant notes that a contemporaneous report provided to Dr. Connor expressly noted that a "*preliminary deadline date*" for a "*fully operational Environmental Management System*" had been set for the end of December 2010.¹²⁰⁷ Claimant further claims that Dr. Connor's criticism regarding an alleged failure to address

¹²⁰³ Claimant's Quantum Post-Hearing Brief, ¶ 147; Claimant's Quantum Reply, ¶ 702.

¹²⁰⁴ Claimant's Quantum Post-Hearing Brief, ¶¶ 148-153.

¹²⁰⁵ Claimant's Quantum Post-Hearing Brief, ¶ 154, *quoting from* Transcript Hearing on Quantum (Day 7), pp. 1965, 1967 *and referring to* pp. 2041-2043.

¹²⁰⁶ Claimant's Quantum Post-Hearing Brief, ¶ 155, *quoting from* Transcript Hearing on Quantum (Day 7), pp. 1971 and 2036-2037.

¹²⁰⁷ Claimant's Quantum Post-Hearing Brief, ¶ 158, *quoting from* Filas II, ¶¶ 21, 66, 140, Filas Presentation p. 15 *and* Transcript Hearing on Quantum (Day 7), pp. 1973-1975 *and Exhibit CE-165*, p. 25.

potential opposition to Claimant's acquisition of land for the pipeline ignored the testimony of Respondent's witnesses and Respondent's exhibits confirming that there were "*virtually no implications for land acquisition*" given the sparse population of the land.¹²⁰⁸

963. Claimant considers it agreed between the Parties and their experts that it applied the correct laws and guidelines in preparing the ESIA and that it correctly applied generally accepted ESIA methodology given that Ms. Filas "*did not take exception to the general methodology ... used in conducting the ESIA analysis,*" Dr. Connor agreed that the ESIA consultation "*followed the usual protocols,*" and Respondent confirmed at the Hearing on Quantum that it does not "*challenge [the] methodology*" applied by Claimant.¹²⁰⁹
964. Claimant further refers to Ms. Cessford's testimony that the process of assessing and managing environmental and social impacts is a "*cyclical process ... based on the knowledge ... available at the time*" which is continuously checked reassessed "*throughout construction and operation, and then finally again at the end of the life-of-mine.*" Claimant points out that Dr. Connor agreed that "*it's a[n] iterative process,*" and that Ms. Filas confirmed that it "*generally and typically evolve[s] over the life of the project.*" Finally, Claimant also considers it agreed that the process is characterized by a "*back and forth*" between the company and the regulators or lenders until the impacts are managed in a satisfactory manner.¹²¹⁰
965. As a result of the Parties' experts' agreement on these issues, Claimant claims that: (i) there can be no dispute about the reliability of the results on which the ESIA team relied in reaching their conclusions and recommendations; (ii) Respondent cannot fault Claimant for not completing steps in the process "*which—by practice and design—would only come after the grant of the mining lease which Balochistan wrongfully withheld*"; and (iii) the allegation raised by Respondent's experts that any of the supposed flaws would have been "*fatal*" or "*non-starters*" for the project is contradicted by the reality of routine ongoing consultations with funders or regulators.¹²¹¹
966. In this regard, Claimant also refers to Ms. Cessford's explanation that "*both regulators and investors have mechanisms by which any perceived shortfalls in the ESIA process can be addressed without a regular resorting to rejecting an ESIA or refusing the overall*

¹²⁰⁸ Claimant's Quantum Post-Hearing Brief, ¶ 159, referring to Connor, Section 2.2.4, ¶¶ 2-4 and Exhibits RE-750A through RE-750D and Transcript Hearing on Quantum (Day 4), p. 1077 and (Day 6), p. 1801.

¹²⁰⁹ Claimant's Quantum Post-Hearing Brief, ¶¶ 161-162, quoting from Filas II, ¶ 78, Connor, Section 2.2.2, ¶ 1 and Transcript Hearing on Quantum (Day 1), p. 262.

¹²¹⁰ Claimant's Quantum Post-Hearing Brief, ¶ 163, quoting from Transcript Hearing on Quantum (Day 7), pp. 1891-1893, 1963-1964, 1988 and 2027.

¹²¹¹ Claimant's Quantum Post-Hearing Brief, ¶ 164.

*project outright.*¹²¹² Claimant also refers to Pakistan's own Guidelines for the preparation and review of Environmental Reports which recognize the availability of "appropriate remedial options" to address specific inadequacies of the environmental report.¹²¹³ Referring to Ms. Cessford, Claimant submits that in that case funding can be approved subject to "*conditions incorporated into the loan agreement, usually in the form of an environmental and social action plan (ESAP)*" and argues that there is no reason why this would not have been possible in case of inadequacies in Claimant's ESIA.¹²¹⁴

967. In any event, Claimant maintains that none of the technical flaws alleged by Respondent and its experts exists. Claimant emphasizes that, contrary to Ms. Filas' criticism, there is no requirement under Pakistani law or international guidelines that an ESIA report at development stage has to include concrete managements systems and refers to guidelines issued by the International Finance Corporation which allow a company to "*develop[] and implement[] [an ESMS] over a reasonable period of time as agreed with the IFC*" if it did not have "*a satisfactory Management System at the time of IFC's appraisal of the project.*"¹²¹⁵

968. Claimant further contends that while Respondent's experts criticized Claimant's ESIA for failing to meet Pakistan's standards and guidelines with regard to environmental and social matters, neither of them is qualified to express an opinion on such standards given Ms. Filas' concession that she was "*not an expert on Pakistan requirements*" and Dr. Connor's "*limited, dated, and irrelevant*" in-country experience.¹²¹⁶ Claimant further considers this criticism disproved by standard industry practice and Ms. Cessford's testimony that Claimant's selection of locations for monitoring impact of air emissions was based on the objective "*to generate a background concentration*" and to communicate to the stakeholders the likely direct air quality impacts.¹²¹⁷ According to Claimant, these locations represented "*the most densely-populated areas near the marine terminal, which were most likely to impact a large group of stakeholders*" and were therefore "*appropriate and suitable*" to meet that goal.¹²¹⁸ Claimant further refers to Ms. Cessford's explanation that "*the ESIA report [not only] specifically discussed impacts on the closest current receptors,*" but also "*presented dispersion plume figures showing the concentration plumes at other locations, including across the project site and beyond.*"

¹²¹² Claimant's Quantum Reply, ¶ 707, quoting from Cessford, ¶ 121.

¹²¹³ Claimant's Quantum Reply, ¶ 708, quoting from **Exhibit CE-1248**, p. 32.

¹²¹⁴ Claimant's Quantum Reply, ¶¶ 709-710, quoting from Cessford, ¶ 123.

¹²¹⁵ Claimant's Quantum Post-Hearing Brief, ¶¶ 167-168 and note 373, quoting from **Exhibit CE-1292**, p. 2, ¶ G3.

¹²¹⁶ Claimant's Quantum Post-Hearing Brief, ¶ 169, quoting from Transcript Hearing on Quantum (Day 7), pp. 1989-1990.

¹²¹⁷ Claimant's Quantum Post-Hearing Brief, ¶¶ 170-171, quoting from Transcript Hearing on Quantum (Day 7), p. 1918.

¹²¹⁸ Claimant's Quantum Post-Hearing Brief, ¶ 171, referring to **Exhibit RE-601**, Sections 6.2.1, 6.2.3.

According to Ms. Cessford, the impact can be ascertained at any point of the graphic image of the marine terminal and not only at the monitoring locations.¹²¹⁹

969. In this regard, Claimant also contends that Respondent misunderstands the ambient limit standards set out in the EDC in that they do not apply to the ESIA's air quality impact assessment for the mine site, which is an occupational zone and therefore subject to occupational health standards with which Claimant has complied in committing to a separate study under the Health & Safety management system; by contrast, the ambient level values in the ESIA are "*significantly below*" the ambient limit standards.¹²²⁰ Claimant further notes that its model of the dispersion of the emissions was provided by Lorax Environmental, a marine specialist and water quality expert, and rejects the suggestion that it manipulated the testing of emission levels by not using the levels at the discharge point. According to Claimant, measuring concentration of metals at the end of the mixing zone is consistent with international standard practice.¹²²¹
970. Claimant submits that local law requirements were captured in its Environmental Design Criteria (EDC) but argues that, contrary to Respondent's argument, compliance with the EDC is not a requirement under local law or international guidelines. In any event, Claimant contends that the ESIA "*demonstrated compliance with every aspect of the local requirements that was reasonably practicable.*"¹²²²
971. Claimant also relies on Ms. Cessford's testimony to argue that its seeking of "*a variance*" to the marine effluent standards did not serve to characterize Claimant's works as faulty, in particular because the limit in Pakistan's stated standards appears to have been erroneously "*carried over from the freshwater limit into the marine*" and "*could actually be causing a harm to the aquatic life.*"¹²²³ According to Claimant, seeking relaxation of a standard for two parameters is recognized by international guidelines; for all others, Claimant maintains that when comparing the correct values to the "*EDC effluent limit,*" the values are equal to or below the stated limits.¹²²⁴
972. Claimant rejects the allegation that it selected the Fan Sediments as its water source without considering the impact of its water usage on the competing interests of local communities. It refers to Mr. Livesey and Mr. Mayer who explained that the water from

¹²¹⁹ Claimant's Quantum Post-Hearing Brief, ¶ 172, quoting from Cessford, ¶ 129 and referring to Transcript Hearing on Quantum (Day 7), pp. 1912-1915; Claimant's Quantum Reply, ¶¶ 715-716.

¹²²⁰ Claimant's Quantum Reply, ¶¶ 712-714.

¹²²¹ Claimant's Quantum Reply, ¶¶ 718-719.

¹²²² Claimant's Quantum Reply, ¶¶ 703-704, referring to **Exhibit RE-576-12.05** and Cessford, ¶¶ 66, 72.

¹²²³ Claimant's Quantum Post-Hearing Brief, ¶ 173, quoting from Transcript Hearing on Quantum (Day 7), pp. 1919-1921.

¹²²⁴ Claimant's Quantum Reply, ¶ 717, referring to **Exhibit RE-601**, p. 7-92, Table 7.18 and **Exhibit CE-1351**, p. 2-22, Table 2-8.

the Fan Sediments was not suitable for irrigation or other agricultural purposes and therefore had no possible alternative economic use.¹²²⁵

973. Similarly, Claimant submits that the direct impact of its proposed slurry pipeline on “groundwater flow patterns” as well as possible indirect impacts on flood irrigation systems and other water users were specifically considered in the ESIA, which proposed mitigation measures to undertake further study. Claimant argues that the “[t]he purpose of the ESIA is to identify and assess material risks” and claims that there is no basis for Respondent’s claim that this assessment was deficient or unacceptable.¹²²⁶
974. As to Ms. Filas’ criticism that Claimant’s mine closure plans would have had to provide for a complete backfill of the pit, Claimant argues that complete backfilling is not generally required for pits of the kind contemplated for Reko Diq and the specific requirement to this effect in California “has long been controversial” and is under consideration for “substantial revisions.”¹²²⁷ Claimant points to its conceptual plan for mine closure and the ESIA and the Feasibility Study as part of which it carried out a high-level assessment of the likelihood of a pit lake forming at closure and identified the studies required during the life of the project.¹²²⁸
975. Claimant also rejects Respondent’s criticism that it failed to consider the condition of the roads, arguing that, as noted in the ESIA, it was not provided with the relevant information by the Pakistani authorities.¹²²⁹
976. With regard to Dr. Connor’s criticism that Claimant did not have tailored community plans or two qualified personnel to supervise and implement them, Claimant refers to its demonstration at the Hearing on Quantum of “the incredible breadth and detail of the community engagement plans it had developed, and the extensive and unrebutted record proving that it had already started to implement these plans and would deliver on its commitments.” Claimant also refers to Dr. Connor’s admission that she was not aware that Claimant had engaged “a Community Engagement Expert” to support its work in this regard.¹²³⁰ Claimant argues that it was committed to engaging with all relevant

¹²²⁵ Claimant’s Quantum Reply, ¶¶ 720-722, referring to Livesey IX, ¶ 75, Mayer I, ¶¶ 82, 84-85 and Cessford, ¶ 141.

¹²²⁶ Claimant’s Quantum Reply, ¶ 723, quoting from **Exhibit RE-601**, pp. 7-63 to 7-66.

¹²²⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 175, referring to Filas II, ¶¶ 38-40 and 149-151 and **Exhibits CE-1693 to CE-1697 and CE-1704 to CE-1705** (admitted *de bene esse*).

¹²²⁸ Claimant’s Quantum Reply, ¶¶ 724-725.

¹²²⁹ Claimant’s Quantum Reply, ¶ 726, referring to **Exhibit RE-601**, Sections 3.2 and 3.3 and Cessford, ¶ 134.

¹²³⁰ Claimant’s Quantum Post-Hearing Brief, ¶ 176, referring to Claimant’s Opening Presentation, pp. 104-105 and Transcript Hearing on Quantum (Day 7), pp. 2054-2062, 2044-2046.

stakeholders that could be affected by the proposed mine and considers this aim reflected in the ESIA process and the preparation of the report.¹²³¹

977. Claimant concludes that, as Ms. Cessford confirmed, its ESIA was the product of a “*robust and rigorous*” ESIA process, which was managed by “*conscientious project sponsors who acted with integrity*,” and it would have been treated seriously by potential investors to satisfy their requirements under the international standards.¹²³²

b. Summary of Respondent’s Position

978. Respondent notes that Claimant recognized in the Feasibility Study that “*the main challenge in Reko Diq is to obtain the social license to operate from the communities, authorities and all the relevant stakeholders.*” According to Respondent, however, Claimant did not have a comprehensive plan in place in order to obtain and maintain the social license but relied primarily on “*a high-level review of the socio-political and economic environment and hypothetical support based on a range of benefits it planned to provide.*”¹²³³ Respondent refers to its social license specialist Dr. Connor who pointed out that Claimant “*followed the wrong process, used the wrong people, and poorly executed what little work it tried to do.*”¹²³⁴

979. According to Respondent, Claimant: “*(1) had no comprehensive plan to mitigate the public’s concerns and provide benefits; (2) failed to understand the socio-political conditions in the area and the Resource’s role in exacerbating already existing tensions; (3) failed to sufficiently engage the affected communities or involve them in strategic decision making during the consultation process; and (4) underestimated what it would take to obtain a social license and maintain it.*”¹²³⁵

980. Respondent claims that Claimant’s ESIA failed to conform to the IFC Performance Standards and Equator Principles as well as to its own Environmental Design Criteria (EDC) in various areas as a result of which it would not have been able to seek funding and would not have been able to obtain political risk insurance.¹²³⁶

981. Respondent relies on Dr. Connor’s testimony that “*the information on baseline social conditions is completely inadequate*” and that the ESIA ignored the conflict situation in Balochistan and thereby also the potential of the project further exacerbating existing

¹²³¹ Claimant’s Quantum Reply, ¶ 727, referring to Cessford, ¶¶ 30-31.

¹²³² Claimant’s Quantum Reply, ¶ 728, quoting from Cessford, ¶¶ 86, 144-145.

¹²³³ Respondent’s Post-Hearing Brief on Quantum, ¶ 207, quoting from **Exhibit RE-576-2**, p. 2-10; Respondent’s Rejoinder on Quantum, ¶ 290.

¹²³⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 208.

¹²³⁵ Respondent’s Rejoinder on Quantum, ¶ 291.

¹²³⁶ Respondent’s Counter-Memorial on Quantum, ¶¶ 313, 320, referring to Filas I, Sections 5.2.3, 5.5.3 and 5.5.4.

conflicts.¹²³⁷ Dr. Connor pointed out that the ESIA provides only a “*brief and superficial description of conflict in Balochistan*” and does not identify terrorism or insurgent activity as a risk to Claimant’s operations but focuses on social ills which reveals “*a profound misunderstanding of the project.*”¹²³⁸ In addition, Respondent argues that, as pointed out by Dr. Connor, there were no mitigation measures to manage potential social conflict with or among the tribes or to deal with militant organizations; there was also no analysis of the adverse impacts of the projects and whether these would be outweighed by the benefits that Claimant would provide.¹²³⁹ With regard to the alleged benefits, Respondent quotes from Dr. Connor’s testimony that she found no information on:

[H]ow that was analyzed, who did it, who determined that was the right thing to do, who determined that wasn’t the wrong thing to do that would divide and cause more conflict, who determined how they were going to figure out what the recipients have, because if you give the wrong thing to the wrong group, you may have a war on your hands. I didn’t see any evidence of any staff that were doing any sort-of-kind-of-even anywhere close to the kind of assessment that needed to be done.”¹²⁴⁰

982. In particular, Respondent criticizes that the ESIA did not outline an implementation plan and that there was no ESMS in place, which resulted in the lack of an organizational structure to analyze and implement a social license plan. Respondent refers to Ms. Filas’ testimony that “*IFC, in particular, will require a management system to be fleshed out to a certain level as part of the initial presentation of the ESIA*” and argues that despite Claimant’s reference to a deadline for a “*fully operational ESMS completed by the end of December 2010,*” there was no evidence of any further steps taken towards completion of the ESMS by November 2011.¹²⁴¹

983. Respondent contends that Claimant’s approach to community relationships and social management programs was “*at best haphazard*” and refers to Dr. Connor’s conclusion that it “*did not have anywhere near the right staff to develop*” the project. Respondent notes that Claimant would have required, *inter alia*, a “*conflict management expert*” and argues that this was not only a question of additional costs but also the delay in “*finding and putting in place the right individuals.*”¹²⁴² Respondent also refers to the observations

¹²³⁷ Respondent’s Post-Hearing Brief on Quantum, ¶ 210, quoting from Transcript Hearing on Quantum (Day 7), p. 2016 lines 6-8.

¹²³⁸ Respondent’s Rejoinder on Quantum, ¶ 293, quoting from Connor, Section 2.1.1, ¶ 1.

¹²³⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 211, referring to Transcript Hearing on Quantum (Day 7), p. 2013 lines 11-19; Respondent’s Rejoinder on Quantum, ¶¶ 294-295.

¹²⁴⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 212, quoting from Transcript Hearing on Quantum (Day 7), p. 2016 lines 21 to p. 2017 line 8.

¹²⁴¹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 212-213, quoting from Transcript Hearing on Quantum (Day 7), p. 1986 lines 18-20 and p. 1987 lines 1-8.

¹²⁴² Respondent’s Post-Hearing Brief on Quantum, ¶ 214, quoting from Transcript Hearing on Quantum (Day 7), p. 2019; Respondent’s Rejoinder on Quantum, ¶ 298, referring to Connor, Section 2.1, ¶ 9 and Section 2.2.2, ¶ 5.

made by a consultant reviewing the community outreach process which, according to Respondent, “*counter any idea that TCC had in place a robust community relations plan.*”¹²⁴³

984. According to Dr. Connor, Claimant would have required “*a very skilled manager, not only a community relations expert...but a manager. And that only happens when you put it within the confines of an Environmental and Social Management Plan.*” Respondent considers it undisputed that no such management system was developed as Ms. Cessford admitted that “*an environmental social management system ... was being developed by TCC and stopped at the point that the Project ceased.*” Referring to Ms. Filas, Respondent contends that the management system was required by relevant international standards but Claimant instead only had a “*plan for a plan*” which was not in accordance with these standards.¹²⁴⁴
985. In response to Claimant’s reference to other documents besides the ESIA and community initiatives, Respondent points to Dr. Connor’s explanation that she did not have to go further than the ESIA because it did not contain the information that a lender would want to see and a lender would therefore have requested that the ESIA be completely redone. According to Respondent, Claimant’s community initiatives were insufficient in the absence of an adequate impact assessment to determine what benefits would be necessary to obtain a social license from the community. Respondent claims that “*the contributions and expenditures TCC outlined in slides 104 and 105 of their opening presentation does little to show that TCC understood the social risks, assessed those risks, and properly planned to mitigate those risks.*”¹²⁴⁵
986. Respondent considers that this conclusion is also confirmed by Ms. Filas who testified that “[b]ased on the status of the programs in the ESIA, this Project ... would be extremely challenged to gain public support, which is needed to get you social license to operate” as well as by Prof. Rais who did not think that “*these social development programs and community development ... will satisfy the Baloch, who have long list of grievances.*”¹²⁴⁶ Respondent also refers to Mr. Davies who testified that “*uniform negative feedback provided to us by community representatives indicated that TCC likely failed to engage in a way that would have positively influenced community perceptions*” and to Mr. Owen

¹²⁴³ Respondent’s Rejoinder on Quantum, ¶ 298, referring to **Exhibit RE-644**, pp. 3-4.

¹²⁴⁴ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 215-216, quoting from Transcript Hearing on Quantum (Day 7), p. 2064 lines 16-20, p. 1896 lines 7-10 and p. 1956 lines 4-10.

¹²⁴⁵ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 217-218, referring to Transcript Hearing on Quantum (Day 7), pp. 2029-2030, 2036, 2047 and 2057-2058.

¹²⁴⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 219, quoting from Transcript Hearing on Quantum (Day 7), p. 1958 lines 18-20 and p. 1792 lines 18-22.

who also concluded that Claimant had not adequately engaged with the local communities and failed to understand the tribal culture in Balochistan.¹²⁴⁷

987. Respondent acknowledges that Claimant “*performed some consultation work with local communities and gathered some locat data,*” but maintains that Claimant failed to allocate adequate resources to the consultation process and failed to address the community concerns in a meaningful way as they were simply passed on and no follow up was made. Referring to Dr. Connor, Respondent contends that Claimant had set up a formal grievance procedure but failed to properly implement it. Respondent also asserts that Claimant ignored concerns raised by its own community relations team regarding the hiring of outsiders for security posts and claims that “[t]he community’s negative perception of TCC was evident.”¹²⁴⁸
988. Respondent contends that Dr. Connor’s conclusions are also confirmed by contemporaneous documents referring to labor disputes, community protests, hunger strikes, a terrorist attack, and bullying of local journalists all of which involved or were directed at Claimant. Respondent also refers to a statement in the Forward Work Plan in the Feasibility Study which confirms in its view that Claimat had not engaged with “*stakeholders in the communities of the pipeline area, Gwadar and in water affected areas.*”¹²⁴⁹
989. According to Respondent, Claimant failed to make specific commitments in response to concerns raised in the public consultation process, planned to make only limited contributions that were not part of a comprehensive plan and also failed to deliver on its promises to commit to “*local employment*” and “*local procurement.*” Respondent considers that Claimant therefore had no way to confirm that the community would have supported its project.¹²⁵⁰ In addition, Respondent claims that Claimant had not prepared for the challenge of training locals for the jobs it planned to provide during construction and operation and therefore would not have had a ready labor force to start construction, which could delay the project and “*fuel the existing tension between TCC and the local population.*”¹²⁵¹ Respondent also considers that the ESIA should have evaluated opportunities for developing the local infrastructure, in particular roads to accommodate

¹²⁴⁷ Respondent’s Post-Hearing Brief on Quantum, ¶ 219, *quoting from Davies II*, p. 45 and referring to Owen Trip Report, pp. 6-8; Respondent’s Counter-Memorial on Quantum, ¶ 350.

¹²⁴⁸ Respondent’s Rejoinder on Quantum, ¶¶ 297-301, referring to Connor, Section 2.2.2, ¶¶ 3-4.

¹²⁴⁹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 221-222, referring to Exhibits RE-564, RE-656 to RE-658, RE-650, RE-752 and RE-576-32, p. 32-9; Respondent’s Rejoinder on Quantum, ¶¶ 295, 302, referring to Connor, Section 2.2.4, ¶ 3, and Exhibit RE-576-13, pp. 13-3 to 13-6.

¹²⁵⁰ Respondent’s Rejoinder on Quantum, ¶¶ 303-306, 345 referring to Connor, Section 2.1, ¶ 1.

¹²⁵¹ Respondent’s Rejoinder on Quantum, ¶ 308, referring to Connor, Section 2.2.3, ¶ 5.

the additional traffic, instead of proposing to set a fly-in/fly-out camp isolating the project from the local communities.¹²⁵²

990. Respondent emphasizes that “*social license issues are key in considering the viability of a mining project*” and claims that “[i]n practice, failure to obtain a social license has caused mining operations to cease or at the very least suspend work.” Respondent refers to Prof. Dagdelen who identified numerous project failures worldwide due to a failure to obtain a social license and argues that a buyer would therefore consider social license “*as one of the most important considerations in deciding whether to proceed with Reko Diq.*” Respondent notes that Claimant has not disputed the importance of obtaining and maintaining a social license; in its view, risks relating to the lack of a social license cannot be incorporated into a modern DCF model and therefore render the project’s value “*speculative, at best.*”¹²⁵³
991. With regard to Claimant’s ESIA, Respondent argues that it was not in compliance with the IFC Performance Standards and Equator Principles, which made it unacceptable to international lenders and the affected community, and points to the following “*deficiencies*”: “*there was a secret sludge dump, TCC circumvented points of compliance to measure water and air discharges, the discharges were not within the prescribed limits of Pakistani law, there were no management plans for mitigation, and mitigation costs were not included in either the ESIA or the IMD FS.*”¹²⁵⁴
992. Respondent considers it undisputed that the ESIA would have had to comply with local law and internationally recognized standards, both of which are acknowledged in the EDC, and refers to Ms. Cessford’s testimony that “*ESIAs must also satisfy policy considerations in addition to the legal requirements imposed by Pakistani national and regional governments,*” which include “*internationally recognized guidelines on GIIP...additional requirements or obligations imposed by financial lenders, and commitments made to stakeholders.*” In Respondent’s view, Claimant therefore also had to comply with its EDC which sets compliance targets adopted and referenced in the ESIA.¹²⁵⁵
993. Respondent argues that lenders expect the ESIA to “*meet host country requirements*”; however, Claimant’s ESIA failed to comply with: (i) national standards for water quality discharge at the Port of Gwadar; (ii) IFC and Pakistan’s guidelines for pollution control

¹²⁵² Respondent’s Rejoinder on Quantum, ¶¶ 341, 346, referring to Filas II, ¶¶ 84-88; Respondent’s Counter-Memorial on Quantum, ¶¶ 342-345.

¹²⁵³ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 224-225, referring to Dagdelen/Owen I, ¶¶ 212, 220-223.

¹²⁵⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 226; Respondent’s Rejoinder on Quantum, ¶ 310.

¹²⁵⁵ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 227-228, quoting from Cessford, ¶ 55; Respondent’s Rejoinder on Quantum, ¶¶ 313-314, referring to Filas II, ¶ 30.

of NOx emissions; (iii) the 2002 BM Rules regarding the backfilling of pits; and (iv) the IFC guidelines for assessing the impact of high levels of greenhouse gas emissions.¹²⁵⁶

994. In Respondent's view, there is no dispute that compliance with the relevant standards required the emissions and discharges to be measured at source; Claimant, however, did not adequately locate the points of compliance for assessing air quality and in its dispersion model at the closest point of access or the property boundary. Claimant also did not set the monitoring points in locations with the nearest receptors and thereby acted contrary to the local law.¹²⁵⁷
995. As for water discharge, Respondent considers that Claimant conceded that it could not meet national standards (let alone its own Environmental Design Criteria) as it required a variance for two metals "*with little to no justification.*" It further claims that, "*in many cases, TCC was planning to discharge metals that were thousands of times the ocean background levels,*" i.e., 10,000 for copper, 7,800 for lead, 3,750 for nickel and 10,050 for zinc and significantly exceeded the EDC limits. Respondent also contends that Claimant failed to consider the cumulative impact of the metals it planned to discharge over the life of the project on the fisheries and refers to its expert Dr. Ault who pointed out that Claimant's modelling studies were "*insufficient*" and the "*risks posed to the local ecosystems and local populations are unquantified.*"¹²⁵⁸
996. Respondent contends that neither the ESIA nor the Feasibility Study include plans for mitigation and, therefore, the costs for mitigating the adverse effects or emissions, water discharge, sludge treatment and removal were not adequately reflected in the Feasibility Study. Respondent emphasizes that Claimant recognized in the Feasibility Study that the environmental impacts of the project "*could affect the health and welfare of the communities*" and that "*some of the impacts would not be able to be reduced to acceptable levels*"; the ESIA, however, failed to identify or address these areas of non-compliance. As an example, Respondent considers it confirmed by Mr. Livesey that Claimant had no plans for treating and disposing of the wastewater treatment sludge and merely speculated that it would be "*an authorized facility in the Port of Gwadar area*"; however, there was

¹²⁵⁶ Respondent's Post-Hearing Brief on Quantum, ¶¶ 230, 235, referring to Transcript Hearing on Quantum (Day 7), p. 1952 lines 7-14 and p. 1958 lines 1-7, and Filas II, ¶¶ 38-39; Respondent's Rejoinder on Quantum, ¶¶ 318, 327-328, 337 referring to Filas II, ¶¶ 29, 42, 68, 111, 149-151 and Exhibit RE-601, p. 21; Respondent's Counter-Memorial on Quantum, ¶¶ 323-324, 330-331, 340-341.

¹²⁵⁷ Respondent's Post-Hearing Brief on Quantum, ¶¶ 231-232, referring to Transcript Hearing on Quantum (Day 7), p. 1926 lines 3-8, p. 1945 lines 19-22, p. 1946 lines 12-14 and pp. 1917-1918, and Cessford, ¶ 67; Respondent's Rejoinder on Quantum, ¶¶ 334, 336, referring to Filas II, ¶¶ 138, 165, 175-176; Respondent's Counter-Memorial on Quantum, ¶ 325, referring to Filas I, Section 5.3.3, p. 15.

¹²⁵⁸ Respondent's Post-Hearing Brief on Quantum, ¶¶ 231-234, referring to Transcript Hearing on Quantum (Day 7), p. 1919, p. 1921 lines 16-18 and p. 1953 line 17 to p. 1954 line 8, Filas II, ¶¶ 123-124, and Ault, p. 10; Respondent's Rejoinder on Quantum, ¶¶ 312, 335 referring to Filas II, ¶¶ 71, 80-81, 113, 121-125, 150, 190; Respondent's Counter-Memorial on Quantum, ¶¶ 332-335, referring to Filas I, Sections 5.2.2 and 6.0.

no analysis of the amount of sludge or its chemical characteristics and no estimate of the costs for treatment and disposal.¹²⁵⁹ Similarly, Respondent claims that while Claimant recognized the “*potential loss of income from fishing near the site for discharge of water in the ocean at Port Gwadar*” and identified as a source of “*tension and discord in the local communities,*” it failed to assess the impact on the fisheries and failed to account for any mitigation costs in this regard.¹²⁶⁰

997. Respondent also contends that the ESIA failed to evaluate mitigation measures to reduce or eliminate the public concerns raised as required under the IFC standards and refers to Ms. Filas’ opinion that any “*mitigation measures were limited to generalized statements regarding economic development, establishing communications between TCC and local communities and Project monitoring.*”¹²⁶¹
998. Referring to Ms. Filas, Respondent contends that the management system plans missing in the ESIA are critical in that they “*define what would need to be done to implement those commitments that are made in the ESIA, in order to make an adequate estimate of the costs.*” Ms. Cessford conceded that the ESIA did not include an environmental mitigation budget but stated that “*there are numbers presented in the Feasibility Study for it*”; however, the Feasibility Study was completed almost six months before the ESIA and there were no costs in the Feasibility Study, *e.g.*, for the proposed sludge disposal even though Mr. Livesey did not know “*whether it would be a significant cost.*”¹²⁶² Respondent considers that the amount of USD 1.2 million in CAPEX for “*field environmental mitigation costs*” is “*completely unrealistic in light of the ESIA’s deficiencies*” and notes that OPEX G&A costs reflect only environmental monitoring but expressly exclude environmental closure costs. As a result, Respondent claims that the mitigation costs required during the operation of the mine “*are severely understated and in most cases are missing.*”¹²⁶³ According to Respondent, the same therefore also applies to Prof. Davis’ model, which “*only addressed three discreet areas, which did not include water aquifer reinjection, training of low-skilled workers, sludge treatment and disposal, air and discharge emission controls, just to name a few.*”¹²⁶⁴

¹²⁵⁹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 237-239, quoting from **Exhibit RE-576-13**, p. 13-31 and referring to Transcript Hearing on Quantum (Day 2), pp. 355-357, and Filas II, ¶¶ 22, 126; Respondent’s Rejoinder on Quantum, ¶¶ 329, 340 referring to Filas II, ¶¶ 22, 126 and **Exhibit RE-601**, p. 4-43.

¹²⁶⁰ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 240-241, quoting from **Exhibit RE-576**, p. 13-31, and referring to Ault, p. 10 and Filas II, ¶ 131; Respondent’s Rejoinder on Quantum, ¶ 330, quoting from **Exhibit RE-601**, pp. 8-17 to 8-19; Respondent’s Counter-Memorial on Quantum, ¶ 335.

¹²⁶¹ Respondent’s Rejoinder on Quantum, ¶ 326, quoting from Filas I, ¶ 12.

¹²⁶² Respondent’s Post-Hearing Brief on Quantum, ¶¶ 240-244, quoting from Transcript Hearing on Quantum (Day 7), p. 1997 lines 16-19 and p. 1934 lines 6-7 and (Day 2), p. 358 lines 2-5.

¹²⁶³ Respondent’s Post-Hearing Brief on Quantum, ¶ 245, referring to **Exhibit RE-576-23**, p. 23-27 and **RE-576-24**, pp. 24-23 to 24-24.

¹²⁶⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 246, referring to Davis I, Workpaper 26, pp. H-53 to H-56.

999. Respondent further contends that Claimant's ESIA failed to meet the formal requirements under the IFC Performance Standards and Equator Principles and notes that Ms. Cessford testified only that "*it aligned with the IFC Performance Standards*" and referred to the Feasibility and other unnamed draft documents that would together with ESIA meet the applicable international standards.¹²⁶⁵ Respondent points to Ms. Filas' identification of "*the key areas*" where the ESIA did not meet international standards and her conclusion that it would therefore not have met lender or regulatory requirements as of the valuation date.¹²⁶⁶ Specifically, Ms. Filas stated:

*"They haven't provided justifications, in particular, for greenhouse gas, for NOx emissions and for the concentrate effluent, and failure to adequately address public concerns regarding aquifer depletions, air emissions, the quality of water into the fishery, and the toxic mine water that would have been left at the end of the closure period."*¹²⁶⁷

1000. Respondent also refers to Ms. Filas' testimony that the ESIA itself would have had to provide an evaluation of the transboundary water drawdown in Afghanistan and an assessment on security in order to meet the IFC Performance Standards.¹²⁶⁸ According to Respondent, Claimant understated the risks and impact associated with: (i) the extraction of water from the Fan Sediments; (ii) the safety and security issues in Balochistan; (iii) the greenhouse gas emissions from the mine that would amount to almost 1% of Pakistan's overall greenhouse emissions; (iv) the environmental impacts to the marine life in the Arabian sea; (v) transboundary impacts on Afghanistan; and (vi) the health impacts on the employees.¹²⁶⁹

1001. Respondent submits that both of its experts reached the conclusion that Claimant's ESIA was not lender ready: (i) Ms. Filas stated that she could "*tell by the content of what's in the ESIA today whether its lender ready. And this one was not*"; and (ii) Dr. Connor stated that the ESIA would need to be "*redone*" because it has not "*identified all the impacts*" and does not give "*the reader ... enough information to reach a conclusion about whether ... to invest or not.*"¹²⁷⁰

¹²⁶⁵ Respondent's Post-Hearing Brief on Quantum, ¶ 247, quoting from Transcript Hearing on Quantum (Day 7), p. 1900 lines 16-17 and referring to pp. 1900-1904.

¹²⁶⁶ Respondent's Post-Hearing Brief on Quantum, ¶ 248, referring to Filas I, Filas II, and Transcript Hearing on Quantum (Day 7), pp. 1943-1959.

¹²⁶⁷ Transcript Hearing on Quantum (Day 7), p. 1958 lines 1-7.

¹²⁶⁸ Respondent's Post-Hearing Brief on Quantum, ¶¶ 101-102 (numbering after ¶ 248) on p. 103, referring to Transcript Hearing on Quantum (Day 7), pp.

¹²⁶⁹ Respondent's Rejoinder on Quantum, ¶¶ 320-325; Respondent's Counter-Memorial on Quantum, ¶¶ 324, 330, 334-339, 351.

¹²⁷⁰ Respondent's Post-Hearing Brief on Quantum, ¶¶ 249-250, quoting from Transcript Hearing on Quantum (Day 7), p. 1986 lines 6-9 and p. 2030 lines 2-3.

1002. Respondent agrees with Claimant that the assessment of a project's environmental and social impacts is a dynamic and iterative process. It notes that the ESIA is submitted to both the local authorities for permits needed for the project as well as to financiers and adds that “[a]s the local authorities and the financiers make changes to the ESIA, the ESIA normally goes through various drafts. With each draft, the requirements imposed by the financiers and the government may require changes to the mine plan, and the mitigation costs related with certain compliance requirements can materially impact the mine, if not make the mine uneconomic to operate.”¹²⁷¹
1003. Respondent emphasizes that Claimant planned to start construction less than a year later and, as of November 2011, “the ESIA was not complete, lacked many of elements that lenders would require, and did not include a plan for managing environmental mitigation.” Referring to Ms. Filas, Respondent maintains that the ESIA was only a “plan for a plan” which, in Respondent’s view, “could have equally been used for any other project,” and further maintains that “IFC would have required at the very least a draft management plan.” Specifically, Respondent refers to Ms. Filas testimony that, drawing on her experience of working with IFC, “the IFC ... would expect to see a management system. I believe that this Guidance note is saying that it doesn’t have to be complete and final, but it needs to address those elements that are time-dependent.”¹²⁷² According to Respondent, this management system is required for “any significant impacts that require mitigation” and should address non-compliant air and water discharges, occupational health and safety plans and security measures to protect the work site and the workers.¹²⁷³
1004. Respondent notes that Ms. Filas identified these deficiencies of the ESIA during a high-level review and observed that “it is conceivable that the project’s ESIA may be rejected outright, without necessarily conducting a detailed review of its content.” Respondent argues that a buyer would also have detected these shortcomings and likely have required the presentation of effective management systems before accepting the ESIA. Respondent also submits that lenders would have found these deficiencies “at the very least problematic” and curing them would have resulted in additional costs for Claimant (as would have the addition of the required mitigation measures), which are not accounted for in the Feasibility Study.¹²⁷⁴

¹²⁷¹ Respondent’s Rejoinder on Quantum, ¶ 347; Respondent’s Counter-Memorial on Quantum, ¶ 316.

¹²⁷² Respondent’s Post-Hearing Brief on Quantum, ¶¶ 251-252, quoting from Transcript Hearing on Quantum (Day 7), p. 1956 lines 1-12 and p. 1983 lines 9-18; ; Respondent’s Rejoinder on Quantum, ¶ 349, referring to Filas II, ¶ 143 and Henry/Howden II, p. 17.

¹²⁷³ Respondent’s Rejoinder on Quantum, ¶ 319, referring to Filas I, Table 2 and ¶¶ 68, 142, 166; Respondent’s Counter-Memorial on Quantum, ¶ 323.

¹²⁷⁴ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 254-255, quoting from Transcript Hearing on Quantum (Day 7), p. 1959 lines 1-3; Respondent’s Rejoinder on Quantum, ¶¶ 311, 347-348 quoting from Filas II, ¶ 15 and referring to ¶¶ 66, 143, 180.

c. Tribunal's Analysis

1005. The Tribunal notes that the Parties' dispute regarding the Environmental and Social Impact Assessment (ESIA) for the Reko Diq Project, which was prepared and completed for submission to the authorities in November 2010, concerns several issues, which are to some extent intertwined. Respondent and its experts take the position that the ESIA did not contain all of the elements required under the relevant international standards that regulatory authorities and lenders would have expected to see in an ESIA when considering whether to approve or provide funding to the project. In addition, Respondent and its experts have raised concerns with regard to certain impacts that are addressed in the ESIA but would, in their opinion, not have been considered acceptable by the authorities and/or lenders.

1006. There is no dispute between the Parties' experts that the relevant international standards are the Equator Principles, and the International Finance Corporation's (IFC) Performance Standards. With regard to the environmental impact assessment, Ms. Cessford and Ms. Filas both also made reference to Pakistan's National Environmental Quality Standards (NEQS).

1007. As pointed out by Claimant, there further appears to be agreement between the Parties regarding the methodology applied by Claimant's consultants in preparing the ESIA. Ms. Filas confirmed in her second report:

*"Filas Engineering agrees that it did not take exception to the general methodology that SRK Consulting UK Ltd and Hagler Bailly Pakistan Pvt. Ltd used in conducting the ESIA analysis. The impact analysis methodology used appeared to be conventional. Due to the high-level nature of our review, Filas Engineering did not conduct a technical review of the various modeling efforts nor did we take exception to their process. We did, however, express concern regarding the proper assessment of specific issues and in the comprehensiveness of the ESIA content relative to Equator Principles IFC Performance Standard expectations."*¹²⁷⁵

1008. Dr. Connor stated in her report with regard to the consultation of stakeholders:

*"TCC identified stakeholders, conducted consultations between March 2008 and October 2009 with various stakeholders including a selection of communities in three affected areas, developed a Grievance Mechanism, and prepared an initial Public Consultation and Development Plan (PCDP) developed during the Scoping phase. Consultation information in the ESIA and PCDP indicates that TCC followed the usual protocols."*¹²⁷⁶

1009. However, Dr. Connor also noted the following:

¹²⁷⁵ Filas II, ¶ 78.

¹²⁷⁶ Connor, Section 2.2.2, ¶ 1.

*“The different formats used and the brevity of the descriptions of stakeholder participation (particularly at the community level), however, inhibit judging the acceptability of the consultation process at that stage and as described in the documents in terms of its scope, extent, methodologies and the level of representativeness of the participation. A reasonable judgment would have required more clarity in identifying the extent and scope of consultation.”*¹²⁷⁷

1010. While Respondent’s experts therefore made certain caveats regarding their acceptance of the methodology and process followed, the Tribunal considers that in the absence of any specific objection in this regard, it has no basis to find that the ESIA process itself, *i.e.*, the manner in which information was collected and assessed to determine the environmental and social impacts of the project, would have given a buyer or a lender cause for concern.

1011. Before turning to the criticisms raised by Respondent’s experts on the contents of the ESIA, the Tribunal also notes that there was agreement between all experts that the assessment of environmental and social impacts is characterized by an iterative process that continues throughout the life of the project. They are in disagreement, however, as to the question which level of information, in particular when it comes to mitigation measures and a management system, has to be included in the ESIA, which is prepared before the start of construction, in order to be considered acceptable by the relevant authorities and potential lenders.

1012. Respondent itself confirmed in this regard that when an ESIA is submitted to the relevant authorities and lenders, it is not yet set in stone; it expressly noted that “[a]s *the local authorities and the financiers may make changes to the ESIA, the ESIA normally goes through various drafts.*”¹²⁷⁸ Ms. Filas stated in her second report, however, that “[i]f *the Project does not propose adequate environmental controls and does not enjoy local support, it is conceivable that its ESIA may be rejected outright, without necessarily conducting a detailed review of its content.*”¹²⁷⁹

1013. Ms. Cessford explained at the Hearing on Quantum that the expectation of what would occur after the submission of the ESIA to the Balochistan authorities was as follows:

“The ESIA team had actually been scoped to interact with the regulator post-submission, the regulator in this case being the Balochistan Environmental Protection Agency. We had also been scoped to undertake the feedback stakeholder of consultation, which is a very important stage in the process, whereby the outcome of the ESIA is presented to stakeholders so they can understand how the issues that they raised in the Scoping Stage have been addressed and what the plans are moving forward with the Project.

¹²⁷⁷ Connor, Section 2.2.2, ¶ 2.

¹²⁷⁸ Respondent’s Counter-Memorial on Quantum, ¶ 316.

¹²⁷⁹ Filas II, ¶ 15.

This was to take place in parallel with the Public Hearing, which is the regulatory requirement, in terms of the Balochistan environmental requirements. In addition to that, we were expecting to have to, as part of our work with the interaction with the stakeholders and the regulators--to possibly have to make amendments to the ESIA. That is quite common as a result of these engagement activities. And then, also, we had been scoped with providing input into TCC's development of their Management Plans.”¹²⁸⁰

1014. Ms. Filas noted in her second report that “[i]t is true that a regulatory authority such as the Pakistan EPA can review an ESIA report and reject certain portions of its content and request additional information on those aspects that are not fully explained.” In her opinion, however, the environmental issues she had identified “would likely be a non-starter in most countries.”¹²⁸¹ She further confirmed her opinion that “[t]o propose a massive use of water resources in a hyperarid environment with little to no environmental controls on air emissions and water discharges without adequate justification would likely be a non-starter for the Pakistan EPA, the IFC and potential private investment firms.”¹²⁸²

1015. With regard to the review of the ESIA by the competent regulatory authority, which she confirmed to be the Balochistan EPA, Ms. Filas noted at the Hearing on Quantum that she was “not an expert on Pakistan requirements” and that she did “not have experience submitting these ESIA’s to the Balochistan EPA.” She clarified that her opinion was based on her expectation “that any Regulatory Authority would expect justification for the presentations that are made. So, it doesn’t require experience in Balochistan to have a reasonable expectation that they would behave in the manner that most regulators around the world do.”¹²⁸³ Ms. Filas further confirmed that she had not asked for information about the record of the Balochistan EPA in reviewing ESIA’s but was aware of the ESIA for the earlier Tanjeel project at Reko Diq which had been approved. Claimant pointed out to Ms. Filas that it had asked for but was not provided with any other ESIA submitted to the Balochistan EPA and that the Tanjeel ESIA was therefore the only ESIA in the record. It further pointed out that the Saindak mine, which has been operating in Balochistan for a number of years, therefore appeared to be allowed to operate without having an approved ESIA.¹²⁸⁴ When presented with this information, Ms. Filas maintained her opinion that “the term ‘non-starter’ ... it’s an accurate statement because ... the massive use of water resources in a hyperarid environment, with little or no environmental controls on air emissions and water discharges without adequate

¹²⁸⁰ Transcript Hearing on Quantum (Day 7), p. 1897 line 16 to p. 1898 line 15.

¹²⁸¹ Filas II, ¶ 80.

¹²⁸² Filas II, ¶ 180.

¹²⁸³ Transcript Hearing on Quantum (Day 7), p. 1989 line 16 to p. 1990 line 18.

¹²⁸⁴ Transcript Hearing on Quantum (Day 7), pp. 1992-1993.

justification would likely be a non-starter.” She further clarified that “if you’re not going to mitigate, ... if you’re going to require variances to the expectations by the lenders and government ... and you don’t provide adequate justification for those, then it’s likely to be a nonstarter because that’s what regulators and lenders do.”¹²⁸⁵ Ms. Filas testified that “[w]hat happened with the Saindak mine is not relevant to whether or not the Reko Diq ESIA is lender ready”; she clarified that she had not been testifying about regulatory approval in her second report but rather that “lenders will defer to the Host Country requirements. You have to meet Host Country requirements, and you have to meet lender expectations.”¹²⁸⁶

1016. Ms. Filas’ oral testimony made clear that she did not base her opinion that the ESIA in its current form “*would likely be non-starter for the Pakistan EPA*” on any specific practices of the competent provincial authority in Balochistan but rather on a more general expectation of how a regulatory authority would react to the environmental impact of the project as presented in the ESIA. At the end of her testimony, Ms. Filas further clarified that she did not really express an opinion on whether regulatory approval would be denied but rather whether non-conformities with the environmental requirements in Pakistan would result in lenders refusing to fund the project.

1017. On that basis, the Tribunal sees no reason to assume that the ESIA would have been rejected by the Balochistan EPA. As Ms. Cessford testified, Claimant expected that interactions with the authority would be required after submission of the ESIA, that there would be a public hearing in accordance with the regulatory requirements, and that they would “*possibly have to make amendments to the ESIA,*” which she considered “*quite common.*”¹²⁸⁷ As noted above, Respondent itself submitted that “*the ESIA normally goes through various drafts*” as, *inter alia*, “*the government may require changes to the mine plan.*”¹²⁸⁸ There is no indication that the Balochistan EPA would not have engaged in such a dialogue with Claimant in the absence of Respondent’s Treaty breaches. In addition, as was also pointed out by Claimant, Balochistan’s authorities did not raise any concern with regard to the environmental or social impact of the project after the ESIA had been submitted together with TCCP’s Mining Lease Application in February 2011. No concern in this regard was included in the reasons provided by the Licensing Authority in its Notice of Intent to Reject and there is no evidence of a concern being raised at any point prior to this arbitration.

1018. In the Tribunal’s view, the more relevant question is therefore whether the content of the ESIA and the proposed measures to mitigate the impact identified in the ESIA would

¹²⁸⁵ Transcript Hearing on Quantum (Day 7), p. 1993 line 22 to p. 1994 line 13.

¹²⁸⁶ Transcript Hearing on Quantum (Day 7), p. 1994 line 17 to p. 1995 line 3.

¹²⁸⁷ Transcript Hearing on Quantum (Day 7), p. 1898 lines 8-12.

¹²⁸⁸ Respondent’s Counter-Memorial on Quantum, ¶ 316.

have been considered by lenders to be in conformity with international standards and, if not, whether they would have required significant additional measures and, thus, additional costs to be included before agreeing to fund the project. In this regard, Ms. Cessford testified at the Hearing on Quantum that with regard to expected interactions with investors, the ESIA team had only been scoped to produce a “*Glorified Executive Summary*” of the ESIA, which she described as “*a much longer Executive Summary, suitable for investors that explained the process and the interaction with the project engineers.*” She further testified:

*“In addition to that, although we had not been scoped in this case, based on my other experience on other projects, we had expected to have interactions with any investors, respond to questions, possibly undertake additional studies, such as on issues they raised, and to develop action plans to address any gaps that they might identify that they felt needed further work.”*¹²⁸⁹

1019. Ms. Cessford’s testimony makes clear that Claimant and its consultants expected at the time that additional work might be necessary before the ESIA would be considered satisfactory. It is also apparent to the Tribunal that additional work might result in additional costs, be it due to substantial further work on the ESIA and/or due to additional mitigation measures that might have to be included following the interactions with investors and authorities. One question that will be addressed below is therefore whether Claimant and/or Prof. Davis included adequate contingency for such additional costs and possibly also delays in the start of construction.

1020. However, as noted above, Ms. Filas expressed the opinion in her second report that “[i]f the Project does not propose adequate environmental controls and does not enjoy local support, it is conceivable that its ESIA may be rejected outright, without necessarily conducting a detailed review of its content” and that by proposing “*a massive use of water resources in a hyperarid environment with little to no environmental controls on air emissions and water discharges without adequate justification,*” the ESIA would likely have been “*a non-starter for ... the IFC and potential private investment firms.*”¹²⁹⁰

1021. Dr. Connor testified at the Hearing on Quantum:

*“So, let me tell you what would happen if this ESIA would have gone to a lender, whether it's me or anybody else. They would have said, This ESIA has to be--or SIA has to be completely redone. You haven't identified all the impacts, and things like land aren't even addressed in it. You haven't properly addressed the significance, and you haven't given the reader or me or anyone else enough information to reach a conclusion about whether I would want to invest or not.”*¹²⁹¹

¹²⁸⁹ Transcript Hearing on Quantum (Day 7), p. 1898 line 18 to p. 1899 line 16.

¹²⁹⁰ Filas II, ¶¶ 15, 180.

¹²⁹¹ Transcript Hearing on Quantum (Day 7), p. 2029 line 22 to p. 2030 line 9.

1022. It became clear at the Hearing on Quantum that the opinion expressed by both of Respondent's experts, *i.e.*, that the ESIA was so deficient that it would likely not even have formed the basis for further discussions with the lenders as described by Ms. Cessford, was based on the consideration that certain information required under the relevant international standards had to be included specifically in the ESIA and not in any other part of the documentation of the project, in particular the Feasibility Study.

1023. Ms. Filas clarified at the Hearing on Quantum that she had not been retained to provide an assessment of any gaps contained in the work done by Claimant and its consultants but rather of "*gaps ... in the content of the ESIA relative to lender expectations.*" In response to the question whether she had considered whether any such gaps might be filled in other documents, Ms. Filas confirmed that she had "*looked at the ESIA as a stand-alone document*" and that her "*task was to look at the ESIA and understand and advise on whether or not it was complete and technically adequate.*"¹²⁹² Ms. Filas added that she had also looked at "*the background information*" and whether "*what was presented in the ESIA was a reasonable translation and summary of what was in the supporting documents.*" Specifically with regard to the situation of conflict in Balochistan, which she considered to be "*so downplayed in the ESIA itself,*" Ms. Filas explained that she had also reviewed Chapter 19 of the Feasibility Study on Security and testified: "*I looked at the representation in the Feasibility Study, and it was represented more like what I was expecting to see, where terrorists and militant groups were active in the area, which was more like what I was expecting to see.*"¹²⁹³ Ms. Filas further confirmed that the list of documents she had reviewed was not a comprehensive set of documents for the Reko Diq project but expressed the opinion:

*"I don't think it was necessary to ask for more documents to come to the conclusions that I came to. My review was done at a high level, and I could see that if this document were to be submitted to the regulators and disclosed to the public, it would have been cause for confusion that would have required additional attention being devoted to this document."*¹²⁹⁴

1024. When asked whether this additional attention would have come in the course of the iterative conversations and dialogue she had referred to earlier, Ms. Filas confirmed that "[i]t would have come through that process" but maintained the opinion that "*typically you will complete that work before you submit the document for regulatory review.*"¹²⁹⁵

¹²⁹² Transcript Hearing on Quantum (Day 7), p. 1967 line 18 to p. 1968 line 4.

¹²⁹³ Transcript Hearing on Quantum (Day 7), p. 1968 line 13 to p. 1970 line 8.

¹²⁹⁴ Transcript Hearing on Quantum (Day 7), p. 1971 line 12 to p. 1972 line 4.

¹²⁹⁵ Transcript Hearing on Quantum (Day 7), p. 1971 lines 8-11.

1025. Dr. Connor also testified at the Hearing on Quantum that she was criticizing a lack of information in the ESIA itself:

*“I thought I didn't have the information. They're supposed to be in the ESIA. The information is supposed to be in the Social Impact Assessment. That's where it's meant to be. They said it was finished. It's not there. There's a difference. It's not supposed to be somewhere else.”*¹²⁹⁶

1026. Dr. Connor emphasized that “[t]here are steps in the financing Project. You will submit to the lender certain documents at intervals. They will decide whether to go forward at each of those intervals.” She confirmed that a lender would also have reviewed the Feasibility Study but maintained that “*their purposes are completely different*” and that the “*social assessment doesn't occur until the ESIA until the Social Impact Assessment. And that document would have to demonstrate to the lender that you are serious and know what you're doing about the social impacts, particularly those of the nature--the fragile and delicate nature and volatile nature that I mentioned.*”¹²⁹⁷ Dr. Connor then confirmed that the opinion she had expressed in her report, *i.e.*, that the existing documentation did not demonstrate a satisfactory grasp of the human environment in which TCC would operate, particularly the socio-political and conflict conditions, was based only on the documents she had reviewed and that she “*didn't need to see any other documents.*”¹²⁹⁸ She maintained:

“If it is meant to be addressed as a social impact in the ESIA, that is where it goes. It can be 35 other places, but it has to be in the social impact assessment because that's the document that assesses the risk of that to the Project, and the risk of the Project to the people in that area.

*So, you can have all kinds of background documents. You have--there should have been. There should have been a very in-depth study of this. That does not exist. There is a sort of superficial study. But the ESIA is a document that the bank--you do not ask the lenders to look around for things. They have a suite of documents they ask for, and that's where it is supposed to be.”*¹²⁹⁹

1027. It is apparent from the testimony of Ms. Filas and Dr. Connor that their review focused on the ESIA itself and whether this report included the information required under the relevant international standards, *i.e.*, in particular the Equator Principles and IFC Performance Standards. However, the Tribunal notes that when Ms. Cessford was asked whether the ESIA met the Equator Principles and IFC Performance Standards at the time it was submitted, she testified as follows:

“I would say that it aligned with the IFC Performance Standards. My experience shows that every potential investor has certain things that they are

¹²⁹⁶ Transcript Hearing on Quantum (Day 7), p. 2029 lines 7-12.

¹²⁹⁷ Transcript Hearing on Quantum (Day 7), p. 2029 line 18 to p. 2031 line 9.

¹²⁹⁸ Transcript Hearing on Quantum (Day 7), p. 2036 lines 2-22.

¹²⁹⁹ Transcript Hearing on Quantum (Day 7), p. 2037 lines 7-20.

concerned about, and that varies from investor to investor and from person to person within the financial institute. So, one never knows exactly how they are going to interpret it, but it certainly aligned with the process, and it took a precautionary approach to the items that were covered.

Q. Okay. When you say ‘aligned with the process,’ do you mean that, in your opinion, it met the Equator Principles and IFC Performance Standards on the date of submission, or that it would meet those standards in the future?

A. The Report itself or the Process? Because the IFC Performance Standards, which support the Equator Principles, outline a process. The ESIA is one step in that process. So, there isn't a fixed endpoint that you reach. The ESIA was part of that, and at that point, we stopped, but we were still doing other activities in parallel with the ESIA that might not be captured in the document itself.

The document's key purpose is to submit to regulatory authorities, not to meet the Equator Principles. To meet the Equator Principles and the IFC Performance Standards, one is doing a process which is captured in multiple documents, including the Feasibility Study and other documents that may have been generated throughout the course of that process.”¹³⁰⁰

1028. Ms. Cessford further clarified that in her opinion, the process of preparing the ESIA met the Equator Principles and IFC Performance Standards and in terms of content reiterated that *“the content of the ESIA Report is only part of the content that’s needed to meet the IFC Performance Standards.”* She further confirmed that *“if you pull in the Feasibility Study and other additional work that was going on in parallel, then, yes, I believe it would [meet the Equator Principles and IFC Performance Standards].”* She testified that some of the additional content she was referring to was contained in the Feasibility Study and further referred to *“draft documents floating around at the time we stopped working.”¹³⁰¹*

1029. Based on Ms. Cessford’s testimony, it appears to be undisputed that the ESIA did not contain in and of itself all of the information required under the relevant international standards. The experts expressed deviating opinions as to whether this would have caused lenders to request additional work on the ESIA on that basis or whether they would also have been satisfied if the information was included in other documentation such as, in particular, the Feasibility Study and other reports that Claimant had completed or was planning to complete before seeking funding from international lenders.

1030. In the Tribunal’s view, it is not necessary to make a conclusive finding on this point. Even if, as Respondent’s experts testified, lenders had required Claimant to include all relevant information, *e.g.*, on the security and conflict situation in Balochistan, in the ESIA itself and had not been satisfied that such information was provided in other reports or in the Feasibility Study, the Tribunal considers it reasonable to assume that these issues could

¹³⁰⁰ Transcript Hearing on Quantum (Day 7), p. 1900 line 13 to p. 1901 line 22.

¹³⁰¹ Transcript Hearing on Quantum (Day 7), p. 1902 line 2 to p. 1903 line 19.

have been resolved without significant additional costs or significant delay – to the extent an assessment had been made and the information was therefore already available in a different part of the documentation.

1031. In the Tribunal’s view, the relevant question is therefore whether Respondent’s experts identified assessments or plans that would have had to be included in the ESIA under the relevant international standards but were not made by Claimant or its consultants, including in other parts of the documentation for the Reko Diq project.

1032. In this regard, Respondent’s expert identified in particular two aspects that they considered crucial but missing in the ESIA (as well as other parts of the documentation), *i.e.*, an Environmental and Social Management System (ESMS) and a community impact assessment. In addition, Ms. Filas raised various additional concerns regarding the environmental impacts of the project presented in the ESIA.

i. Whether Claimant Adequately Addressed Environmental and Social Management

1033. As for environmental and social management, Ms. Filas stated in her second report that “*the management measures proposed in the ESIA were only broad-based generalizations that would normally be further addressed in environmental and social management systems. The ESIA did not include these management systems, which is customary for inclusion in a typical ESIA and mandated by IFC Performance Standard 1 and Equator Principle 4, but instead only included a framework for the management systems. Consequently, the ESIA did not provide adequate information for a reviewer to determine the effectiveness of the management systems in mitigating environmental impacts.*”¹³⁰² In her opinion, “*a certain number of the evaluations and impact analyses did not get completed to a level that meets international best practice or typical lender expectations,*” including “*the ‘plan-for-a-plan’ instead of actual management systems to demonstrate how mitigation will be accomplished.*”¹³⁰³ Ms. Filas further stated:

*“Discipline-specific management plans describe the ‘who, what, where, when and why’ of implementing mitigation measures. If these are not spelled out, it is difficult to accurately cost out the management system implementation costs. This suggests that the costs included in the Feasibility Study financial model may be insufficient to cover the actions needed to mitigate Project impacts to acceptable levels once those management plans are adequately developed.”*¹³⁰⁴

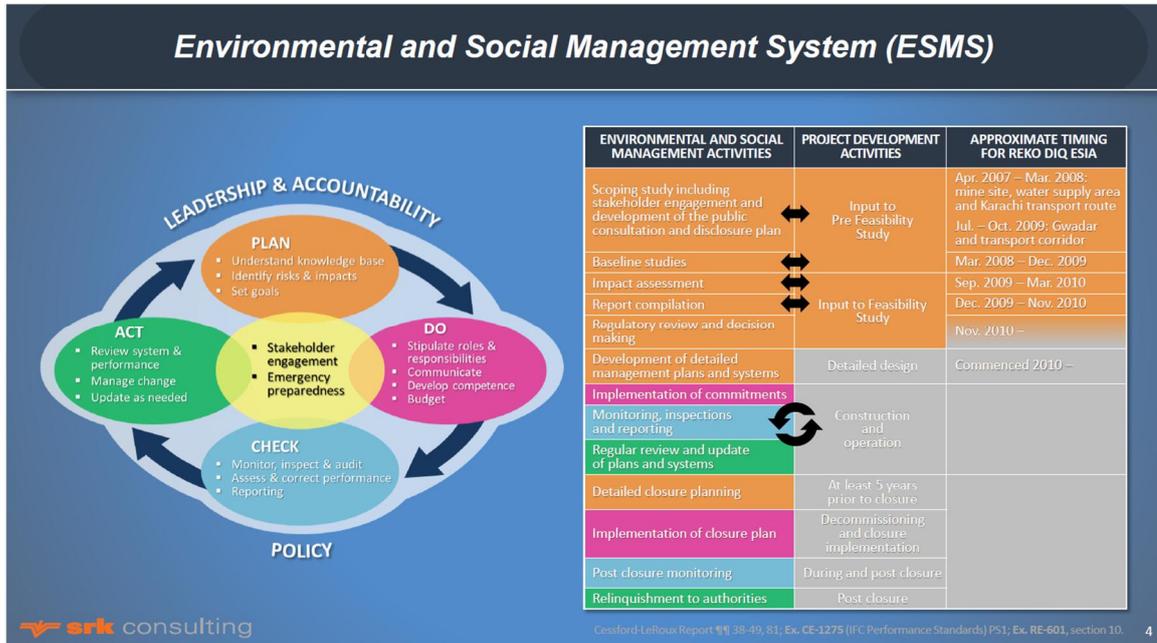
1034. At the Hearing on Quantum, Ms. Cessford agreed that “[i]n terms of environmental and social management, the process is laid out in IFC Performance Standard One” and noted

¹³⁰² Filas II, ¶ 17.

¹³⁰³ Filas II, ¶ 21.

¹³⁰⁴ Filas II, ¶ 66.

that this process “follows a standard business cycle of plan, do, check, act” with certain additions. She testified that “all the activities that were undertaken by the ESIA team fall under the planning aspect of this” and then explained how they “would have expected the Environmental and Social Management System to have moved forward through this plan, do, check, act, as it moved towards construction, operation, and then, eventually, its end of life-of-mine.”¹³⁰⁵ Ms. Cessford illustrated the steps which had been carried out and completed (orange) as well as the steps that had been commenced but not completed and the outstanding steps (grey) as follows:¹³⁰⁶



1035. Ms. Filas testified in response to this presentation:

“I heard her Opening Presentation, and I fundamentally disagree with the comments that she made about the ESMS being something that can be put off until later.

I've been called in on projects, by the IFC in particular, where projects have done almost identical to this and where they had not done a management system--and management systems, I agree, they're an iterative process. They are developed over time and refined over time, but you don't--if you're trying to comply with Equator and IFC expectations, you have a plan, a management system plan, and action plan for those key mitigation measures that you need to be able to demonstrate how you're going to implement them on the ground.

You don't have a generic plan for a plan that does not address how you do that, and you don't wait until later, particularly in those areas that are time-dependent.

¹³⁰⁵ Transcript Hearing on Quantum (Day 7), p. 1888 line 6 to p. 1889 line 6.

¹³⁰⁶ Cessford Presentation, p. 4. See also Transcript Hearing on Quantum (Day 7), p. 1889 line 7 to p. 1892 line 4.

This Project was going to be--was scheduled to be implemented according to the Implementation Schedule in the ESIA, less than a year later. So, you better have your preferential benefits for local communities identified and who's going to get those benefits because, in an area of conflict, you're going to have conflict if you don't respect that.”¹³⁰⁷

1036. Ms. Filas noted that she did not have experience working with Pakistan but that she had worked with lenders and “*the lenders expect more than what is presented here. IFC is very clear on that.*” As for the opinion expressed in her second report that a “*complete plan*” would normally be expected, including by the Government of Pakistan, Ms. Filas stated that she “*would expect that most Governments expect to see ... a complete document, and there may be some discretion as far as the level of development in--from country to country. But certainly from a lender perspective and an IFC perspective, I can assure you that the expectation is higher than a generic plan for a plan.*”¹³⁰⁸

1037. When pointed to the IFC Performance Standards’ description of the “*Social and Environmental Management System,*” which “*will incorporate the following elements: (i) Social and Environmental Assessment; (ii) management program ; (iii) organizational capacity; (iv) training; (v) community engagement; (vi) monitoring; and (vii) reporting,*”¹³⁰⁹ Ms. Filas agreed that the ESIA corresponded to the first element and was different from the management program embodied in the second element. Ms. Filas did not agree, however, that by criticizing the Reko Diq ESIA for not including a full management plan, she was actually going further than the IFC requires. She stated that “*I think you're splitting hairs here because, as far as I'm concerned, if you were going for financing at IFC or with an equator lender, you will need to have the management system, the initial Management System and certain action plans that will mitigate--that will demonstrate how you intend to mitigate the critical impacts and the time-dependent impacts.*”¹³¹⁰

1038. Claimant then pointed to the IFC’s guidance notes on the Performance Standards, which provide with regard to the requirement quoted above:

“The level of detail and complexity of the social and environment management system and the resources devoted to it will depend on the level of impacts and risks identified in the social and environmental assessment and the size and nature of the client’s organization. A satisfactory Management System appropriate to the nature and scale of the project and commensurate with the level of social and environmental risks and impacts is a condition of IFC’s investment. If the client does not have a satisfactory

¹³⁰⁷ Transcript Hearing on Quantum (Day 7), p. 1973 line 10 to p. 1974 line 13.

¹³⁰⁸ Transcript Hearing on Quantum (Day 7), p. 1975 line 9 to p. 1976 line 5.

¹³⁰⁹ **Exhibit FIL-18**, p. 1.

¹³¹⁰ Transcript Hearing on Quantum (Day 7), p. 1979 line 17 to p. 1981 line 17.

Management System at the time of IFC's appraisal of the project, one should be developed and implemented over a reasonable period of time agreed with IFC, and be in effect in time to manage project activities financed by IFC."¹³¹¹

1039. With regard to the final sentence of the paragraph quoted above, Ms. Filas testified that "[t]hey are giving that provision--my experience in working with IFC has not--has been that they would expect to see a management system to some level being a project-specific management system. I believe that this Guidance Note is saying it doesn't have to be complete and final, but it needs to address those elements that are time-dependent."¹³¹² Claimant then pointed to its Quarterly Report on Exploration Activities that ended 30 June 2010, which provided:

"Implementation of Environmental Management System (EMS)

Reko Diq Environmental management system currently is under development. The preliminary deadline date to have fully operational Environmental Management System is end of December 2010. It is anticipated that during November – December status of the EMS implementation will be reviewed by the owners and in 2011 EMS will be certified according ISO 14001.

*The major activities are: [...]"*¹³¹³

1040. When asked whether, if she had been reviewing the ESIA for an investor or a regulator, she would have asked when the company expected to have a fully operational ESMS, Ms. Filas testified:

"If I'm reviewing a document for whether or not it is lender ready, I can tell by the content of what's in the ESIA today whether it's lender ready. And this one was not.

Q. Okay. We went through and showed how the IFC Performance Standards don't actually require a full management plan in the ESIA. I can do the same exercise with you with the Equator Principles and the Pakistani regulations, if you would like.

A. You can certainly do that. Guidelines are written the way they're written so that they give flexibility. My experience, on more than--on several projects are that the IFC, in particular, will require a management system to be fleshed out to a certain level as part of the initial presentation of the ESIA.

Q. Even though that's not what the IFC Performance Standards or the Guidelines say?

A. My Expert Opinion is that the IFC will require that whether they have easygoing words or not. You will have to make a case for why it's not necessary if you are not going to include what is required by Performance

¹³¹¹ Exhibit CE-1292, p. 2.

¹³¹² Transcript Hearing on Quantum (Day 7), p. 1983 lines 1-18.

¹³¹³ Exhibit CE-165, p. 25.

Standard 1 and Equator Principle 4 in the documentation that you're putting forward as representing those--addressing those elements."¹³¹⁴

1041. Based on the testimony of the Parties' experts regarding the Environmental and Social Management System, the Tribunal considers it common ground that the IFC Performance Standard One requires the implementation of such a Management System. It further appears to be undisputed that Claimant's ESIA did not contain the management program identified in the IFC Performance Standard but that, as stated in Claimant's June 2010 Quarterly Report, it was aiming to implement an Environmental Management System (EMS) by December 2010. On the other hand, Claimant has not pointed the Tribunal to a document demonstrating that this deadline was met and that a fully operational EMS was completed by the end of 2010 or thereafter.
1042. It is not entirely clear to the Tribunal whether the EMS was or was not completed and, if not, whether this was due to events after the delivery of the Feasibility Study to the GOB, which gave rise to Respondent's breaches of the Treaty. It is also not entirely clear whether the scope of the management system that Claimant planned to implement would be limited to environmental impacts or would also extend to social impacts as required under IFC Performance Standard One. In any event, however, the Tribunal is not convinced that a not yet fully operational ESMS would have caused a lender to consider the ESIA and other documentation of the project so deficient that it would have rejected the ESIA or requested that it be completely redone. As pointed out by Claimant, the guidance notes of the IFC Performance Standards state that the absence of a satisfactory Management System does not mean that funding is necessarily declined but the Management System should then "*be developed and implemented over a reasonable period of time agreed with IFC, and be in effect in time to manage project activities financed by IFC.*" Ms. Filas confirmed at the Hearing in Quantum that the guidelines "*are written the way they're written so that they give flexibility*" but maintained that her experience was that the IFC "*will require a management system to be fleshed out to a certain level as part of the initial presentation of the ESIA.*"¹³¹⁵
1043. In the Tribunal's view, it is not necessary to make a conclusive finding on this point. Even if, as Ms. Filas testified, the IFC and other lenders were to require a certain level of information on the management system to be implemented for the project in the ESIA and even if, contrary to the Quarterly Report of June 2010, Claimant had not completed the implementation by the time it would approach lenders, the Tribunal is not convinced that this would have caused the lenders to decline funding to the project. In the Tribunal's view, it is rather reasonable to assume that, as Ms. Cessford expected, interactions would have followed and based on the requirements and issues raised by the lenders, Claimant

¹³¹⁴ Transcript Hearing on Quantum (Day 7), p. 1986 line 6 to p. 1987 line 8.

¹³¹⁵ Transcript Hearing on Quantum (Day 7), p. 1986 lines 15-20.

would have had the chance to finalize its plans for a management system in conformity with the IFC Performance Standards.

1044. The question that remains to be answered is whether this would have resulted in additional costs that Claimant did not sufficiently account for in its cost estimate for the project. Ms. Filas testified that the management system would be important in order to determine the actual costs associated with implementing the mitigation measures identified with regard to environmental and social impacts. Ms. Cessford confirmed at the Hearing on Quantum that the “*Budget*” identified in her illustration of the business cycle under the action item “*Do*” in pink color “*wasn’t presented in the ESIA*” but also stated that “*there are numbers presented in the Feasibility Study for it.*” She then clarified:

“The ESIA team did not get to the pink area, but you can’t--like with any aspect of a project, when you do your Feasibility Study, you put costs in. There were costs presented in the Feasibility Study to handle environmental and social management ...both Capex and Opex.

They are just not presented in the ESIA. ...

They are presented in the Feasibility Study. ...

*And the ESIA team did not develop those costs. TCC developed those costs.”*¹³¹⁶

1045. Ms. Filas stated at the Hearing on Quantum that in her opinion the ESIA would need to address the shortcomings she had identified and confirmed that this would likely translate into further outlays from Claimant in terms of capital costs and operating costs. She further confirmed that she had not given an estimate of what those costs might be for the following reason:

“I do not give an estimate of what those costs are, but I do know that those costs are, normally, when you prepare an ESIA, the idea behind--because the ESIA is being developed concurrently with the Project Feasibility Study, the action plans for implementing mitigation measures for the key mitigation that needs to be done for the Project would typically be accompanied by an implementation schedule and an implementation budget so that you have the capital and the Operating Costs quantified based on the commitments of the Project. And those would be factored into the Feasibility Study Cost Evaluation.

*And, to me, the Management System is the piece, the missing piece that would define what would need to be done to implement those commitments that are made in the ESIA, in order to make an adequate estimate of costs.”*¹³¹⁷

1046. Ms. Filas confirmed that Ms. Cessford was “*absolutely right if she says the ESIA costs would be factored into the Feasibility Study.*” She then referred to a discussion with Ms.

¹³¹⁶ Transcript Hearing on Quantum (Day 7), p. 1934 line 1 to p. 1935 line 4.

¹³¹⁷ Transcript Hearing on Quantum (Day 7), p. 1995 line 20 to p. 1997 line 19; Filas Presentation, p. 17.

Cessford on the disposal of sludge, which she considered to be “*a costly item*” for which “*they hadn’t even decided what they were going to do with that.*” Ms. Filas further confirmed that she was not aware whether the additional costs to meet any additional commitments that Claimant might have to make were already included in the valuation model prepared by Prof. Davis for this arbitration.¹³¹⁸

1047. Based on the experts’ testimony, the Tribunal considers it undisputed that the costs for handling environmental and social impacts would be included in the Feasibility Study and not in the ESIA itself. The question is rather whether Claimant had sufficiently accounted for these costs. Ms. Filas did not provide an estimate of what she would have considered an adequate budget or which additional costs Claimant should have included in the Feasibility Study. As will be discussed in further detail below, Dr. Connor also did not provide an estimate of the “*substantial expenditure in cost and time*” that she described as necessary to maintain a social license to operate in Balochistan.¹³¹⁹

1048. The Tribunal further notes that Respondent’s experts both testified that they focused their review on the ESIA and supporting documents and reviewed only certain parts of the Feasibility Study such as the Chapter on Security. In particular, neither of them engaged with the cost estimates provided in the Chapters on Capital Costs and Operating Costs, including the contingencies, nor with the residual risk register and the quantification of these risks by Claimant and/or by Prof. Davis in his valuation model. Consequently, the Tribunal has no basis to find that Claimant should have included a specific additional amount to manage environmental and social impacts.

1049. This does not yet mean, however, that the Tribunal is convinced that Claimant had sufficiently addressed and accounted for the various individual issues raised by Respondent’s experts in terms of environmental and social impacts. These will now be assessed.

ii. Whether Claimant Adequately Addressed the Environmental Impacts of the Project

1050. As for environmental impacts, Ms. Filas raised criticisms regarding the assessment of the impact on air quality at the mine area and at the area of Port Gwadar, greenhouse gas emissions, the water treatment process and resulting quality of the effluent to be discharged into the sea, and transboundary impacts of pumping water from the Fan Sediments. Ms. Filas also identified what she described as “*Other Non-Conformities*” in her presentation at the Hearing on Quantum with regard to safety and security, traffic, cumulative impacts and the presentation of alternatives for power supply, water supply

¹³¹⁸ Transcript Hearing on Quantum (Day 7), p. 1997 line 20 to p. 1999 line 4.

¹³¹⁹ Cf. Connor, Section 2.1, ¶ 9; Transcript Hearing on Quantum (Day 7), pp. 2059-2062.

and concentrate transport in the ESIA.¹³²⁰ In addition, Ms. Filas raised concerns with regard to toxic mine water forming in the pit at closure of the mine and a requirement in the 2002 BM Rules to fill up excavations after mining.¹³²¹

(a) Impacts of the Project on Air Quality

1051. With regard to air quality, Ms. Filas criticized in particular that, in her opinion, “*the point of compliance used for assessing air quality impacts were inappropriately located at both the mine and the port.*” Noting that the ESIA was to be submitted to the regulatory authority, she considered that “[a]ir quality compliance is measured at the source” and would therefore have expected a table in the ESIA providing information as to the emissions at the mine itself. She also expressed the opinion that for dispersion modeling, “*the point of compliance is set at the property boundary or closes point of public access*” because “*the project proponent does not control what happens outside the fence.*”¹³²² For the mine area, Ms. Filas accepted that to set the points of compliance upgradient from the wind in order to analyze the impacts to receiving communities “*makes sense*” but maintained that these did not correspond to the closest point of public access, which she instead considered to be the access road to the project. For the port area, Ms. Filas similarly illustrated that the nearest residential location and a hotel were located closer to the port site than the points of compliance. She acknowledged that “*these two locations, maybe these were built after the ESIA was completed*” but considered this as a confirmation that “*it’s more prudent to look at the property boundary because you can always have receptors move in with time,*” in particular with a project life of over 50 years.¹³²³

1052. When presented with the dispersion plume for sulfur dioxide for the Marine Terminal Operation Phase,¹³²⁴ Ms. Cessford testified that the areas within the dispersion plume “*would be experiencing an increase in ... annual average sulfur dioxide of two micrograms per normal meter cubed.*” She explained that in order to determine the impact, the increase would have to be added to the background concentration and the total figure would then be compared to the ambient air quality guideline for sulfur dioxide annual average. Ms. Cessford stated that the concentration within the dispersion plume was “*well below*” the guideline and also referred to “*other ways of assessing the impact, which are explained in more detail in the Air Quality Impact Assessment Report.*”¹³²⁵ As

¹³²⁰ Filas Presentation, p. 14.

¹³²¹ Filas Presentation, p. 16; Filas II, ¶¶ 149-151.

¹³²² Transcript Hearing on Quantum (Day 7), p. 1945 line 18 to p. 1946 line 17.

¹³²³ Transcript Hearing on Quantum (Day 7), p. 1946 line 21 to p. 1949 line 9.

¹³²⁴ **Exhibit FIL-11**, Figure 6.5.

¹³²⁵ Transcript Hearing on Quantum (Day 7), p. 1913 line 1 to p. 1914 line 4.

for the dispersion plume for nitrogen dioxide presented for the same area,¹³²⁶ Ms. Cessford acknowledged that if inhaled, this gas “*can have affects on your respiratory system if it exceeds the ambient air quality limit.*” She pointed out, however, that even the areas nearest to the port with the highest concentration of nitrogen dioxide had a concentration of “*less than the ambient air quality limit ... for nitrogen dioxide.*” She added that, therefore, “*even in those areas, I would not expect to see an impact on health based on comparison with the air ambient quality.*”¹³²⁷ With regard to the locations circled in the illustration, Ms. Cessford testified that “[t]hey are chosen, one, because it's the nearest location to the port, the port facility, so the nearest place a person could be in terms of ambient air quality as opposed to occupational air quality. The one at the Pearl Continental Hotel is basically downwind. And then, as we talked about, the upwind one is a little bit trickier just because there is water there.”¹³²⁸ Ms. Cessford further explained:

“[I]f the authorities request it, it would be, I'm sure, not a problem to create one maybe up on the mainland off the peninsula, to give a background, because what you're trying--the objective is to generate a background concentration. And if the authorities felt that that was not appropriate, it would absolutely not be a problem to add another monitoring location in a place that they felt was more appropriate.”¹³²⁹

1053. Ms. Cessford further clarified that what Ms. Filas had described as inappropriate points of compliance were not the points used to reach the conclusions regarding the impacts in the ESIA. She explained that “[t]hose are the points that were used to represent to stakeholders in a very simplistic way what the impacts might be on them. The conclusions reached in the ESIA are based on the isopleth plumes and a specialist air quality interpretation of those.”¹³³⁰

1054. Based on the experts’ testimony, the Tribunal is not convinced by the concern raised by Ms. Filas, *i.e.*, that the impacts on air quality at the mine area and at the port area were inappropriately assessed. In particular, Ms. Cessford pointed out that even the areas with the highest concentration of nitrogen dioxide close to the port site at Port Gwadar would be within the relevant limits provided for ambient air quality. Ms. Filas stated in her second report that she “*could not evaluate whether ambient standards would be met at the property boundary*” because “*the ESIA does not provide isocontours for SOx and NOx concentration levels at the port*” but considered it “*likely that ambient standards would not be met*” due to “*the use of high sulfur fuel, multiple large generators, and the*

¹³²⁶ Exhibit FIL-11, Figure 6.6.

¹³²⁷ Transcript Hearing on Quantum (Day 7), p. 1914 line 13 to p. 1915 line 8.

¹³²⁸ Transcript Hearing on Quantum (Day 7), p. 1917 lines 3-10.

¹³²⁹ Transcript Hearing on Quantum (Day 7), p. 1917 line 21 to p. 1918 line 7.

¹³³⁰ Transcript Hearing on Quantum (Day 7), p. 1918 lines 8-15.

*relatively small size of the property.*¹³³¹ Ms. Filas therefore did not show that if the impacts had been assessed at the property boundary, ambient standards would not have been met; she merely presumed that this would be the case based on rather general assumptions. She also did not engage with the information that the dispersion plumes also provided on the areas closest to the port site, as Ms. Cessford pointed out at the Hearing on Quantum.

1055. Consequently, the Tribunal is not convinced that if the points of compliance had been set differently, the ambient standards for air quality would not have been met. In addition, even if the authorities had requested that the impact be presented for a different location such as the property boundary, the Tribunal is not convinced that this would have caused significant additional costs or delay.

1056. Ms. Filas further continued to criticize that the ESIA did not present the emissions at source. Already in her first report, Ms. Filas stated that “[t]he ESIA should have assessed whether these occupational standards and guidelines could be met on site given the very high SO₂ and NO₂ emission levels.”¹³³² In response, Ms. Cessford emphasized that “the IFC PS do not require compliance with occupational health standards to be expressly discussed in the ESIA. Instead, they mandate the identification and management of occupational health exposures.” She further stated:

[T]he Filas Report has drawn conclusions based on a comparison of health exposures against the EDC ambient limits which is not comparing the values against the proper occupational standards. This misrepresents the information provided in the ESIA report which is not appropriate for occupational health assessment. The ESIA acknowledged the project’s commitment to separately develop health and safety management plans, to continuously and systematically identify, assess and respond to health and safety risk throughout the project’s life cycle. The environmental and social management programme included as part of the ESIA also reaffirmed this commitment. In my experience, addressing occupational issues in this manner would satisfy regulators or potential investors, or could be supplemented by the mechanisms available to them if they were not.”¹³³³

1057. In her second report, Ms. Filas responded to this statement:

“While Filas Engineering accepts that it is not necessary to develop comprehensive health and safety plans prior to submittal of an ESIA, a preliminary plan is usually included as part of the management system. Since the ESIA did not include even a preliminary management system, as is required for conformance with Pakistan, Equator Principles and IFC Performance Standards, employee health impacts were never addressed.

¹³³¹ Filas II, ¶ 139.

¹³³² Filas I, p. 14,

¹³³³ Cessford, ¶ 130.

The commitment referenced in the ESIA to develop a health and safety management plan consists of approximately one page of general statements that could apply to any project. There is no discussion of site-specific concerns and potential safety measures that would be considered in addressing these concerns. While it is customary to have a conceptual or preliminary health and safety management plan completed at this stage in the process, it is also common to provide more project-specific health and safety information in the ESIA, especially if elevated levels of air pollutants are expected, which they are, on site. This would establish some level of confidence that the project proponent can meet applicable occupational regulations and guidelines.”¹³³⁴

1058. The Tribunal notes that in addition to the disagreement regarding the preliminary management system which has already been addressed above, Ms. Filas maintained her opinion that “*more project-specific health and safety information*” should have been provided in the ESIA. She did not, however, point to a specific requirement to this effect in the IFC Performance Standards and therefore did not specifically address Ms. Cessford’s comment that compliance with occupational health standards does not have to be addressed in the ESIA. Ms. Filas also did not provide any support for her opinion that a comparison of stack discharges with emission limits at the source “*is normally required by governments and lenders.*”¹³³⁵ In this regard, the Tribunal notes that Ms. Filas herself stated in her second report:

“Although dispersion modeling is commonly used for evaluating compliance with ambient standards and guidelines, the rules and guidelines for maximum concentrations of pollutant apply to stack emissions. The air emission EDC for power generation facilities states correctly that the Pakistan NEQS does not have a stack emission standard for oil-fired power plants and instead relies on an ambient standard.”¹³³⁶

1059. Ms. Filas then referred to the Pakistan guidelines for major thermal power stations as well as the IFC guideline stack emission standards and, based on the annual level of NOx emissions presented in the ESIA, considered it “*likely that the exceedance of the guideline is significant.*”¹³³⁷ The Environmental Design Criteria and Guidance Report to which Ms. Filas referred in this regard states:

“The HFO plant proposed is a reciprocating engine with a total rated heated heat input capacity of 400 MW on a higher heating value basis and therefore a number of the Pakistan standards are not applicable. In particular, the particulate matter limits in the Pakistan guidelines for power plants and the NEQS do not apply to engines and nitrogen oxides are controlled with

¹³³⁴ Filas II, ¶¶ 167-168.

¹³³⁵ Filas Presentation, p. 5.

¹³³⁶ Filas II, ¶ 174.

¹³³⁷ Filas II, ¶¶ 175-176.

ambient standards only. The only Pakistan standard applicable to engines is for sulfur dioxide. The IFC EHS Guidelines for Thermal Power Plants has limits for reciprocating engines with total rated heat input capacity above 300 MW, which are based on one hour average basis and should be achieved 95% of annual operating hours. The relevant standards and derived project design criteria are presented in Table 3.2.”¹³³⁸

1060. For nitrogen oxides, table 3.2 then refers to the IFC EHS Guidelines for Thermal Power Plants and provides the following note: *“The project is in an area of scarce water resources (see note above) and therefore this Project emission limit only applies if the Project’s ambient air quality criterion for nitrogen oxides (see Table 12.1) cannot otherwise be achieved, as determined by air dispersion modeling.”¹³³⁹*

1061. Ms. Filas agreed that there is no stack emission standard in the Pakistan NEQS which instead rely on an ambient standard. She further did not provide the Tribunal with any substantiated basis for calling into question the consideration presented in the ESIA that the IFC emission guideline would become relevant only if the project could not otherwise achieve compliance with the ambient air quality standard through dispersion modeling, which has already been discussed in detail above.

1062. In the same context, Ms. Filas further criticized that the ESIA did not perform an analysis regarding the amount of water required for NO_x emission controls or the effectiveness of water injection in reducing NO_x emission levels.¹³⁴⁰ Ms. Cessford responded that in her opinion this was not necessary because *“[t]he dispersion modeling conducted as part of the Air Quality Impact Assessment for the Reko Diq Mine Site concluded that the predicted emissions from the power plant would enable compliance with the Project’s ambient air quality target. Therefore, it did not provide emission controls for nitrogen oxides. This is consistent with the EHS guidelines, which explicitly waive the requirement to control nitrous oxides under these circumstances. The Filas Report also does not challenge any aspect of the modeling process, including the underlying choice of model, the ESIA’s approach to modeling or the scenarios adopted, or the inputs. Accordingly, the Filas Report has provided no basis for its arguments.”¹³⁴¹* In response, Ms. Filas noted that the NO_x emissions at the mine’s power plant did not comply with the IFC guidelines at the source and maintained her opinion that the ESIA should *“at least evaluate emission controls and justify why water to reduce emission levels cannot be made available.”* She also criticized that nitrogen oxide controls were dismissed as unnecessary *“without presenting an assessment of the human health risk posed by worker exposure.”¹³⁴²*

¹³³⁸ Exhibit RE-601, Appendix D, pp. 14-15.

¹³³⁹ Exhibit RE-601, Appendix D, p. 15.

¹³⁴⁰ Filas I, p. 13.

¹³⁴¹ Cessford, ¶ 131.

¹³⁴² Filas II, ¶¶ 169-173.

1063. As pointed out by Ms. Filas, the ESIA provides in this regard:

“The sulfur content of HFO currently available in Pakistan is 3.5%, which prevents effective use of electrostatic precipitators (ESP) to control particulates or selective catalytic reactors (SCR) to control oxides of nitrogen (NOx). The maximum sulfur content that would allow use of ESP and SCR under the expected operating conditions would be 2%.

Whereas particulates are effectively controlled by the included fabric filters, no suitable alternative is available for NOx control. Water injection into the engines would achieve some reduction in NOx emissions, but in a water-scarce environment the achievable reduction in NOx emissions is outweighed by the increased consumption of water. The mine site is in a non-deteriorated airshed. Dispersion modelling (Chapter 7) demonstrates compliance with the Project’s ambient air quality target for NOx. Therefore, no NOx emission controls are provided. This is consistent with IFC guidelines, which waive the requirement to control NOx emissions under these circumstances.”¹³⁴³

1064. Ms. Filas did not dispute the statement that NOx emission controls were not required by the IFC guidelines in the circumstances presented in the ESIA. She also did not provide an argument as to why a lender or regulatory authority would have considered NOx emission controls necessary despite the absence of a NOx emission standard in the Pakistan NEQS and the described waiver in the IFC guidelines. On balance, the Tribunal is therefore not convinced that the assessments made by Claimant and its consultants with regard to the impact on air quality were not in conformity with the relevant standards.

1065. Ms. Filas further testified that “[t]he ESIA also fails to address greenhouse gas emissions” and that despite recognizing that “the mine site will be a major emitter,” it “present[ed] no options to reduce or offset the impacts of greenhouse gas.” In her opinion, the rationalization of these emissions by noting that they would amount to less than 1% of Pakistan’s greenhouse emissions was “flawed” and “lenders would definitely take exception to that logic.”¹³⁴⁴ With regard to greenhouse gas (GHG) emissions, Ms. Cessford provided the following explanation in her expert report:

“Although not included in the GHG section, the ESIA report did include information about the project’s consideration of a number of options with the potential to reduce GHG for activities considered as significant emission contributors: fuel, power and concentrate transportation. This was presented in other sections of the ESIA report. For example, the ESIA indicated that the HFO engines are convertible to dual fuel so that if natural gas became available, modifications could be made to use natural gas. The ESIA also evaluated different power supply options, including renewable energy sources and acknowledged the use of wind as a supplemental energy source

¹³⁴³ Exhibit RE-601, p. 4-22.

¹³⁴⁴ Transcript Hearing on Quantum (Day 7), p. 1950 line 14 to p. 1951 line 9.

as a matter for further investigation. The options considered, however, were not technically and financially feasible and cost-effective. Also, the selection of a concentrate slurry pipeline as the preferred option was based on a number of reasons, including the fact that this resulted in lower GHG emissions than transporting concentrate by trucks.”¹³⁴⁵

1066. In response, Ms. Filas merely noted the acknowledgment “that the GHG section of the ESIA did not include the options considered for GHG mitigation” and maintained that “the EDC obliged additional consideration in the feasibility study which was not done in the SNC Lavalin report nor in the ESIA.”¹³⁴⁶ Ms. Filas did not, however, engage with the references made by Ms. Cessford to the other sections of the ESIA in which certain options were discussed but considered not feasible and cost-effective. Against this background, the Tribunal does not consider it necessary to discuss this criticism in further detail as it has not been sufficiently substantiated.

(b) Impact of Discharging Effluent on Sea Water Quality

1067. Ms. Filas further criticized that the water treatment process and resulting quality of the effluent to be discharged into the sea was calculated and that she “saw no evidence that testing was done to demonstrate the quality of water that would be coming from this system.” In her opinion, such testing would have been necessary to determine the efficacy and to predict the cost for water treatment which are “usually not trivial” and “need to be factored into the Feasibility Study.”¹³⁴⁷ Ms. Filas then relied on a table in which she had summarized the water quality data for the proposed Reko Diq project’s effluent discharge, and highlighted in blue what she considered to be failures to comply with the relevant standards. She further presented the ratio by which the concentration of the effluent exceeded the background concentration highlighted in yellow:¹³⁴⁸

Water Resources

TABLE 1 - WATER QUALITY DATA FOR THE PROPOSED REKO DIQ PROJECT'S EFFLUENT DISCHARGE

Parameter	Upper Limits of Treated Effluent (mg/L) ^(a)	NEQS Effluent Limit (mg/L) ^(b)	IFC Liquid Effluent Limits (mg/L) ^(c)	EDC Ambient Seawater Limits (mg/L) ^(d)	Ambient Background for Sea Water (mg/L) ^(e)	Effluent to Background Ratio ^(f)	Ambient EDC to Background Ratio ^(g)
Arsenic (h)	0.0042	1.0	0.1	0.036	0.0026	1.6	14
Barium (h)	0.039	1.5			0.02	2.0	
Boron (h)	2.5	6.0			6.0	0.4	
Cadmium (h)	0.0066	0.1	0.1	0.0088	0.00001	660	880
Chromium (h)	0.064	1.0	0.1	0.050	0.0003	213	167
Copper (h)	1.0	1.0	0.5	0.0031	0.0001	10,000	31
Iron	8.0	8.0	3.5		0.002	4,000	
Lead (h)	0.234	0.5	0.2	0.0081	0.00003	7,800	270
Manganese	1.5	1.5			0.006	250	
Mercury (h)	<0.0005	0.01	0.01	0.00094	<0.0005	1	>1.9
Nickel (h)	0.75	1.0	0.5	0.0082	0.0002	3,750	41
Selenium (h)	0.02	0.5		0.071	0.0004	50	178
Silver (h)	0.00007	1.0		0.0019	0.00004	1.8	48
Zinc	1.005	5.0	2	0.081	0.0001	10,050	810
Ammonia	0.67	40			0.00008	8,375	
Flouride	2.5	10			0.001	2,500	
Sulfate	2,760	Seawater concentration			2,760	1.0	
Total Dissolved Solids (TDS)	10,190	3,500			36,000	0.3	
Total Metals	Not available	Not available	10		Not available	Not available	
Total Toxic Metals (TTM)	4.62	2.0			6.02	0.8	
TTM (excluding boron)	2.12	2.0			0.024	88.3	

¹³⁴⁵ Cessford, ¶ 110.

¹³⁴⁶ Filas II, ¶ 110.

¹³⁴⁷ Transcript Hearing on Quantum (Day 7), p. 1951 lines 10-21.

¹³⁴⁸ Filas Presentation, p. 11.

1068. In Ms. Filas' opinion, "*the yellow portion is compelling because what that is, is it takes the treated effluent, and it divides each parameter by the background water quality.*" She acknowledged that "*you can meet the ambient limits after dilution in this from the modeling*" but noted that the model "*didn't take it over a 56-year time frame*" and did not look at the degradation of the water quality even though "*70 percent of the people, according to this ESIA, say that--they draw their income from the fishing industry out of the Arabian Sea.*" Ms. Filas considered that "*even though the evaluation of the discharge can meet the particular toxicity requirements of the ambient background conditions, when you're putting out copper concentrations and zinc concentrations that are literally 10,000 times the concentration of the receiving seawater, that's a significant degradation of the water, and that is something that--those are parameters that are known to be toxic to aquatic life, and so it's something that I think would be very, very difficult to get past the local community in Gwadar.*" She emphasized that while the ESIA "*only attempted to look at the ... variances for boron,*" "[t]he issue really is, *the composition of the water is extremely different than the composition of the receiving water, and that's what you see highlighted in yellow, and that's where I think that the issue would see itself.*"¹³⁴⁹

1069. The Tribunal notes that Ms. Cessford clarified in her report that the Upper Limits of Treated Effluent, which are presented in the left column of the table prepared by Ms. Filas, had to be compared to the EDC effluent limit presented in the Reko Diq Concentrate Characterisation and Ocean Discharge Study prepared by Lorax Environmental in July 2010 (rather than the EDC Ambient Seawater Limits to which Ms. Filas had compared them in her first report). Ms. Cessford stated that "*compar[ing] like for like ... the Filas Report should have concluded that all the values are equal to or below the EDC effluent limit.*"¹³⁵⁰ Specifically, Ms. Cessford referred to the following table in the study prepared by Lorax Environmental:¹³⁵¹

¹³⁴⁹ Transcript Hearing on Quantum (Day 7), p. 1952 line 11 to p. 1954 line 8.

¹³⁵⁰ Cessford, ¶ 114.

¹³⁵¹ **Exhibit CE-1351**, Table 2-8.

Table 2-8:
Composition of Treated Effluent Compared to its Environmental Design Criteria

Parameter	Units	Treated effluent	EDC ¹
METALS			
Aluminium	mg/L	1.74	NP ²
Antimony	mg/L	0.001	NP
Arsenic	mg/L	0.0042	1.0
Barium	mg/L	0.039	1.5
Beryllium	mg/L	<0.001	NP
Bismuth	mg/L	<0.001	NP
Boron	mg/L	2.5	6.0
Cadmium	mg/L	0.0066	0.1
Calcium	mg/L	940	NP
Chromium	mg/L	0.064	1
Cobalt	mg/L	0.024	NP
Copper	mg/L	1.0	1.0
Iron	mg/L	8.0	8.0
Lead	mg/L	0.234	0.5
Magnesium	mg/L	155	NP
Manganese	mg/L	1.5	1.5
Mercury	mg/L	<0.0005	0.01
Nickel	mg/L	0.75	1
Potassium	mg/L	68	NP
Selenium	mg/L	0.02	0.5
Silver	mg/L	0.00007	1
Sodium	mg/L	2195	NP
Strontium	mg/L	21.4	NP
Tin	mg/L	<0.001	NP
Titanium	mg/L	<0.01	NP
Uranium	mg/L	0.0024	NP
Vanadium	mg/L	<0.01	NP
Zinc	mg/L	1.0	5
Total toxic metals ³	mg/L	4.6	Background ⁴
PHYSICAL			
pH	PU	8.5	6 – 9 ⁴
Total Dissolved Solids	mg/L	10190	Background ⁴
ANIONS/NUTRIENTS			
Ammonia	mg/L	0.67	40
Nitrate	mg/L	5.4	NP
Fluoride	mg/L	2.5	10
Sulphate	mg/L	2760	Background ⁴

1. EDC = Environmental Design Criteria for effluent discharged to sea

2. NP = None Proposed

3. Total toxic metals (TTM) is a parameter specified in Pakistan's National Environmental Quality Standards for industrial effluent (PEPA, 2000) and is equal to the sum of 11 metals: As, Ba, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, and Ag.

4. Baseline value of TDS is 36,000 mg/L, of sulphate is 2760 mg/L, and of TTM is 6.0 mg/L.

1070. Ms. Filas acknowledged in her second report that she had “initially misinterpreted the information presented in the Lorax Report, as two different compliance criterion were presented in the report with limited explanation.” However, she maintained her opinion that “the proposed discharge of partially treated waste water exceeds Pakistan’s NEQS for Municipal and Liquid Effluents into the Sea.”¹³⁵² Ms. Filas agreed with Ms. Cessford that “the Pakistan NEQS only requires ‘end-of-pipe’ compliance for discharge to the sea” but emphasized that “the proposed discharge does not meet the NEQS discharge standard for total dissolved solids (TDS) and total toxic metals (TTM).” She further disagreed with Ms. Cessford’s opinion that adequate justification was presented in the ESIA for relaxing the standards for TDS and TTM and that this was in accordance with good international practice. Ms. Filas considered that it would have been “normal practice to conduct bench-scale tests of the treatment process to determine the level of treatment necessary to meet water quality standards.” Ms. Filas also maintained that “some of these metals are present

¹³⁵² Filas II, ¶¶ 112-113.

in the effluent at thousands times greater than the ocean background levels” and that, therefore, “it would be unlikely that the Pakistan EPA would relax the TTM standard in such an important fishery.”¹³⁵³

1071. Ms. Cessford explained at the Hearing on Quantum with regard to the ESIA’s proposal for “a variance to the TTM (boron constituent only) and TDS limits”¹³⁵⁴ that “the limit set in the NEQS, which is the Pakistan limits, is significantly below the actual seawater level, the actual concentration in the seawater. So, by--if the effluent was required to meet the lower limit, you would be discharging--you would basically be putting in at much lower than the existing seawater is.” Ms. Cessford further testified that “Canadian guidelines indicate that the TDS discharge should not be more than 10 percent of the actual receiving watercourse to protect aquatic life. So, if they were obligated to discharge TDS at that concentration, it could actually be causing a harm to the aquatic life.”¹³⁵⁵ With regard to boron, Ms. Cessford testified:

“In the case of boron, it's a less significant difference. So we're talking about--I think it was--the seawater was 6, and the limit needed to be less than 2 in order to comply with the total toxic metals. But there was a conflict in the guidelines, because the guidelines also give a limit of a boron of 6. But if you discharge at 6, boron, you cannot comply with the total toxic metals of 2. So there's a conflict in the legislation.

Obviously, I'm not party to how those guidelines were written, but my initial reaction is regulators make mistakes. I was a regulator for eight years. We make mistakes. And I suspect that these were carried over from the freshwater limit into the marine and are mistakes. And, in my experience, regulators are very reasonable when presented with this kind of information.”¹³⁵⁶

1072. The Tribunal notes that Ms. Cessford’s explanation is in line with the argumentation presented in the ESIA. It was specifically noted:

“Pakistan’s NEQS for effluent discharged to sea contains a limit for boron of 6 mg/L and a limit for total toxic metals (TTM) of 2 mg/L. The TTM parameter incorporates boron along with 10 other metals, thus by implication lowering the maximum possible value for boron to 2 mg/L. This lower boron value is below the average background seawater concentration for boron of 6 mg/L, as measured during the baseline studies. Additionally, the NEQS limit for total dissolved solids (TDS) of 3,500 mg/L is also lower than the background TDS of seawater in the discharge area (36,000 mg/L).

For the boron constituent in the TTM parameter and TDS, the Project proposes to treat the concentrate filtrate to concentrations no higher than seawater background levels, not to the lower levels implied in the NEQS.

¹³⁵³ Filas II, ¶¶ 116-123.

¹³⁵⁴ Exhibit RE-601, p. 7-91.

¹³⁵⁵ Transcript Hearing on Quantum (Day 7), p. 1919 line 22 to p. 1920 line 18.

¹³⁵⁶ Transcript Hearing on Quantum (Day 7), p. 1920 line 19 to p. 1921 line 13.

Discharging effluent with lower values of these parameters than seawater background would not benefit the marine ecosystem and would require more elaborate treatment involving the generation of additional sludge requiring disposal, with associated negative terrestrial environmental consequences. Therefore the project is proposing a variance to the TTM (boron constituent only) and TDS limits as there is no environmental benefit to be gained with treatment to these discharge limitations.”¹³⁵⁷

1073. In the Environmental Design Criteria and Guidance Report, it is similarly noted that “[f]or boron and TDS the Project proposes to treat the concentrate filtrate to seawater background levels, not to the lower levels implied in the NEQS. Discharging effluent with lower values of these parameters than seawater background would not benefit the marine ecosystem and would require more elaborate treatment involving the generation of additional sludge requiring disposal, with associated negative terrestrial environmental consequences.”¹³⁵⁸

1074. Ms. Filas maintained in her second report that the request to increase the TDS standard to 36,000 mg/L was “without merit.” She did not dispute that this corresponded to the background levels of TDS in the ocean but considered that it “ignor[ed] that the chemical composition of the proposed effluent is quite different than sea water.” In her opinion, “[t]he effluent contains elevated levels of metal and would be expected to have a different ionic makeup given the chemical characteristics of the pipeline concentrate.” She pointed to the overall annual discharge of waste material into the sea and considered that “[g]iven that the baseline report for the port area found that the sea water and sediment were of good quality, it is unlikely that the Pakistan EPA and the local fisherman would agree to this requested variance.”¹³⁵⁹ As for boron, Ms. Filas did not dispute the contradiction between the the NEQS effluent standard for boron of 6 mg/L and the NEQS effluent standard for total toxic metals of 2 mg/L. She maintained, however, that even excluding boron, the TTM exceeded the effluent standard (2.12 compared to 2.0).¹³⁶⁰

1075. As for the variance of the TDF effluent standard, the Tribunal notes that Ms. Filas did not provide any support for her opinion that the ESIA’s proposal to treat the concentrate to seawater level would not be accepted due to the “quite different” chemical composition of the effluent. The Tribunal understands based on Ms. Cessford’s reference to the Canadian guidelines that it would in fact cause harm to aquatic life if the TDS discharge varied more than 10% from the receiving watercourse, which would be the case if the water were treated to the NEQS effluent standard. Against this background, the Tribunal

¹³⁵⁷ Exhibit RE-601, p. 7-91.

¹³⁵⁸ Exhibit RE-601, Appendix D, p. 20.

¹³⁵⁹ Filas II, ¶¶ 124-125.

¹³⁶⁰ Filas II, ¶ 122 and Table 1.

cannot follow Ms. Filas' opinion that a variance would likely have been denied by the Balochistan EPA.

1076. As for the total toxic metals, the Tribunal considers it common ground between the experts that the NEQS effluent standard for boron, *i.e.*, for one of the 11 metals included in the TTM, was higher than the TTM effluent standard and that it was therefore reasonable to request a variance for the boron constituent as proposed in the ESIA. Finally, as for the TTM effluent (excluding boron), Ms. Filas calculated that the value still exceeded the NEQS standard. However, in the absence of any further support for Ms. Filas' argument that the ESIA incorrectly calculated the TTM effluent, the Tribunal has no basis to assume that the ESIA contained an error which would have been a significant issue for the Balochistan EPA.

1077. The Tribunal notes that in her table presented at the Hearing on Quantum, Ms. Filas also highlighted certain additional values, which in her opinion failed to comply with the NEQS and IFC limits, specifically for copper, iron, lead and nickel. Ms. Cessford testified, however, that the IFC Liquid Effluent Limits to which Ms. Filas had compared the Upper Limits of Treated Effluent were "*very outdated*" as they "*date way back to the previous set of guidelines which were superseded*" and stated that they had instead used the numbers in the Environmental Health and Safety Guidelines dated 2007.¹³⁶¹ The Tribunal notes that the document referenced by Ms. Filas for this column indeed dates from July 1998.¹³⁶² Ms. Cessford's testimony is therefore plausible to the Tribunal. Also taking into account that the values for copper, iron, lead and nickel are all equal to or below the values presented in the Reko Diq Concentration Characterisation and Ocean Discharge Study,¹³⁶³ the Tribunal cannot follow Ms. Filas' opinion that the planned discharges exceeded the relevant effluent limits.

1078. Finally, the Tribunal recalls that what Ms. Filas described as "*the real issue*" concerned her illustration in yellow of the Effluent-to-Background Ratio, *i.e.*, the ratio between the concentration of a certain element in the effluent that Claimant planned to discharge into the sea and the background concentration in the ocean water. Ms. Cessford acknowledged that "*there are some quite significant increases, yes.*"¹³⁶⁴ When asked whether she would anticipate that this would have an effect on how fishermen would view the impact of the project, she testified:

"The way you have to look at this is that the discharge obviously looks at emission limits at the point of release, which we talked about the motivation

¹³⁶¹ Transcript Hearing on Quantum (Day 7), p. 1923 line 14 to p. 1924 line 3.

¹³⁶² **Exhibit FIL-12.**

¹³⁶³ **Exhibit CE-1351**, Table 2-8.

¹³⁶⁴ Transcript Hearing on Quantum (Day 7), p. 1925 lines 15-18.

for adjustment of those. It then looks at the compliance with ambient seawater quality guidelines, and that's where all the modeling comes in.

Now, that modeling shows that those ambient water quality limits can be met within different distances, depending on the scenarios used. So, there is a range of scenarios used to look at sort of your normal case and then a worst case.

So, what's important here is compliance with the ambient seawater quality limits because those are set specifically to protect marine life, not the difference between baseline and the ambient limit.

So, just because you have a background that's much lower than the ambient limit doesn't mean that there's going to be an impact, because the ambient limit is set to protect marine life.

And then in addition to that, the ESIA, the marine specialists, undertook ecotoxicology. So, they specifically looked at the effect on, I think, three organisms to evaluate the ecotoxicology of the effluent.

And then that--also you see how far--what sort of distance--we call it a mixing zone--what sort of distance from the discharge point that reaches. That showed an even smaller mixing zone than compliance with the ambient limits, which just shows that the ambient limits are conservative in nature in terms of protecting marine life.

And under normal circumstances, we were looking at--I can't remember the numbers--but I think 1 meter and 3 meter for ecotoxicology and ambient chemistry. And then I think it was 10 and 13 for the worst case scenario.

So, we're talking about an impact that stretches 13 meters from a discharge point.”¹³⁶⁵

1079. As for the impact that the ratio presented by Ms. Filas would have on the perception by the local community regarding the discharge, Ms. Cessford considered that *“it depends on how it was presented. If an anti-mining NGO got ahold of it and presented it in a similar way to what we're talking about now, yes, it could give negative. But if it was presented with the scientific information on the ecotoxicology and the ambient air, seawater quality monitoring and the actual expected impact and the proposed monitoring, and it was presented in a constructive way, you'd get a different reaction.”¹³⁶⁶*

1080. The Tribunal finds Ms. Cessford's testimony convincing. While particularly the ratios presented by Ms. Filas for copper (10,000), iron (4,000), lead (7,800), zinc (10,050) and ammonia (8,375) have been acknowledged by Ms. Cessford as *“quite significant,”* it appears to be undisputed that this ratio is not directly relevant to assessing whether the discharge was in compliance with the relevant effluent standards and the ambient seawater limits which Claimant had also set out in its EDC. As discussed above, the

¹³⁶⁵ Transcript Hearing on Quantum (Day 7), p. 1926 line 3 to p. 1927 line 19.

¹³⁶⁶ Transcript Hearing on Quantum (Day 7), p. 1928 lines 2-10.

Tribunal is not convinced that the discharge failed to comply with any of the relevant limits. Rather, both Respondent's line of questioning and Ms. Filas' testimony indicate that the Effluent-to-Background ratio could have influenced the perception of the discharge by the community and in particular the fishermen. In this regard, the Tribunal also agrees with Ms. Cessford that this perception would naturally depend on the way in which the information was presented to the community. While it may be reasonable to assume that there would be opposition from the fishermen to the discharge because they feared an impact on their income, the Tribunal sees no basis to assume that a regulatory authority acting in good faith would have refused to grant a permit for the discharge in compliance with the applicable standards. This does not mean that the perception of the project by the community was irrelevant but, in the Tribunal's view, a perceived impact is better characterized as a social impact and should be discussed in the context of whether Claimant had adequate plans to ensure that it would obtain and maintain a social license to operate. This will be addressed further below.

(c) Disposal of Sludge Generated by Water Treatment

1081. An additional concern raised by Ms. Filas with regard to the water treatment process was the disposal of the sludge generated by the treatment of the water before discharging it into the sea. In the context of whether the costs of the ESIA were factored into the Feasibility Study, she noted that “[i]f you have to transport sludge back to the mine, that could be quite a costly activity, and they hadn't even decided what they were going to do with that.”¹³⁶⁷ Ms. Filas was referring to the earlier testimony of Ms. Cessford in response to the question whether she agreed that the ESIA did not arrive at a conclusion regarding the disposal of the wastewater treatment sludge:

*“At the time we were finalizing the ESIA, I think that work was still progressing for the project, and in line with the precautionary principle, which is one of the fundamental principles of Environmental and Social Impact Assessment, we evaluated--I'm going to use the word ‘worst case,’ so anything that the company did that improved the situation would be better. So we've evaluated the most--the worst potential in terms of impacts, and the information is what's presented in the impact assessment.”*¹³⁶⁸

1082. She clarified that “[a] number of options were presented” in the ESIA for where to dispose of the wastewater treatment sludge and testified that “I believe one was at the mine site, and the other would be at a site that would have to be authorized by the authorities.” She added that “there's not a specific ‘this is what it's going to be.’ It presented some alternatives and it indicated that we would assess the worst of those situations.”¹³⁶⁹

¹³⁶⁷ Transcript Hearing on Quantum (Day 7), p. 1998 lines 3-8.

¹³⁶⁸ Transcript Hearing on Quantum (Day 7), p. 1922 lines 3-12.

¹³⁶⁹ Transcript Hearing on Quantum (Day 7), p.1922 line 18 to p. 1923 line 4.

1083. The issue was not addressed in the first round of the experts' reports. In her second report, Ms. Filas expressed the opinion that the *"assessment of impacts associated with wastewater treatment and the sludge that will be generated at the Port of Gwadar was substantially disregarded."*¹³⁷⁰ She noted that the ESIA provided the following information:

*"Excess overflow water from the dewatering process is treated before being discharged to the sea. Treatment will consist of lime pre-treatment followed by reverse osmosis. The effluent treatment process will generate a sludge, which will be disposed of in a lined facility at the mine site or other suitable authorized location."*¹³⁷¹

1084. Ms. Filas further noted that site layout drawings of the ESIA showed two water treatment plant sludge ponds but considered that *"they appear to be for temporary storage given that they are much too small to store an appreciable amount of the sludge that would be produced by this large of [sic] a dewatering operation."* She therefore complained that *"[t]here was no discussion of permanent repositories for water treatment sludge in the Conceptual Closure Plan at either the mine or port facility"* and that, apparently, no tests were carried out *"to determine the amount of sludge that would be produced and what its chemical characteristics might be."* In her opinion, *"[t]he lack of this information and the lack of a disposal facility design and associated costing represents a large gap in the ESIA and associated documents."*¹³⁷² Ms. Filas further stated that in order to grant a discharge permit, the regulatory authority would need to review *"the solid waste characteristics of the sludge produced during the treatment process and the proposed disposal facility,"* and considered that the above quoted description in the ESIA fell *"far short of what would be required for a regulatory agency to evaluate the toxicity of the material and the type of lined facility that would be needed to safely dispose of the material."*¹³⁷³

1085. At the Hearing on Quantum, Mr. Livesey was referred to the description in the ESIA and responded to the question whether he knew where Claimant decided to actually put the sludge, that *"at the port, there was a design containment facility to collect that--in the port design. It's not on this image. This just shows the ship loader. But if you show the picture of the wider port design, you can see, quite clearly marked, there's a sludge containment pond next to the dewatering area."*¹³⁷⁴ When asked whether Claimant also contemplated disposing sludge at the mine site, Mr. Livesey responded that they

¹³⁷⁰ Filas II, ¶ 22.

¹³⁷¹ **Exhibit RE-601**, p. 4-43.

¹³⁷² Filas II, ¶ 22.

¹³⁷³ Filas II, ¶ 126.

¹³⁷⁴ Transcript Hearing on Quantum (Day 2), p. 355 lines 8-16.

“contemplated tailings at the mine site” but that “this reference here, if this is referring to the operations at the port, clearly it wouldn't be driven back up to the mine site. This would be in an authorized facility in the Port Gwadar area.” He confirmed that he was not aware where that facility would have been “because Port Gwadar was and is still undergoing expansion. The 30-year design is available and, I believe, was reviewed by Tethyan's team, as we did with Port Qasim and Port Karachi as well.”¹³⁷⁵ Mr. Livesey further testified:

“But there was a facility designed, I think, on the--to the east in the bay--in the bay to the east of the promontory--if there was a map, I could point it out--was the area which the Government itself had designated as part of the port expansion as a materials-handling area. I can't remember the exact phrase they used, but it basically referred to bulk materials.

And that would have been an area that probably would have had this type of facility developing in it.

Q. You stated that ‘would have been an area that probably would have had this type of facility.’ So, you don't know. You're speculating as to what it would be; right?

A. I'm speculating based on the interactions we had at Port Qasim and Port Karachi, where the port designs contemplated disposal of materials--areas for disposal of materials. And the fact that the team met with Port Gwadar officials and again looked at the Project design for Port Gwadar.”¹³⁷⁶

1086. Finally, in response to the question whether the potential cost for the disposal facility was included in the Feasibility Study, Mr. Livesey stated:

“I'm sure there would be a cost captured in there somewhere. I don't know where it is.

Q. Would it surprise you if it was not?

A. It would surprise me if it was not if it was a significant cost. We don't know how much sludge would be generated. We don't know whether it would be a significant cost. The likelihood is it wouldn't.

The sludge at the dewatering facility is a wash-down material. The material that is coming down the pipe is concentrate, which you want to dry and ship, and the resultant waters that you are bringing out would be put down and disposed of separately.

So, the sludge would be a minor component by the time you're at the port facility.

Q. So, you don't know how much sludge would have been generated, but you are able to reach a conclusion as to whether the cost would have been significant?

¹³⁷⁵ Transcript Hearing on Quantum (Day 2), p. 355 line 21 to p. 356 line 5.

¹³⁷⁶ Transcript Hearing on Quantum (Day 2), p. 356 line 8 to p. 357 line 11.

*A. No. I can say that if the cost had been significant, I would be surprised if it had been omitted, which, I think, was the thrust of your question. I did not say that the cost would be significant. I said I suspected that it would not because the volumes would be small, in my opinion. But it was not my area to design. I was the Project Director. I was not specifically on any one target area.*¹³⁷⁷

1087. In the Tribunal's view, Mr. Livesey's testimony that a sludge disposal facility was designed and contemplated to be in an area designated by the Government for bulk material appears plausible. The Tribunal also finds it reasonable that it was not yet clear where exactly that facility would be due to the fact that Port Gwadar was in the process of being expanded. Given Mr. Livesey's explanation that their assumption for the contemplated location was based on interactions of his team with officials at Port Gwadar and the port design for contemplated disposal of materials, the Tribunal cannot agree with Respondent's characterization that Mr. Livesey was "*mere speculating*."¹³⁷⁸

1088. The remaining question is therefore whether the costs associated with the sludge disposal facility were included in the Feasibility Study. As pointed out by Respondent, Mr. Livesey did not confirm that this was the case nor did he confirm that they were not a significant cost. He explained, however, why it was likely that it was not a significant cost and reiterated that "*any sludge generated ... would most likely be from wash-downs and flushing out of equipment, which would, you know, not be—we're not talking about half of the contents of the concentrate pipeline going into a sludge tank.*"¹³⁷⁹ The Tribunal also notes that, while Ms. Filas referred to the sludge disposal as a potentially "*costly item*," she clarified that this "*could*" be the case "[i]f you have to transport sludge back to the mine."¹³⁸⁰ It is therefore apparent that she was transferring to the cost of transporting the sludge rather than the cost of disposing it in a designated facility. Mr. Livesey clarified, however, that the sludge generated at the port would not be transported back to the mine site but rather disposed in the Port Gwadar area and that, therefore, no such costly transport would occur. Ms. Filas did not provide any opinion whether the cost associated with disposing the sludge would be significant and the Tribunal therefore has no basis to doubt Mr. Livesey's explanation as to why they would likely not be significant.

1089. In addition, the Tribunal recalls that the ESIA explicitly noted that by requesting a variance for two metals contained in the effluent to be discharged into the sea, additional water treatment and the creation of additional sludge were avoided. In the Tribunal's view, this further confirms the reasonableness of Claimants plan to request a variance and Mr. Livesey's testimony that the volume of sludge generated would not be such as to

¹³⁷⁷ Transcript Hearing on Quantum (Day 2), p. 357 line 20 to p. 359 line 4.

¹³⁷⁸ Cf. Respondent's Post-Hearing Brief on Quantum, ¶ 239.

¹³⁷⁹ Transcript Hearing on Quantum (Day 2), p. 359 lines 17-22.

¹³⁸⁰ Transcript Hearing on Quantum (Day 7), p. 1998 lines 3-8.

cause significant additional cost. Consequently, the Tribunal does not have to make a conclusive finding as to whether the costs for the disposal facility were included in the cost estimate of the Feasibility Study because, in any event, it is not convinced that this would amount to a significant additional cost.

(d) Further “Non-Conformities” Regarding Environmental Impacts

1090. As a final criticism on water, Ms. Filas also criticized that the ESIA characterized the drawdown of the aquifer at the Fan Sediments and transboundary effects to be of “*low significance*.” The water supply, including the transboundary effects into Afghanistan, have already been addressed in detail above. At this point, it suffices to add to the Tribunal’s previous findings that the Tribunal is not convinced by Ms. Filas’ comment that “[e]ven though there were no beneficial users of the water identified, water competition will be significant if you’ve got water available.”¹³⁸¹ As discussed in detail above, Claimant pointed out that the water at the Fan Sediments was not potable and not suitable for irrigation and agricultural use. Also taking into account Ms. Filas’ agreement that “*there is no fixed procedure for assessing the significance of impacts*,”¹³⁸² the Tribunal is therefore not convinced that it was inadequate in the circumstances to assign a low significance to this aspect.

1091. With regard to Ms. Filas’ criticism on the absence of “*an appropriate security and conflict action plan*,” the Tribunal refers to its detailed analysis of the security-related issues above and further recalls that these were addressed in the Feasibility Study, in particular Chapter 19 on Security, which Ms. Filas also reviewed and considered to be “*more like what [she] was expecting to see*.”¹³⁸³ In the absence of any detailed engagement by Ms. Filas with those parts of the Feasibility Study that addressed security and conflict in the area, the Tribunal does not consider it necessary to address Ms. Filas’ criticism on the absence of appropriate information in the ESIA in more detail.

1092. An additional criticism of Ms. Filas concerned the characterization of traffic impacts as “*negligible*” despite the lack of information on road size, conditions and current levels of congestion. Ms. Cessford pointed out that “*the lack of information on road geometry and future improvement plans is a result of HBP’s inability to obtain this from the National Highway Authority of Pakistan*.” She added that “[t]he study used available information and presented results showing the incremental increase was not considered significant in light of the overall increase in traffic expected as a result of Pakistan’s ongoing development. In any event, the condition of the national roads is something over which

¹³⁸¹ Transcript Hearing on Quantum (Day 7), p. 1954 lines 9-20.

¹³⁸² Filas II, ¶ 9.

¹³⁸³ Cf. Transcript Hearing on Quantum (Day 7), p. 1969 line 14 to p. 1970 line 8.

*TCCP has no control, which the ESIA acknowledged. To the extent that TCCP will construct or maintain roads outside the Project area, the ESIA also committed to perform regular inspections.” Ms. Cessford also noted that as the condition of the roads was a matter outside the control of the company, she failed to see how this could affect an investor’s decision whether to participate in the project.*¹³⁸⁴

1093. As pointed out by Ms. Cessford, the Traffic Modeling for Reko Diq Transport Corridors prepared by Hagler Bailly Pakistan in July 2010 noted in its section of Total future Traffic Levels:

*“It is pertinent to know the present highway capacity and the extent to which it is currently utilized and will be utilized in future, ie, when it is likely to saturate. This information is not available from the National Highway Authority. As highway capacity is a function of road surface dimension, geometry, controls, and environmental conditions, any attempt to calculate the highway capacity also failed due to lack of information on these aspects. Only relevant information that is available is that the highway is a two lane highway (one lane in each direction). The width of each lane is 3.7 m (12 feet) and the shoulders on each side are between 1 to 2 m (typically 6 feet). The exceptions are as follows: [...]”*¹³⁸⁵

1094. Similarly, it is noted in the section of Future Road Development Plans:

*“Future road development plans for the segments comprising RD-1 were not available with the NHA. However, these are expected to include roadway widening, resurfacing, shoulder and curvature improvements, additional lanes and carriageways, bridges and grade-separated intersections, and new alignments and connecting routes that will improve the route capacity, level of service, and reduce travel distances. These changes may appreciably alter the regional roadway infrastructure over the operational phase of the Project.”*¹³⁸⁶

1095. In response, Ms. Filas emphasized that she had merely observed that if the capacity and physical condition of the roadways is unknown, *“the ramifications of that increase cannot be assessed based on the available information.”* She added that *“[t]his observation was in response to the ESIA having turned the HBP report into seven pages of impact assessment text when the HBP report did not present anything more than traffic counts. To assess impacts, an understanding of the road conditions and carrying capacities must be coupled with the baseline traffic and Project-related traffic volumes to determine if the Project-related transportation requirements can be accommodated or will adversely affect existing public arterials.”* Ms. Filas then clarified that she did not state that this issue would affect an investor’s decision but *“simply observed that impacts could not be*

¹³⁸⁴ Cessford, ¶¶ 133-134.

¹³⁸⁵ Exhibit CE-1349, pp. 3-1 to 3-2.

¹³⁸⁶ Exhibit CE-1349, p. 3-2.

reasonably drawn from calculated percentages of traffic counts. Impacts could only be understood when those increases in traffic counts are coupled with the capacity and condition of the arterial.”¹³⁸⁷

1096. In light of Ms. Filas’ clarification that she did not consider this issue to affect an investor’s decision and also taking into account that any more detailed assessment of the traffic impact would have required information that was not available from the National Highway Authority of Pakistan, the Tribunal is not convinced that this aspect would have been considered a significant issue by lenders or the authorities.
1097. Finally, Ms. Filas considered that the assessment of certain additional cumulative impacts like the Tanjeel project, air emissions and water discharge as well as alternatives for power supply, water supply and concentrate transport were not sufficiently addressed in the ESIA. In this regard, Ms. Cessford explained that the Tanjeel project was not addressed in the ESIA because its scope was limited to the initial mine plan, which did not include Tanjeel. She also noted that “[a]lthough not explicitly stated in the ESIA the Tanjeel project was considered within the cumulative impact assessment as part of TCCP’s planned expansion. The ESIA report also acknowledged the upsides associated with the socio-economic effects of expansion by TCCP or the development of other projects in Section 9.3.”¹³⁸⁸ In response, Ms. Filas maintained her opinion that having a previously approved ESIA for Tanjeel and then not mentioning it in the cumulative impact section of the ESIA for the Feasibility Study was “*highly unusual*” and considered that it was relevant in that “*it could potentially prolong the life of the Project and disturb more land, with all the trickle-down impacts, both positive and negative, that go with land disturbance and extended mine life.*”¹³⁸⁹
1098. In the Tribunal’s view, it is plausible that the Tanjeel project and the additional impacts it might have would have to be addressed if and when they materialized, *i.e.*, in the context of the contemplated expansion. By contrast, the Tribunal is not convinced that the Balochistan EPA or a lender would have expected these impacts to be addressed in the context of the ESIA for the Initial Mine Development Feasibility Study covering the Wester Porphyries and not the Tanjeel area. As for the additional aspects of the air emissions and water discharge, the Tribunal notes that these were raised by Ms. Filas only in her second report and not substantiated in any further detail.
1099. Finally, as for the alleged failure to sufficiently consider alternatives for power supply, water supply and concentrate transport, Ms. Cessford stated noted that “*there is no requirement to exhaustively consider and investigate all alternatives at the same level of*

¹³⁸⁷ Filas II, ¶¶ 177-178.

¹³⁸⁸ Cessford, ¶ 111.

¹³⁸⁹ Filas II, ¶ 111.

*detail. For example, Pakistan’s Guidelines for the preparation and review of Environmental Reports expressly recognise this. It also states that it is ‘quite common to undertake a preliminary analysis of a wide set of alternatives to decide which ones should be taken forward for further consideration, and which ones should be discarded.’ The Guidelines also accept that in many environmental impact assessments, the ‘favoured alternative will be the only one examined in detail.’”¹³⁹⁰ As for the IFC Performance Standards, Ms. Cessford explained that they require “*an environmental and social impact assessment to include ‘an examination of technically and financially feasible alternatives to the source of such impacts, and documentation of the rationale for selecting the particular course of action proposed.’ The Guidance Notes to the IFC PS explain that the report ‘typically includes’ analysis of alternatives that ‘[c]ompare reasonable alternatives’ and ‘[s]tates the basis for selecting the particular project design proposed.’ It also implicitly recognises that the ESIA need not be exhaustive but should ‘focus[] on the significant issues’ and its scope and level of detail should be ‘commensurate’ with the project’s impacts and risks.’ Accordingly, in preparing the ESIA report there is judgment involved in determining ‘reasonable’ alternatives and the level of detail necessary to meet the IFC PS requirements to compare alternatives and state the basis for selecting an alternative.*”¹³⁹¹*

1100. Ms. Cessford testified that as noted in the ESIA, alternatives were “*investigated and refined*” but in some cases, the results of investigations were included in the supporting documents rather than the main ESIA report because they were no longer relevant to the final project description. She also stated that she attended workshops and conference calls discussing alternatives, which meant that “*the analysis of alternatives proceeded both formally and informally and was reflected in the ESIA and other documentation.*” Ms. Cessford then discussed in more detail the evaluation of the different water sources, the HFO plant to which there were “*no other technically and financially available alternatives that could have been considered*” and concentrate transport for which three options were considered.¹³⁹²

1101. In response, Ms. Filas noted that “[t]echnical reviewers are not mind readers” and considered that “*if the ESIA fails to enumerate the alternatives considered or how the criteria influenced their decisions, a reviewer has no choice but to identify that missing information and explanation as gaps.*”¹³⁹³

¹³⁹⁰ Cessford, ¶ 137.

¹³⁹¹ Cessford, ¶ 138.

¹³⁹² Cessford, ¶¶ 139-142.

¹³⁹³ Filas II, ¶ 182.

1102. The Tribunal is not convinced by Ms. Filas' argument. While it is certainly true that technical reviewers could only rely on information provided to them, Ms. Cessford stated that the information was included in the supporting documentation, which would also be provided to a reviewer. This is also expressly noted in the ESIA.¹³⁹⁴ In addition, Ms. Filas did not engage with Ms. Cessford's references to both Pakistan's guidelines and IFC Performance Standards and her explanation as to why she therefore considered the discussion of alternatives in the ESIA and/or supporting documentation adequate and sufficient. Against this background and in the absence of any further substantiation on this point, the Tribunal is not convinced that a lender or regulatory authority would have requested additional work on the consideration of alternatives for power supply, water supply or concentrate transport.

(e) Impact of the Project After Closure of the Mine

1103. As a final matter that was not addressed in any detail at the Hearing on Quantum, the Tribunal notes that Ms. Filas also criticized in her first report that while the ESIA and the Conceptual Closure Plan did not expect that a toxic pit lake would form at closure of the mine, they failed to evaluate the likeliness and she "*did not identify documentation to substantiate the presence or absence of a pit lake at closure.*"¹³⁹⁵ Ms. Filas considered:

*"The ESIA has already stated that the hypersaline sink water contained in the pit would be a high to extremely high toxicity risk. Moreover, surface water exposure in such a hyper-arid environment could potentially result in significant impacts to living receptors. Road blocks, berms and physical enclosures all have the potential of being breached if humans, animals, birds or other organisms have no other access to water. The ESIA disregards the potentially significant impacts associated with a likely toxic water body remaining at the surface post-closure, even if only temporary as a result of precipitation events."*¹³⁹⁶

1104. In response, Ms. Cessford emphasized that "[t]he ESIA acknowledges there is a threat to birds of exposure to the pit lake based on a screening level risk assessment undertaken in supporting documents. Having identified the potential risk, it is not correct for the Filas Report to say that the ESIA did not assess the risk."¹³⁹⁷ Specifically, the ESIA states:

"The model indicates that should a pit lake form, the combination of the metals in the pit lake water with the excessive concentrations of calcium, chloride, magnesium, potassium, sodium and sulfate, makes the modelled pit waters unsuitable for consumption, with an overall high to extremely high risk to livestock and wildlife.

¹³⁹⁴ Exhibit RE-601, p. 5-1.

¹³⁹⁵ Filas I, p. 11.

¹³⁹⁶ Filas I, p. 12.

¹³⁹⁷ Cessford, ¶ 126.

During operation, water will be removed from the pit and used in the process plant. Access of livestock and large mammals to the pit will be prevented by a fence. At closure, earth embankments will be placed across access points to the pit and the haul roads will be ripped up, and fences will be placed around the pit to preclude access by large mammals and livestock. It is expected that over time, the pit bottom will slowly fill with windblown sand further reducing the size and duration of any pit lake.”¹³⁹⁸

1105. With regard to the likelihood of a pit lake forming after the closure of the mine, Ms. Cessford noted that *“technical experts from SMEC and Barrick provided findings with respect to the groundwater inflow, on which the Filas Report has not commented.”¹³⁹⁹* In this regard, Ms. Cessford referred to the Section on Temporary Pit Lake Geochemical Predictive Modelling in the report on Geochemical Characterisation and Prediction, Reko Diq Project, Pakistan prepared by SRK Consulting in July 2010, which states, *inter alia*:

“Pit water balance studies undertaken by Barrick (Zhan and Shelp, 2008a; Zhan, 2008; Zhan and Shelp, 2008b) have shown that a permanent pit water body will not form at the Reko Diq site. This is due to low precipitation, minimal groundwater interception and highly evaporative environment. However, modelling indicates that temporary pit water bodies may form in response to extreme storm events (Zhan, 2009; Appendix J, Attachment 5C). SRK has modelled these events taking into account post closure build up of evaporative deposits within the pit bottom and wall rocks in response to average rainfall events.”¹⁴⁰⁰

1106. Ms. Cessford further pointed out that both the ESIA and the Conceptual Closure Plan *“also acknowledged that further studies are needed during the life of the project to confirm: a) if a lake is likely to form; and b) how potential exposure of wildlife, particularly birds, could be managed.”¹⁴⁰¹* Among the primary components of the closure approach, the ESIA lists the following:

“Pit safety berms and/or fences will be placed around the perimeter of the pit and across the ramps into the pits to restrict vehicular access. Groundwater intersected by the pit is not expected to accumulate in the pit to form a lake after closure. However, storm water may periodically accumulate in the pit bottom and remain until it evaporates. Additional monitoring and studies during operations will be able to better predict if groundwater is likely to inflow into the pit at a rate that would cause a permanent pit lake in which case additional mitigation could be required.”¹⁴⁰²

1107. The Conceptual Closure Plan further stated:

¹³⁹⁸ Exhibit RE-601, p. 7-26.

¹³⁹⁹ Cessford, ¶ 127.

¹⁴⁰⁰ Exhibit CE-1348, p. 146.

¹⁴⁰¹ Cessford, ¶ 127.

¹⁴⁰² Exhibit RE-601, p. 4-59.

“One large open pit will exist at closure, the Western Porphyries pit. Based on the current groundwater models, the pit is not expected to collect groundwater after closure, although monitoring of groundwater inflows during operations will provide additional data to improve the accuracy of this prediction. However, stormwater may accumulate ephemerally during major storm events and that water is likely to exceed IFC water quality standards. Given the significant evaporation at the site, any collected stormwater is not expected to remain in the pit for very long.

Because there is some uncertainty associated with the prediction of groundwater inflow to the pit, and the likelihood of ephemeral stormwater collection, mitigation measures to protect human, terrestrial and avian life may be required after closure. Therefore, the closure plan assumes that access to the pit will be limited after closure by construction of fences and berms around the pit. Avian access to a possible pit lake would be difficult to limit, so future studies should evaluate the need for, and feasible types of mitigation for this potential risk.

Although placement of waste rock backfill in the pit bottom, or an excavated sump in the pit bottom, could act as a temporary mitigation measure, it is not considered a permanent solution because fine grained material from the pit walls and blowing sand will eventually fill the void spaces in the backfill, limiting the water that could be stored in the backfill and resulting in an ephemeral pit lake on top of the backfill following major storm events. The other closure concern related to the pit is the safety risk associated with the final pit highwalls. Currently, the key components of the closure approach for the open pits include:

- placement (or repairing) of a safety berm and/or fence a safe distance from the pit high wall;*
- posting warning signs around the pit highwall; and*
- construction of berms across the pit ramps to stop unauthorized access to the pit.*

Over time, blowing sand is likely to accumulate in the pits. This would not adversely affect the closure design and would be consistent with natural landforms in the area.”¹⁴⁰³

1108. Ms. Cessford then expressed the opinion that “[g]iven the risk concerns a situation arising after many years at the closure of the mine, even if this was perceived as a shortcoming, a regulator could require remedial action such as monitoring or further investigation during the operation of the mine. A potential investor could also require an ESAP to monitor, review and audit the company’s compliance with its plan for further studies.”¹⁴⁰⁴

1109. In her second report, Ms. Filas did not reiterate her initial criticism that the ESIA failed to evaluate the likelihood of a pit lake forming at closure or that it disregarded the

¹⁴⁰³ Exhibit RE-601, Appendix H, p. 17.

¹⁴⁰⁴ Cessford, ¶ 127.

potentially significant impacts associated with a (temporary) pit lake. However, she raised a new concern, *i.e.*, that the EDC and Conceptual Closure Plan failed to discuss “*the Balochistan requirement for backfilling excavations upon closure*” or the potential need to request a variance.¹⁴⁰⁵ She took note of the following statement in Table 3.1 on Environmental Legislation Relevant to Reko Diq in Appendix C of the ESIA:

*“The requirement of Rule 13(2)(d) to fill up all excavations is interpreted not to apply to large scale open pit mining operations, as complete backfilling of the open pit would be infeasible and would not be required for similar operations anywhere else.”*¹⁴⁰⁶

1110. The requirement itself was described to be as follows:

“The conditions pertaining to the mitigation of negative impacts require that the holder of the mineral title or concession:

...

- *on the expiry, termination, surrender or cancellation of the title or concession and in accordance with good mining practices, fills up all excavations, securely plugs all mines, removes all equipment, installations and structures and restores the land, in so far as possible, to its original condition and to prevent hazards to human or animal life or to the property of others or to the environment [Rule 13(2)(d)].”*¹⁴⁰⁷

1111. In Ms. Filas’ opinion, the interpretation regarding the inapplicability of the requirement to the Reko Diq project was wrong because “[t]here are many instances where pit backfilling is done concurrent with mining operations and there are instances where such backfilling is required by law. Exemptions to complete pit backfilling are sometimes approved by regulating authorities, but such variances are authorized based on appropriate technical and financial justification presented by the project proponent, not based on an arbitrary assumption that Balochistan law is not applicable to this Project.”¹⁴⁰⁸ In support of her opinion, Ms. Filas referenced US and California legislation.¹⁴⁰⁹

1112. Ms. Filas further agreed that “*there is significant time to optimize the Conceptual Closure Plan included as Appendix D to the ESIA over the life of the Project*” but considered that “*the ESIA commitments must be sufficient to demonstrate that the proposed action presented in the ESIA has the ability to mitigate Project risks to acceptable levels. It is not enough to simply intimate that there is a risk and we will deal with it later because we don’t need to know if our closure plan will work for at least 50+ years. The ESIA must*

¹⁴⁰⁵ Filas II, ¶ 39.

¹⁴⁰⁶ Exhibit RE-601, Appendix C, p. C-10.

¹⁴⁰⁷ Exhibit RE-601, Appendix C, p. C-10.

¹⁴⁰⁸ Filas II, ¶ 40.

¹⁴⁰⁹ Exhibits FIL-22 and FIL-23.

present a plan that will mitigate unacceptable risks. That plan is then carried forward into the Project feasibility study and financial analysis.” Specifically with regard to the requirement to fill up all excavations, Ms. Filas considered that the acknowledgment of this requirement only in an appendix and its dismissal as inapplicable suggested that it “may have been intentionally ignored.” She added that “[i]f the Government of Balochistan were to insist on compliance with this backfilling requirement, the circa \$130 million closure cost estimate presented in the Feasibility Study and presumably included in the Project financial model would be grossly inadequate and may affect the overall feasibility of the Project.”¹⁴¹⁰

1113. The Tribunal notes that the issue was not discussed with the experts during the Hearing on Quantum. However, given that Ms. Filas had raised this issue only in her second report, Claimant sought leave to introduce certain exhibits into the record which demonstrate in its view that “*complete backfilling is not generally required for pits of the kind contemplated for Reko Diq*” as well as that “*the specific California requirement cited by Ms. Filas has long been controversial and that substantial revisions to limit its scope were under active consideration.*”¹⁴¹¹ The Tribunal admitted these exhibits *de bene esse* and now decides to admit them into the record. As pointed out by Claimant, Ms. Filas did not include the requirement of filling up excavations in her presentation of the “*non-conformities*” she had identified in the ESIA. She did, however, maintain that “[t]oxic mine water was a concern during public consultation, so leaving toxic water in the pit at closure will likely be contentious.”¹⁴¹² In her conclusion, Ms. Filas included “*the toxic mine water that would be left at the end of the closure period*” as an issue for which “[t]hey haven’t provided justifications.”¹⁴¹³

1114. Against this background, it appears to the Tribunal that while Ms. Filas maintained her criticism that the concern of leaving toxic mine water in the pit at closure was not adequately addressed in the ESIA, she did not reiterate her criticism that this was contrary to a requirement in the 2002 BM Rules or contrary to current practices in mining operations. The Tribunal therefore does not consider it necessary to address the evidence submitted by Claimant in detail. It suffices to note at this point that the California Regulation on backfilling was criticized in the documents submitted by Claimant as being detrimental to the environment because it “*requires moving material twice (increasing GHG emissions), fails to address the proper storage and handling of waste materials*

¹⁴¹⁰ Filas II, ¶¶ 149-151.

¹⁴¹¹ Claimant’s Quantum Post-Hearing Brief, ¶ 175.

¹⁴¹² Filas Presentation, p. 16.

¹⁴¹³ Transcript Hearing on Quantum (Day 7), p. 1958 lines 1-7.

*(jeopardizing water quality), and can cause greater ground disturbances (impacting habitat for sensitive species).”*¹⁴¹⁴

1115. The Tribunal notes that considerations underlying a discussion on amendments to California legislation are not directly relevant to whether the Balochistan authorities would request that Claimant fill up the excavations created by its mining project at closure. As pointed out by Ms. Filas, rules 13(2)(d)(i) of the 2002 BM Rules indeed provides that “[i]t shall be a condition of every mineral title or mineral concession that - ... (d) on the expiry, termination, surrender or cancellation of the title or concession, the holder thereof, in accordance with good mining practices, shall - (i) fill up all excavations on the land to which the title or concession relates.”¹⁴¹⁵ This provision is contained in Part III of the 2002 BM Rules, which contains general provisions on Mineral Titles and Mineral Concessions and would thus generally be applicable to the project. However, the Tribunal cannot agree with Ms. Filas that the ESIA ignored this requirement and dismissed it without any discussion with the GOB. In the appendix to the ESIA, it is stated that “*complete backfilling of the open pit would be unfeasible and would not be required for similar operations anywhere else.*”¹⁴¹⁶ While Ms. Filas disputed this statement, she did not provide any support for her opinion apart from her reference to US and California legislation which is apparently under revision due to the environmental concerns raised by the backfilling requirement. In addition, as Mr. Filas herself noted, the Chapter on Closure in the Feasibility Study expressly quotes, *inter alia*, the requirement in rule 13(2)(d)(i) of the 2002 BM Rules and then states:

*“These rules contain some requirements that appear to imply that all pits would require backfilling as part of closure. However, these regulations are based on laws written in the mid-twentieth century and complete backfilling of large base metal pits is not a standard practice anywhere in the world. These particular aspects of the regulation will need to be discussed and clarified with the Balochistan government during negotiations for the mining lease.”*¹⁴¹⁷

1116. Consequently, the Tribunal cannot agree with Respondent or Ms. Filas that this requirement was simply ignored or hidden in an appendix to the ESIA. Claimant rather made express reference to it in the Feasibility Study and considered it an aspect for negotiation with the GOB. Based on the evidence in the record, the Tribunal sees no basis for doubting Claimant’s statement that complete backfilling is not standard practice in the mining industry. Also taking into account the express reference in rule 13(2)(d)(i) of the 2002 BM Rules to “*good mining practices*” and the environmental implications of

¹⁴¹⁴ Exhibit CE-1695, p. 1.

¹⁴¹⁵ Exhibit RE-1, rule 13(2)(d)(i).

¹⁴¹⁶ Exhibit RE-601, Appendix C, p. C-10.

¹⁴¹⁷ Exhibit RE-576, p. 15-5.

backfilling which were not addressed by Ms. Filas, the Tribunal is not convinced that the GOB would have required Claimant to completely fill up the excavation created by the mine and, thus, that it should have accounted for the cost of complete backfilling in its estimate of the closure costs.

1117. In addition, the Tribunal notes that the residual risk register of the Feasibility Study expressly includes the risk of “*Underestimation of closure cost due to uncertainty in regulatory closure requirements (e.g., pit backfilling requirements)*” and assigned to this risk a CAPEX impact of USD 20.6 million.¹⁴¹⁸ This risk was incorporated by Prof. Davis into his valuation model.¹⁴¹⁹ Neither Respondent nor Ms. Filas have addressed the quantification of this residual risk by Claimant and the Tribunal therefore has no basis to assume that a buyer would have considered it insufficient.

1118. The Tribunal is also not convinced that Claimant’s plans for addressing a temporary toxic pit lake that might form at closure of the mine were inadequate for a project at the development stage of Reko Diq. Ms. Filas explicitly agreed that “*there is significant time to optimize the Conceptual Closure Plan ... over the life of the project.*”¹⁴²⁰ While she maintained the opinion that the ESIA should have presented a plan for the mitigation of unacceptable risks, the costs of which would then be carried over to the Feasibility Study, the Tribunal has also taken note of Ms. Cessford’s explanations and the results of the pit water balance studies and the modelling performed by SRK Consulting. On balance, the Tribunal is therefore not convinced that the possibility of a temporary toxic pit lake forming at closure was a risk whose mitigation could not be addressed over the life of the mine or that Claimant should have accounted for additional costs regarding the closure of the mine. In this regard, the Tribunal also notes that the overall closure cost estimate accuracy was presented as being “*in the range of +30% to -25%*” and that the total closure cost estimate of USD 110.6 million was therefore increased by an additional USD 20 million contingency.¹⁴²¹ In the Tribunal’s view, Respondent and Ms. Filas have failed to provide the Tribunal with a substantiated argument as to why this estimate would have been considered insufficient.

1119. In conclusion, the Tribunal finds that Respondent and its expert Ms. Filas have failed to convince the Tribunal that any of the alleged non-conformities of the ESIA in terms of environmental impacts would have been an issue causing significant additional work and/or costs for which Claimant should have accounted in the cost estimate included in the Feasibility Study.

¹⁴¹⁸ Exhibit CE-952.

¹⁴¹⁹ Davis I, Workpaper 26, p. 3.

¹⁴²⁰ Filas II, ¶ 149.

¹⁴²¹ Exhibit RE-576-15, p. 15-31 and Table 15.2.

iii. Whether Claimant Adequately Addressed the Social Impacts of the Project

1120. The Tribunal will therefore now turn to the social impacts addressed in the ESIA and the criticisms raised by Dr. Connor.

1121. In her presentation at the Hearing on Quantum, Dr. Connor stated, *inter alia*, that “[t]he information on baseline social conditions is completely inadequate,” which she considered to be “particularly worrisome ... in terms of the conflict implications, as well as there appears to be an almost complete lack of understanding of the local organizational structure.” In her opinion, “[y]ou need to have much more information. And that is missing in the ESIA, and that is absolutely required in the ESIA. That’s its job, is to do the assessment, determine the severity.”¹⁴²²

1122. The Tribunal recalls that, as already discussed above, Dr. Connor placed emphasis on the fact that certain information was supposed to be contained in the ESIA rather than any other place of the project documentation and that if the ESIA for Reko Diq had gone to a lender, “[t]hey would have said, *This ESIA has to be ... completely redone. You haven't identified all the impacts, and things like land aren't even addressed in it. You haven't properly addressed the significance, and you haven't given the reader or me or anyone else enough information to reach a conclusion about whether I would want to invest or not.*”¹⁴²³ Dr. Connor acknowledged that a lender would also have seen the Feasibility Study but maintained that “*their purposes are completely different.*” In her opinion:

“The social aspect of the Feasibility Study level are up in the sky. They didn't tell you anything. They give you a sort of overall view of how many people might be affected if they locate the mine here, blah, blah, blah. That's why it is so different from environmental.

That social assessment doesn't occur until the ESIA, until the Social Impact Assessment. And that document would have to demonstrate to the lender that you are serious and know what you're doing about the social impacts, particularly those of the nature--the fragile and delicate nature and volatile nature that I mentioned.”¹⁴²⁴

1123. In response to the question whether there were other documents addressing the socio-political and security risks, Dr. Connor again maintained that these had to be addressed in the ESIA “*because that’s the document that assesses the risk of that to the Project, and the risk of the Project to the people in that area.*” She agreed that “*you can have all kinds of background documents*” but considered that there was only “*a sort of superficial study.*” Dr. Connor confirmed that she had reviewed Chapter 19 of the Feasibility Study

¹⁴²² Transcript Hearing on Quantum (Day 7), p. 2014 line 14 to p. 2015 line 13.

¹⁴²³ Transcript Hearing on Quantum (Day 7), p. 2029 line 7 to p. 2030 line 9.

¹⁴²⁴ Transcript Hearing on Quantum (Day 7), p. 2030 line 17 to p. 2031 line 9.

on Security but noted that she “*wasn’t here to evaluate security*” and argued that “[i]t does not address—what what I am concerned about is the social person, is how do we address the implications of the Project, how the Project is going to cause more conflict. And it doesn’t address that.”¹⁴²⁵

1124. As noted above, the Tribunal is not convinced by an argument that certain information was to be contained in the ESIA rather than other parts of the documentation that would also be submitted to a lender. To the extent that a certain assessment was made and the information was thus available, the Tribunal considers it reasonable to assume that any issue regarding the location of the information could have been resolved without causing significant additional costs or significant delay. While the Tribunal understands Dr. Connor’s testimony to be that critical information on the social baseline conditions was missing, including from other parts of the documentation, the Tribunal is not convinced that this is in fact the case.

1125. The Tribunal agrees with Dr. Connor that the Chapter on Security in the Feasibility Study may not have contained the social assessment she was looking for. However, Claimant also asked its consultants from Hagler Bailly Pakistan to prepare a Socioeconomic Baseline for Reko Diq Transport Corridors and Marine Terminal, which was completed in July 2010.¹⁴²⁶ It is not entirely clear to the Tribunal whether Dr. Connor was referring to this report when opining that there was only “*a sort of superficial study.*” However, the Tribunal notes that while Respondent frequently referred to the July 2010 report in its Rejoinder on Quantum, Dr. Connor did not list it among the documents she consulted when preparing her report.¹⁴²⁷ She rather listed a Cultural Baseline and Study of Relationship Dynamics Draft Report dating from July 2009, which was considerably shorter than the July 2010 report.¹⁴²⁸

1126. As for the socio-economic baseline, Dr. Connor referred in her report to Section 6.3.2 of the ESIA on Conflict in Balochistan, criticizing that it was “*very brief and superficial*” and “*only ½ page long.*”¹⁴²⁹ Dr. Connor then discussed Section 8 of the ESIA containing the Socioeconomic Impact Assessment but continued to refer in this discussion only to Section 6.3.2 of the ESIA as the “*baseline,*”¹⁴³⁰ without addressing the 160-page July 2010 report on the Socioeconomic Baseline for Reko Diq Transport Corridors and Marine Terminal. She also did not make any explicit reference to the 39-page July 2009 draft report on the Cultural Baseline and Study of Relationship Dynamics. In the absence of any engagement by Dr. Connor with these reports, the Tribunal cannot follow Dr.

¹⁴²⁵ Transcript Hearing on Quantum (Day 7), p. 2037 line 5 to p. 2040 line 1.

¹⁴²⁶ **Exhibit RE-751.**

¹⁴²⁷ Cf. Connor, pp. 5-6.

¹⁴²⁸ **Exhibit CON-9 / RE-609.**

¹⁴²⁹ Connor, Section 2.2.1 and note 7, referring to **Exhibit RE-601**, p. 6-25.

¹⁴³⁰ Cf. Connor, Section 2.2.1, ¶ 3.

Connor's opinion that "[t]he information on baseline social conditions is completely inadequate."

1127. Dr. Connor further testified that "[t]here are no methods to manage ... the benefits the project will have" and criticized that "[t]hose benefits are not in that part of the ESIA" but only "some section on the kind of typical benefits that a mining project will bring local employment ... and other kinds of community development and that sort of thing, educational help and so on."¹⁴³¹ She criticized that "[t]here is no implementation plan. There is not one single discussion of how that was analyzed, who did it, who determined that was the right thing to do, who determined that wasn't the wrong thing to do that would divide and cause more conflict, who determined how they were going to figure out what the recipients have, because if you give the wrong thing to the wrong group, you may have a war on your hands." In her opinion, there were only "some boilerplate descriptions of, say, employment training plans that come out of ... any standard mining company before they actually develop the plan."¹⁴³²

1128. In her report, Dr. Connor referred to Section 1.3.3 and Table 8.1 of the ESIA in this regard, which "identifies numerous benefits that the project would bring to Balochistan and its people" but considered that "[t]his benefits description ... is a list of the general types of benefits mining projects provide, rather than the detailed plans for delivery of benefits needed to evaluate their effectiveness in maintaining LTO."¹⁴³³ While the list of documents consulted by Dr. Connor in preparing her report also included Chapter 13 of the Feasibility on Community Relations,¹⁴³⁴ she did not make any reference to this chapter throughout her report, including to Section 13.5 on Community Management Plans, which included a more detailed description of Claimant's Community Engagement Plan, Community Development Projects, Local Workforce Development, Education and Training, Local Procurement and Supplier Development, and Management of In-migration.¹⁴³⁵ The Tribunal is not convinced that the description in the Feasibility Study could reasonably be described as "some boilerplate descriptions" or "a list of the general types of benefits mining projects provide" and, thus, that Dr. Connor's criticisms regarding the ESIA would also apply to the Chapter on Community Relations in the Feasibility Study. As Dr. Connor did not engage with the content of Chapter 13, the Tribunal cannot follow her opinion regarding the description of the benefits that Claimant intended to bring to Balochistan.

¹⁴³¹ Transcript Hearing on Quantum (Day 7), p. 2015 line 17 to p. 2016 line 19.

¹⁴³² Transcript Hearing on Quantum (Day 7), p. 2016 line 20 to p. 2017 line 17.

¹⁴³³ Connor, Section 2.2.3, ¶ 1.

¹⁴³⁴ Connor, p. 5.

¹⁴³⁵ Exhibit RE-576-13, pp. 13-36 to 13-39.

1129. Dr. Connor further argued that Claimant had not developed a community development strategy and, while acknowledging that “*community development strategies and plans typically evolve over and are revised over time,*” the ESIA failed to explain “*how these efforts would be tailored to the conditions of the affected communities – the most important factor in developing effective plans and in evaluating the likely outcome of community support programs.*”¹⁴³⁶ Dr. Connor noted that the benefits “*though a way off from being turned into management plans*” had been made known to the community through disclosure and consultations and therefore considered that “[m]anaging these expectations requires a great deal of skill, which does not seem to have been the case with TCC’s Community Relations (CR) work or, at least, evidence is not available.”¹⁴³⁷
1130. Dr. Connor then referred to a “*Social Performance Specialist’s report from his 2009 visit*” in which it was noted that “*community contributions at that stage were ad hoc consisting largely of donations to sports events and some other minor activities in response to requests, and these activities were being implemented in an uncoordinated way by various non CR departments.*” Dr. Connor agreed with the Social Performance Specialist that “*donations and responding to requests cause more problems than they resolve as they lead to negative feelings of both those whose request is rejected, as well as those whose request is accepted, but find the assistance insufficient or become entitlements over time from which the company cannot extract itself without causing conflict.*”¹⁴³⁸
1131. At the Hearing on Quantum, Dr. Connor confirmed that she had relied in her report on a contemporaneous assessment performed by Mr. Luc Zandvliet, whom she now described as a Community Engagement Expert and “*the only one out there I would have paid any attention to and given me an opinion.*”¹⁴³⁹
1132. The Tribunal notes that with regard to community development, Mr. Zandvliet stated in his report of a trip to Reko Diq in March /April 2009 that “[a] *community development strategy is yet to be developed, which is normal is this phase of the project.*”¹⁴⁴⁰ Consequently, and contrary to what Dr. Connor’s report suggests, he did not consider it unusual that Claimant had not yet developed a community development strategy at the time he visited the teams working on the project.
1133. Mr. Zandvliet then noted that “[t]he *current approach largely consists of donations to sports events, combined with a number of activities that were started, and are still being implemented by departments other than CR*” and that “[t]he *donation policy is not likely*

¹⁴³⁶ Connor, Section 2.2.3, ¶ 2.

¹⁴³⁷ Connor, Section 2.2.3, ¶ 3.

¹⁴³⁸ Connor, Section 2.2.3, ¶ 3.

¹⁴³⁹ Transcript Hearing on Quantum (Day 7), p. 2044 line 21 to p. 2045 line 6 and p. 2053 lines 3-7

¹⁴⁴⁰ Exhibit RE-644, p. 8.

to yield a positive return on investment.” He proceeded to present various options for community development, including to “[b]ase a short term community development strategy on risk analysis and link it to the business case.” He noted that “[t]he main risks to the Reko Diq project are related to the perceived lack of jobs and contracting opportunities for local people, rather than the lack of community projects. This needs to be reflected in the community development approach.”¹⁴⁴¹

1134. As Dr. Connor placed emphasis on the expertise of Mr. Zandvliet as a community engagement expert, the Tribunal considers it worth reviewing his trip report in more detail. Mr. Zandvliet indeed made various observations and proposals indicating that significant additional work would be required on the subject of community relations before construction could start. For example, Mr. Zandvliet made the general observation that “[c]onsistently and repeatedly, local stakeholders have expressed their - expectations related to two main benefits: jobs and contracts for which they feel they are qualified. These demands are reasonable but require a concerted effort on TCC’s part given current local literacy levels and contracting capabilities. If construction does indeed commence in Q2 2010, TCC’s efforts are currently not bold and comprehensive enough to provide local people with realistic employment and contracting opportunities; the window of opportunity is rapidly closing to train 5000+ people to a level of qualification for non- or semi-skilled labor positions.” He then presented options on how this could be achieved.¹⁴⁴²

1135. With regard to the community relations team, Mr. Zandvliet considered that “[t]here are opportunities for the CR team to become more strategic in its approach to establish and maintain local support and in allocating staff to achieve these objectives” and “an opportunity to clarify the tasks of various members of the CR team to ensure that duplication is avoided and some gaps are addressed.” He referred to certain measures which had already been implemented during his trip and presented further options on how the effectiveness of the community relations team could be improved in the future.¹⁴⁴³

1136. On stakeholder engagement, Mr. Zandvliet observed that “[t]here has been no systematic and ongoing TCC presence in the various communities. This was in part due to assumptions that too many visits would lead to questions and requests for which the company would not have an answer.” He then reported that “[t]he CR team committed to the implementation of a stakeholder engagement program, which will be systematically followed starting the first week of May. The month of April will be used for 5 pilot meetings. See Annex G for an overview which stakeholders will be met as well as the

¹⁴⁴¹ Exhibit RE-644, p. 8.

¹⁴⁴² Exhibit RE-644, pp. 2-3.

¹⁴⁴³ Exhibit RE-644, pp. 3-5.

frequency of engagement.” He also noted that “Stakeholders claim that, in the past, TCC has made several promises that it never fulfilled” but added that “[t]his perception is typical for any project during the exploration stage” and referred to a new site-based Communication Officer and a draft communication strategy which he had provided. He again presented further options on how to improve stakeholder engagement.¹⁴⁴⁴

1137. As for the grievance procedure, Mr. Zandvliet observed that it *“has been implemented and diligently followed by the grievance officer. The first cases have been closed.”* He noted that some Heads of Departments had dismissed the grievance SOP because it had not been explained to them but noted that it would be publicized during the upcoming round of public community meetings and again presented further options with regard to the grievance procedure.¹⁴⁴⁵

1138. Perhaps most urgently, Mr. Zandvliet addressed employment and hiring, observing that *“[a] staff recruiting strategy for the construction phase is still missing. On a site level, the HR department is mandated, and resourced, to look after existing employees (and reportedly does that well). As a result, TCC has yet to start developing a hiring strategy for 5,000-10,000 people—potentially starting within the year. Experience from other mines shows the need to start planning for a recruitment exercise of 5,000-10,000 at least one year in advance. Some mines have a full-time project team of 3-6 people on site at least 6 months prior to the start of construction dedicated to preparation and implementation of the recruitment effort. If a hiring strategy is not developed in the short term, there will not be sufficient time to educate communities, and to design a mechanism that provides maximum opportunities for local people, which will almost certainly increase social risk to the project.”* Following further observations on a lack of progress on vocational training and a feeder program as well as a *“Policy-Practice Gap”* regarding preferential recruitment, he again presented various options to address the issues he had identified.¹⁴⁴⁶

1139. Finally, for Contracting, Mr. Zandvliet noted that *“[a]t present, very few local businesses benefit from the presence of TCC. Even many of the goods that local business people say they can provide are sourced from Karachi or elsewhere. This is to assure quality of produce as well as timely delivery”* and that *“[a]t the same time, the administration department has made deliberate efforts to source locally but was confronted with sellers who did not understand the modalities of working with a large company (e.g. they kept raising their prices).”* Mr. Zandvliet saw *“tremendous opportunities to ensure that local vendors and contractors benefit more from the TCC presence”* and presented an option

¹⁴⁴⁴ Exhibit RE-644, pp. 5-6.

¹⁴⁴⁵ Exhibit RE-644, pp. 6-7.

¹⁴⁴⁶ Exhibit RE-644, pp. 10-12.

which he considered “*would be ‘low hanging fruit,’ possibly cost effective and would demonstrate a visible commitment to TCC claims to support local people.*”¹⁴⁴⁷

1140. At the Hearing on Quantum, Dr. Connor clarified that she did not know whether Mr. Zandvliet’s recommendations had been followed. She also clarified, however, that while she had not known at the time she had written her report that Mr. Zandvliet had been retained by Claimant as a consultant, she learned shortly before the Hearing that Claimant had offered him a contract after his trip report.¹⁴⁴⁸ As the criticisms raised by Dr. Connor were raised for the first time in her report submitted together with Respondent’s Rejoinder on Quantum, Claimant submitted certain additional documents which were admitted by the Tribunal *de bene esse* and are now admitted into the record. Specifically in this context, Claimant submitted a Reko Diq Flash Report dated July 2009 in which was noted that “*Luc Zandvliet has been retained as a consultant to support Community Relations team.*”¹⁴⁴⁹

1141. Dr. Connor explained that Mr. Zandvliet would often fly in for a brief visit at first and then provide a proposal on how he could help “[a]nd in most cases, he goes in to help them, and he’s quite good at it.”¹⁴⁵⁰ Against this background and taking into account that Mr. Zandvliet’s initial observations dated from April 2009, *i.e.*, one and a half years before the Feasibility Study and ESIA were completed, the Tribunal considers it reasonable to conclude that Claimant retained him in order to work on the areas he had identified and implement some of the options he had proposed.

1142. In the Tribunal’s view, this is also confirmed by the summaries of the community initiatives that Claimant presented at the Hearing on Quantum: (i) the contributions that Claimant had already made before applying for a mining lease (first slide); and (ii) the contributions that Claimant planned to make after being granted the mining lease (second slide):¹⁴⁵¹

¹⁴⁴⁷ Exhibit RE-644, p. 13.

¹⁴⁴⁸ Transcript Hearing on Quantum (Day 7), p. 2046 lines 4-8 and p. 2063 lines 9-15.

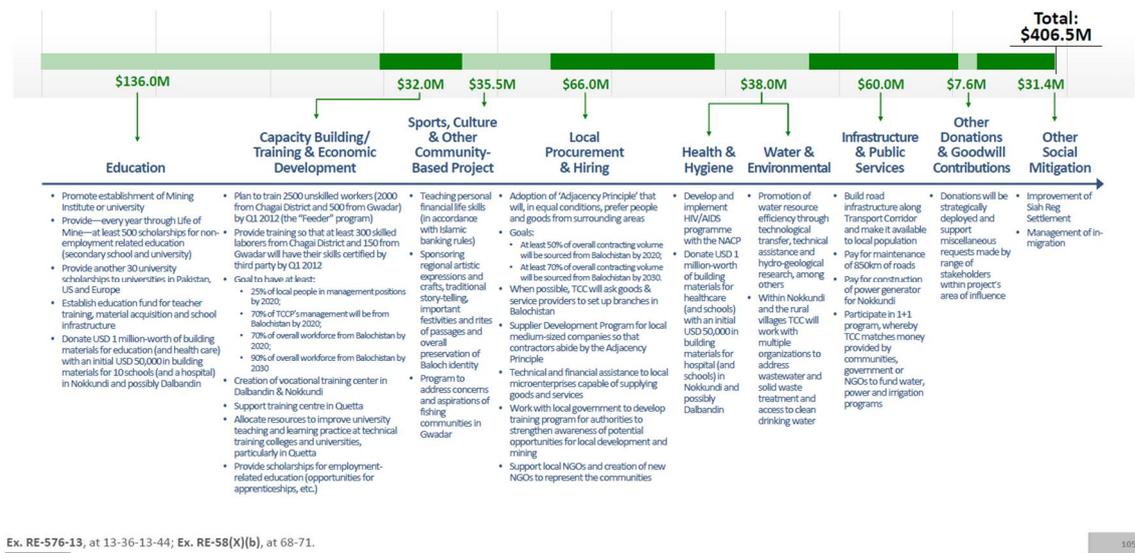
¹⁴⁴⁹ Exhibit CE-1714, p. 3. It was also noted that “*Alexey Fotygin has joined site as Environmental Manager.*”

¹⁴⁵⁰ Transcript Hearing on Quantum (Day 7), p. 2063 lines 16-21.

¹⁴⁵¹ Claimant’s Opening Presentation, pp. 104-105.

Health & Hygiene	Education	Capacity Building/ Training & Economic Development	Sports, Culture & Other Community-Based Project	Local Procurement & Hiring	Water & Environmental	Infrastructure & Public Services	Other Donations & Goodwill Contributions	Other Social Mitigation
<ul style="list-style-type: none"> Built and staffed a medical clinic at Humal that treated hundreds of patients each quarter Weekly health services in medical clinic at Nokchah village Sponsor of 10 patients' eye-surgery at RHC, Nokkundi Regular vaccination services in the project's surrounding areas Lady Health Workers training Health & hygiene awareness training in Nokkundi & Humal schools First aid training for school students and teachers Free medicines to the Humal and Siah Reg communities Donations of medicine and furniture to open a clinic at Nok Chah Free medical camp at Durburn Chah in 2010 	<ul style="list-style-type: none"> Construction of extra rooms, computers in Humal School Provision of teacher and student uniforms to Humal School Provision of reading and writing materials and electricity at Humal School Transport to Siah Reg students attending Humal school Nokkundi Education Support Programme with Nokkundi NGOs Network (library + computers + english + language Center) Small grants to support schools in Nokkundi, Taftan and Dalbandin Celebrated literacy week in Nokkundi Donations to various schools, including water cooler, well digging, stoves, books, etc. Education awareness walk at Nokkundi school 	<ul style="list-style-type: none"> Establishing literacy centers in Nokkundi Female tailoring training at Humal for Humal and Siah Reg community Formation and capacity building of Nokkundi NGOs Network (NKN) Pre-qualification workshops for local business community of Dalbandin, Nokkundi and Taftan Initial meeting conducted with NGOs and donors for workshop development 120 unskilled laborers trained in literacy and life skills training Basic skill training programs in Quetta and Lahore English classes at site for TCC's local employees and other contractors' employees Worked with the Azat Foundation for the Community Employability Support Program which inaugurated 8 learning centers 	<ul style="list-style-type: none"> Annual donation to Chagal Sports Festival Financial support to sports associations, clubs and teams (Dalbandin, Nokkundi and Chagal) Donation of sports equipment Financial assistance to Dalbandin Public Library Donation to cultural organizations for cultural promotion programs Sponsorship of players and teams in competitions outside the district Holding of the All Reko Diq Sports Festival 	<ul style="list-style-type: none"> Conducted pre-qualification workshops 	<ul style="list-style-type: none"> Cleaning of garbage/waste-fabrication Nokkundi city Provision of dustbin and hygiene awareness sessions Provided water pump and electric generator to residents of Nok-Chah Assisted Department of Agriculture in combating rodent attacks on date palms Donations to rehabilitation of water supply pipe line at Nokkundi Provided water pump to PHE, Nokkundi 	<ul style="list-style-type: none"> Humal village mud bricks-fabrication Donation of diesel generator and water pump to Durban Chah 	<ul style="list-style-type: none"> Emergency relief contribution of 10 million rupees to GOB for Ziarat following 2008 Earthquake 4.6 million rupees donated to flood victims of the Gwadar district in 2010 Auction of TCC's within immediate community (Siah Reg, Humal) Donation to President Press Club Dalbandin 	<ul style="list-style-type: none"> Parties, meetings, visits and events with a variety of stakeholders (e.g. grand Eid Milian Party, visiting notables of Dalbandin to express condolences on the occasion of the death of their family members)

Ex. RE-175, at 5-8; Ex. CE-68, at [3], 6-9, 13-14; Ex. CE-82, at 6-15, 24-26; Ex. CE-110, at 7-13, 22-24; Ex. CE-154, at 5-7, 10-12; Ex. CE-155, at 6-8, 12-14; Ex. CE-156, at 6-8, 12-13; Ex. CE-157, at 6-11, 18-19; Ex. CE-158, at 6-11, 17-19; Ex. CE-162, at 6-11, 18-20; Ex. CE-164, at 8-13, 25-27; Ex. CE-165, at 8-18, 29-31; Ex. CE-171, at 8-13, 22-24; Ex. CE-417, at 8-9; Ex. CE-418, at 5-6, 9; Ex. CE-419, at 5-6, 9-10; Exs. CE-545, CE-547.



1143. Dr. Connor confirmed that she was aware of the initiatives reflected on the slide presented to her and added that “[t]hey are not all in here, but there are pages that show photographs of people doing this and that, and, you know, they are having this training program and so on. So, there are lists periodically that have some of these things, yes. So, I'm aware of this, yes.”¹⁴⁵² In response to the question whether she would agree that what matters to a local population would be what the company does rather than what it writes or says, Dr. Connor responded:

“This has changed so much in the last 10 years, and I've been involved in that. The old style was charity, and then it moved to sort of philanthropy, but that's 25 years out of date. This is 25 years out of date. And you don't just go in and give people what you think they want so they will like you because they will not like you. They will end up not liking you at all because it isn't really what they need because you don't know really what they need.”

¹⁴⁵² Transcript Hearing on Quantum (Day 7), p. 2055 line 22 to p. 2056 line 8.

You have to have--the banks will make you have a community development program that is founded in a very sound assessment by people who are very sound in doing this, and you will pick a handful of things to concentrate on. So, you'll have a livelihood chapter, there will be a livelihood bucket, and you might have two or three activities in that that you are going to do for the next 10 years. Maybe you'll have a health one. And you'll pick a few things, which is usually like higher level, I said, you know, setting up systems.

Infrastructure? I never what [sic] to see anybody anything, but if you have to put 5 percent of something in, do it, but it doesn't really make any difference, because if they could build it, they would have done it. These Parties' meetings, visits, you've going to do some of that. It's not a contribution. It may make some people like you--and it may not--because in an environment like this, what if you pick the wrong people to give things to? What if you give too much to one group?"¹⁴⁵³

1144. Dr. Connor therefore maintained that “*this scattershot kind of ‘let's just give them what they want’ is bound to get you in trouble. I've never seen it not.*”¹⁴⁵⁴

1145. The Tribunal is not convinced, however, that Claimant’s approach was as random as Dr. Connor’s testimony suggests. In particular, the Tribunal notes that actions presented on these slides included several of the recommendations provided by Mr. Zandvliet in his trip report of April 2009, such as, *e.g.*, on the subject of Local Procurement & Hiring for which Claimant identified several measures to achieve defined goals of sourcing certain contract volumes from Balochistan within a specified timeframe.

1146. The Tribunal notes that these goals as well as other community initiatives that Claimant planned to achieve after being granted a mining lease were communicated to the GOB together with Claimant’s revised offer for the Reko Diq project submitted to Mr. Lehri on 4 October 2010. This offer contained a Proposed Social Investment Plan setting out in detail the initiatives contemplated by Claimant for Training & Education, Economic Development & Procurement, and Infrastructure & Public Services, as well as Goodwill contributions.¹⁴⁵⁵ In the final section on Budget and Fund Disbursement, it is noted that “*[o]ver the first 10 years, the project will invest US\$ 100 million, equivalent to roughly 1.5% of the annual Ebidta [sic]. These financial commitments are additional to those investments that will have to be made to comply with obligations described in the Environmental and Social Impact Assessment.*”¹⁴⁵⁶

1147. As this statement was made before the final ESIA was completed in November 2010, it is not entirely clear to the Tribunal whether and to which extent some of the initiatives described in the revised offer were not contained in the ESIA. However, as noted above,

¹⁴⁵³ Transcript Hearing on Quantum (Day 7), p. 2056 line 10 to p. 2058 line 9.

¹⁴⁵⁴ Transcript Hearing on Quantum (Day 7), p. 2058 lines 20-22.

¹⁴⁵⁵ **Exhibit RE-58(X)(b)**, pp. 61, 68-71.

¹⁴⁵⁶ **Exhibit RE-58(X)(b)**, p. 71.

the Tribunal considers it reasonable to assume that amendments to the ESIA based on already available information could have been made without causing significant additional cost or delay if and when an agreement with the GOB had been reached on the basis of this revised offer. This also corresponded to Ms. Cessford's expectation that further interaction with the regulatory authority would be required post-submission of the ESIA.

1148. In any event, however, the Tribunal notes that the revised offer was submitted to Mr. Lehri after the Feasibility Study had been delivered to the GOB in August 2010. As the Feasibility Study included the cost estimates for the measures described in the ESIA, it appears to the Tribunal that the additional costs of USD 100 million referred to in this revised offer may not have been included in the cost estimate of the Feasibility Study. This will be addressed further below.

1149. With regard to individual measures contemplated by Claimant, the Tribunal notes that Dr. Connor testified at the Hearing on Quantum that she would personally not recommend education "*unless you are doing something during a long-term community development program that is defined in improving educational systems.*" Similarly, she would not recommend health programs "*unless you are--you are going to have some because you have to in an area, but you're not a health--you know, you don't know anything about health.*" When pointed to Claimant's health impact assessment, Dr. Connor stated that "*I didn't really look at it. You know, I did look at it, but I know what the health conditions are there because I occasionally review things for UNICEF and so on, so I know what the health conditions are.*" She then affirmed that she had looked at the health impact assessment but testified that it was not listed in the documents she had reviewed because "*it's not relevant to ... whether they can maintain a license to operate.*"¹⁴⁵⁷ She further confirmed that she had received the health impact assessment only after her report and clarified her answer that "*that health report is all secondary information. I can get better information than that from going somewhere else. But again, I didn't think it was relevant to whether or not people would accept the benefits when they don't know what they are against the adverse impacts when they don't know what those are.*"¹⁴⁵⁸

1150. The health impact assessment was also submitted by Claimant in response to the criticisms raised by Dr. Connor in her report, specifically that the ESIA did not adequately address, *inter alia*, "*deterioration in public health and increases in social ills associated with population influx*" as well as "*human health and wellbeing.*"¹⁴⁵⁹ The Health Impact Assessment prepared by International SOS in September 2008 took into account at

¹⁴⁵⁷ Transcript Hearing on Quantum (Day 7), p. 2050 line 19 to p. 2052 line 1.

¹⁴⁵⁸ Transcript Hearing on Quantum (Day 7), p. 2065 lines 11-21.

¹⁴⁵⁹ Connor, Section 2.2.1, referring to **Exhibit RE-601**, p. 8-17.

various points of its impact analysis the influx of migrant people.¹⁴⁶⁰ While the Tribunal appreciates that this report was not available to Dr. Connor when she prepared her written report, it cannot follow her explanation as to why she considered the 138-page report irrelevant to her assessment of whether the population would accept the benefits contemplated by Claimant with regard to health. Against this background, the Tribunal is also not convinced by Dr. Connor's criticism that Claimant failed to appropriately assess the impact of the project on the local population and whether they would be outweighed by the social benefits it planned to provide.

1151. In addition, the Tribunal notes that while Dr. Connor expressed the opinion that Claimant focused on the wrong areas of community initiatives, she did not provide an estimate of the costs that would have been associated with initiatives that she would have considered more adequate.

1152. In her report, Dr. Connor stated:

*"The continuous effort to maintain LTO would involve substantial expenditure in cost and time and highly skilled social and community experts with experience in conflict management, particularly in Balochistan and/or similar environments. This Expert is not in a position to evaluate the costs for such an effort as given in the TCC budget. The ESIA does not discuss the human resources TCC has or intends to recruit in any detail, which is a serious omission because it suggests that TCC is not aware of the expertise and experience that will be needed to deal with sensitive issues like license to operate in this project's context. Moreover, highly skilled experts are not numerous and most are already engaged in other projects. TCC documentation indicates that staff will be trained, but does not address who will do this training and mentoring or when it would have begun."*¹⁴⁶¹

1153. At the Hearing on Quantum, Dr. Connor clarified with regard to the costs she had referred to that "[t]he costs are indirect. You are going to be doing all these other things to make sure that you're bringing the right benefits and so on. So, there are the engagement costs and so on, but they are the costs of running your Project properly." She further clarified that in addition to the benefits brought to the local communities, "[y]ou're going to work with the Government higher up to maybe improve the Ministry of Mines. You are going to do all kinds of stuff. If give yourself enough time, you find out what are rights things to do, and then you are not wasting money and upsetting people. So, those are the costs I'm talking about." Dr. Connor added that she was not able to predict the costs as "they were nowhere near to figuring out what those were going to be."¹⁴⁶²

¹⁴⁶⁰ Exhibit CE-1701, pp. 109, 113, 115, 117 and 128.

¹⁴⁶¹ Connor, Section 2.1, ¶ 9.

¹⁴⁶² Transcript Hearing on Quantum (Day 7), p. 2059 line 14 to p. 2060 line 16.

1154. When pointed to Claimant's presentation of the amount that it was planning to spend on community initiatives, *i.e.*, USD 406.5 million,¹⁴⁶³ Dr. Connor testified:

*"Well, it's got a number down there that isn't meaningful. It's got a number for these things it's decided to do, which I don't think they should be doing at all, at least some of them. So, is that a lot of money for a size of project like this? Yeah, it could be. I don't know. But there's nothing--I can't evaluate amounts of money because I'm not accepting their community programs, most of them."*¹⁴⁶⁴

1155. In addition, with regard to the "*highly skilled experts*" she had referred to in her report, Dr. Connor emphasized that even if Mr. Zandvliet may have been retained by Claimant, "*you still have to have the staff,*" *i.e.*, "*a very large community staff,*" including a "*very skilled community manager,*" within the confines of an Environmental and Social Management System.¹⁴⁶⁵ In her opinion, "*this Project is just way, way up the road, and they did not have anywhere near the right staff to develop this, so they have to acquire these social managers and supporting Experts*" such as "*a conflict management expert to assess that and see what needs to be done.*" Dr. Connor added that "*I'm sure it could be done, but it would take a long time*" and stated that it would take "*a minimum of two years, might be much longer than that*" to implement the necessary risk management measures. She maintained, however, that "*it wouldn't have been anytime soon, and they would not have been able to demonstrate adequately to a lender that they would get license to operate.*"¹⁴⁶⁶

1156. As for the costs aspect, the Tribunal notes that Dr. Connor did not consider the amount that Claimant planned on spending on community initiatives too low. She stated that "*it could be ... a lot of money for a site of project like this*" but could not provide an answer because she did not accept most of the community programs as such. As the Tribunal is not convinced by Dr. Connor's criticisms on these community programs, it also has no basis to doubt that the amount Claimant planned to spend on these would be inadequate.

1157. Finally, as for Dr. Connor's concern regarding the availability of skilled experts and personnel to implement the community relation programs envisaged by Claimant, the Tribunal considers that while concerns regarding recruitment are also reflected in Mr. Zandvliet's trip report, these concerns did not relate specifically to the community relations team but more generally to the workforce of 5,000+ people required for construction. The Tribunal is not convinced that to retain professional community relations personnel would have been significantly more difficult than to retain the various experts and consultants as well as employees that Claimant retained in other areas of the

¹⁴⁶³ Claimant's Opening Presentation, p. 105.

¹⁴⁶⁴ Transcript Hearing on Quantum (Day 7), p. 2061 line 13 to p. 2062 line 10.

¹⁴⁶⁵ Transcript Hearing on Quantum (Day 7), p. 2063 line 21 to p. 2064 line 12.

¹⁴⁶⁶ Transcript Hearing on Quantum (Day 7), p. 2019 line 6 to p. 2021 line 1.

project, including those that have been discussed in detail in this Award. In any event, the Tribunal is not convinced that recruitment of qualified community relations personnel would have formed a valid basis for an assumption that the project could not obtain and maintain a social license to operate.

1158. In conclusion, the Tribunal is therefore not convinced by any of the criticisms raised by Respondent and its expert Dr. Connor regarding alleged shortcomings of the ESIA in terms of assessing the social impacts. In particular, the Tribunal has no basis to assume that a lender would have considered the cost that Claimant contemplated to spend on the community programs it had described insufficient.

1159. The Tribunal recalls, however, that some of these programs were included only in the revised offer submitted to the GOB in October 2010 and that an amount of USD 100 million was thus apparently not included in the cost estimate of the Feasibility Study. As Claimant itself has relied on the additional financial commitments made in the revised offer to demonstrate the adequacy of its community initiatives, the Tribunal considers it reasonable to assume that a buyer would also have factored these additional costs into its valuation of the project.

1160. The Tribunal notes that, according to Claimant's submission in its Quantum Post-Hearing Brief, the offer to spend an additional USD 100 million of October 2010 would have increased the amount of USD 406.5 million that Claimant and its owners were prepared to spend at the Feasibility Study stage.¹⁴⁶⁷ In support of its argument that the amount of USD 406.5 million was contemplated already at Feasibility Study stage and thus included in the cost estimates, Claimant referred to its opening statement and the slide in its opening presentation, which in turn refers to the Chapter on Community Relations in the Feasibility Study and the revised offer of October 2010.¹⁴⁶⁸ The Chapter on Community Relations does not, however, provide for a cost estimate of the community relations measures it describes. The Tribunal is also not convinced that the full amount of USD 406.5 million is included in the estimates of the capital costs and operating costs in Chapters 23 and 24 of the Feasibility Study.¹⁴⁶⁹

1161. In any event, Claimant itself clearly presented the additional community initiatives outlined in the revised offer as part of the initiatives whose total costs it calculated to be at USD 406.5 million.¹⁴⁷⁰ This confirms the Tribunal's conclusion that the cost estimates

¹⁴⁶⁷ Claimant's Quantum Post-Hearing Brief, ¶ 178.

¹⁴⁶⁸ Claimant's Quantum Post-Hearing Brief, note 403, *referring to* Transcript Hearing on Quantum (Day 1), pp. 102-103 *and* Claimant's Opening Presentation, p. 105, *in turn referring to* Exhibits RE-576-13, pp. 13-36 to 13-44, and RE-58(X)(b), pp. 68-71.

¹⁴⁶⁹ Exhibits RE-576-23 and RE-576-24.

¹⁴⁷⁰ Claimant's Opening Presentation, p. 105.

of the Feasibility Study did not yet include the additional USD 100 million that Claimant offered to spend in October 2010.

1162. The Tribunal notes that Respondent did not dispute that the amount of USD 406.5 million reflected the cost estimates in the Feasibility Study plus the revised offer of October 2010 but only relied on Dr. Connor's testimony to argue that "*the contributions and expenditures TCC outlined in slides 104 and 105 of their opening presentation does little to show that TCC understood the social risks, assessed those risks, and properly planned to mitigate those risks.*"¹⁴⁷¹ These criticisms have been addressed in detail above. In the absence of a challenge on the total amount presented by Claimant at the Hearing on Quantum, the Tribunal does not consider it necessary to examine in further detail whether the amount (except for the additional USD 100 million contained in the revised offer) accurately sums up the various estimates for community relations-related costs in the estimates of capital costs and operating costs.

iv. Whether Prof. Davis Has Adequately Accounted for the Costs and Risks Associated with the Environmental and Social Impacts of the Project

1163. Consequently, the Tribunal will now turn to the final question whether Prof. Davis has adequately accounted for the costs and risks associated with the environmental and social impacts of the project.

1164. The Tribunal was not convinced by the criticisms raised by Ms. Filas and Dr. Connor regarding the impact assessment that Claimant had made and the measures it had identified to mitigate those impacts. As neither Ms. Filas nor Dr. Connor engaged with the cost estimates in the Feasibility Study, the Tribunal also has no reason to doubt that these estimates fully account for the contemplated mitigation measures.

1165. However, the Tribunal recalls Ms. Cessford's testimony regarding expected interactions with the regulatory authority and potential investors, which might have led to additional work and thus additional costs for further studies and/or additional mitigation measures that might have to be included in order to obtain a certain permit or funding. The Tribunal therefore considered it a relevant question whether Claimant and/or Prof. Davis included adequate contingency for such additional costs and possibly also delays in the start of construction.

1166. Ms. Cessford testified that the ESIA team had "*been scoped to interact with the regulator post-submission*" and to "*undertake the feedback stakeholder of consultation*" in parallel with a Public Hearing. In addition, the team was "*expecting to have to, as part of our work with the interaction with the stakeholders and the regulators—to possibly have to make amendments to the ESIA.*" Ms. Cessford further testified that the ESIA team had

¹⁴⁷¹ Respondent's Post-Hearing Brief on Quantum, ¶ 218.

also “*been scoped with providing input into TCC’s development of their Management Plans.*” With regard to investors, she stated that the team had only been scoped to produce a “*Glorified Executive Summary*” of the ESIA Report, *i.e.*, “*a much longer Executive Summary, suitable for investors that explained the process and the interaction with the project engineers.*” Ms. Cessford added that while they “*had not been scoped in this case,*” based on her experience with other projects, they “*had expected to have further interactions with any investors, respond to questions, possibly undertake additional studies, such as on issues they raised, and to develop action plans to address any gaps that they might identify that they felt needed further work.*”¹⁴⁷²

1167. Based on Ms. Cessford’s testimony, it appears to the Tribunal that while the ESIA team had not yet been specifically scoped for further interactions with potential investors and potential follow-up actions, the ESIA team expected and was prepared for these interactions. The question is whether they were costed.

1168. As pointed out by Claimant, the risk register included, *inter alia*, the following environmental risks: (i) “*Underestimation of closure cost due to uncertainty in regulatory closure requirements (e.g., pit backfilling requirements)*”; and (ii) “*Changes in design criteria necessitated from the output of environmental baseline may result in significant changes in infrastructure designs/layout.*” For both risks, Claimant has assigned a CAPEX impact of USD 20.6 million and USD 0.7 million (following risk mitigation), respectively.¹⁴⁷³ In addition, the risk register also included certain permitting & approval risks, including: (i) “*Delay in the ESIA approval process caused by ESIA complexity, resulting in a delay of the project*”; and (ii) “*Delays in ESIA submittal due to changes in the project description, resulting in a delay of the project.*” For the first of these risks, Claimant assigned an OPEX impact (following risk mitigation measures aimed at adherence to the relevant guidelines and establishing a relationship with the GOB) of USD 1.0 million.¹⁴⁷⁴ Prof. Davis classified both of these risks as risks that could cause project start-up delay and thereby incorporated them into his estimate of the expected timeframe between completion of the Feasibility Study and start of construction, which will be addressed in more detail below.¹⁴⁷⁵

1169. As for the environmental risk of additional closure costs, the Tribunal has already concluded above that it has no basis to assume that the quantification of this risk was insufficient. As for the other risks identified by Claimant with regard to the ESIA, the Tribunal is not entirely convinced that Claimant thereby also accounted for the

¹⁴⁷² Transcript Hearing on Quantum (Day 7), p. 1897 line 16 to p. 1899 line 16.

¹⁴⁷³ Exhibit CE-952; Davis I, Workpaper 26, p. H-55.

¹⁴⁷⁴ Exhibit CE-952.

¹⁴⁷⁵ Davis I, Workpaper 27, p. H-68.

“*additional studies*” that Ms. Cessford expected to possibly have to conduct on the ESIA following interactions with potential investors and “*the action plans to address any gap that [the potential investors] might identify that they felt needed further work.*”¹⁴⁷⁶ However, neither Respondent nor its experts have addressed the cost estimates included in the Feasibility Study for ESIA-related measures, nor have they provided the Tribunal with any estimate or range of the cost that would usually be expected for additional work following the initial submission of an ESIA to the regulatory authorities and/or a lender.

1170. In the absence of any such figure, the Tribunal sees no basis to conclude that Claimant or Prof. Davis should have incorporated a further cost into the valuation of the Reko Diq project.

1171. In addition, the Tribunal notes that the risk register also included certain community relations risks such as, in particular, the risk of “*Disruption to construction and operations caused by political and community opposition to the project leading to project delay. This can be related (but not limited to): a) perceived insufficient employment opportunities for Chagai people; b) a perceived lack of contracting opportunities for Chagai vendors and contractors; c) labor conditions during construction d) lay-offs at the end of the construction phase; e) local dependency on the mine at the time of mine closure; f) efforts of ‘other companies’ to stir up anti-TCC sentiments.*” This risk was described by Claimant as “*the key Community Risk – to be reviewed to include updates. Review further once port risks are better understood.*” Claimant identified several risk mitigation measures; it did not assign a CAPEX or OPEX impact to this risk.¹⁴⁷⁷ Prof. Davis classified it as “*not material*” as it had an impact rating of 3.¹⁴⁷⁸

1172. Claimant further identified the risk of “*Disaffected communities caused by water shortages or the perceived waste of water for the pipeline-Fan Sediments(Pakistan impact only) resulting in damage to reputation.*” It stated that “[t]he rating of this risk has increased significantly from a D2 due to the inclusion of the slurry pipeline.” Claimant identified “*comprehensive public consultation and stakeholder engagement within the water affected areas*” as risk mitigation measures; it did not assign a CAPEX or OPEX impact to this risk.¹⁴⁷⁹ Prof. Davis classified it as “*not material*” as it had an impact rating of 1.¹⁴⁸⁰ A similar risk was identified for the alternative water sources contemplated for the expansion scenario and qualified as “*not material*” as it had an impact rating of 3.¹⁴⁸¹

¹⁴⁷⁶ Transcript Hearing on Quantum (Day 7), p. 1899 lines 9-16.

¹⁴⁷⁷ **Exhibit CE-952.**

¹⁴⁷⁸ Davis I, Workpaper 27, p. H-66 and Appendix D, p. D-13.

¹⁴⁷⁹ **Exhibit CE-952.**

¹⁴⁸⁰ Davis I, Workpaper 27, p. H-66 and Appendix D, p. D-13.

¹⁴⁸¹ **Exhibit CE-952**; Davis I, Workpaper 27, p. H-66 and Appendix D, p. D-13.

1173. Claimant also identified the risk of “*The influx of jobseekers upsets existing social dynamics, causes pressure on already scarce local resources resulting in protest by host communities, especially in Nokkundi.*” It identified several risk mitigation measures and then assigned a CAPEX impact of USD 0.2 million to this risk, which was also incorporated into Prof. Davis’ valuation model.¹⁴⁸²
1174. Claimant further pointed to the fact that Prof. Davis had accounted for the risk of events caused by extreme political violence or government action by modeling an annual probability of 0.5% that there would be a permanent shutdown of the mine. The Tribunal has addressed this aspect in detail in its analysis of the security-related risks above.
1175. As will be discussed further below, Prof. Davis also accounted for the risk of project delays and the additional costs associated with these delays.
1176. In the absence of any opinion provided by Dr. Connor on additional costs that she would have considered necessary to be spent on community relations and also taking into account that the risk register identified the community initiatives contemplated by Claimant as risk mitigation measures, the Tribunal considers it plausible that Prof. Davis has classified the community relations risks set out above as “*not material*” and thereby did not model any separate financial impact in this regard. In this regard, the Tribunal also notes that as will be discussed below, Prof. Davis assumed in his valuation that substantial delays would be incurred between the completion of the Feasibility Study and the start of construction, which are based on a large dataset of mining companies around the world. In the Tribunal’s view, there is no basis to assume that any of the community relations risks would have delayed the project beyond the delays modeled by Prof. Davis.
1177. As a final point, the Tribunal recalls that the cost estimate of the Feasibility Study apparently did not include the additional amount of USD 100 million that Claimant proposed to spend in its revised offer of 4 October 2010 and that a buyer would therefore also have factored into its valuation of the project. The Tribunal also sees no indication that Prof. Davis included these additional costs into his valuation model.
1178. Consequently, the Tribunal concludes that while it has no basis to assume that Claimant and Prof. Davis did not fully account for the measures and risks that Claimant had identified, a deduction has to be made to account for the additional amount of USD 100 million that Claimant proposed to spend on its Social Investment Program pursuant to its revised offer of 4 October 2010.

8. Whether Claimant Has Established That It Had a Feasible Plan for Obtaining Permits and Land Rights Required for the Project

¹⁴⁸² Exhibit CE-952; Davis I, Workpaper 26, p. H-53.

a. Summary of Claimant's Position

1179. Claimant submits that none of the allegations raised by Respondent with regard to permitting established an impact on the valuation of the project beyond the delays that Prof. Davis has already incorporated into his valuation model. Claimant contends that: (i) it did not experience significant problems securing approvals, licenses or permits for the project; (ii) it took appropriate steps to address future permitting needs; and (iii) in any event, Prof. Davis incorporated longer delays into his model than any of the delays posited by Respondent.¹⁴⁸³

1180. Claimant submits that before the GOB decided to unlawfully take over the project in December 2009, Claimant had obtained all permits required for the exploration and feasibility stage and a team of in-house and external local consultants from Hagler Bailly Pakistan had identified the permits and approvals needed to proceed to construction and operation. In Claimant's view, "*there is every indication that TCC would have been able to secure all necessary permits and authorizations without any greater delay than Prof. Davis has already modeled*" if the authorities had continued to cooperate with Claimant in good faith. It further argues that to seek the permits required for operation before obtaining the Mining Lease would have been premature and cost-inefficient.¹⁴⁸⁴

1181. Claimant points out that it did not experience any significant difficulties in obtaining permits and approvals over the nearly two decades at Reko Diq until the GOB decided to take over the project in December 2009.¹⁴⁸⁵ In Claimant's view, the examples relied on by Respondent "*bear little if any resemblance to Reko Diq and the sparsely populated areas which the proposed pipeline would traverse.*" In particular, Claimant points out that Reko Diq is located in an isolated area with "*minimal*" negative interference with local communities. In addition, Claimant considers that when discussing the Reko Diq project, Respondent ignored Balochistan's contractual obligation as Claimant's joint venture partner to assist Claimant in obtaining "*all leases, licenses, permits or other authorities of any kind whatsoever*" that were required for the project.¹⁴⁸⁶

1182. Claimant also emphasizes that Respondent has not referred to any permitting problems experienced by other mining projects in Balochistan and refused to produce documents that would disclose any such problems experienced by other projects.¹⁴⁸⁷ In its view, Respondent's reference to Pakistan's ranking for ease of doing business is irrelevant given that: (i) "*industry practice shows that mining companies operate successfully in*

¹⁴⁸³ Claimant's Quantum Post-Hearing Brief, ¶¶ 186, 188.

¹⁴⁸⁴ Claimant's Quantum Reply, ¶¶ 731, 741, referring to Livesey IX, ¶¶ 41-42 and Livesey V, ¶ 25.

¹⁴⁸⁵ Claimant's Quantum Reply, ¶ 732.

¹⁴⁸⁶ Claimant's Quantum Post-Hearing Brief, ¶¶ 189-190 lit. a, quoting from Decision on Jurisdiction and Liability, ¶¶ 944, 947; Claimant's Quantum Reply, ¶¶ 733-734, 736, quoting from Exhibit CE-1, clauses 7.2(a) and 24.6.2.

¹⁴⁸⁷ Claimant's Quantum Reply, ¶ 743.

many jurisdictions that have a lower ranking than Pakistan,” such as the Central African Republic, Congo, Guinea-Bissau, Afghanistan and Iran; and (ii) Barrick had experience in operating in jurisdictions with “*similarly challenging business environments,*” such as Dominican Republic, Zambia, Papua New Guinea and Argentina.¹⁴⁸⁸

1183. Specifically with regard to the land acquisition for the slurry pipeline, Claimant refers to the oral testimony of Respondent’s expert Mr. Rahman in which he acknowledged that he was not aware that the pipeline route was specifically designed to avoid populated areas or that earlier public interest litigation involving Reko Diq had been “*speedily resolved*” with the assistance of the GOB and that he had not considered the potential value increase of the owners’ remaining land as an incentive to support the project.¹⁴⁸⁹

1184. With regard to Respondent’s reference to a pending litigation between Claimant and Benway Corp., Claimant contends that it is unrelated and in any event “*well-settled Pakistani law that pending litigation does not bar the alienation of immovable property rights.*”¹⁴⁹⁰ Claimant further argues that Respondent and Mr. Rahman failed to mention the special procedure under the Land Acquisition Act under which land can be acquired on an urgent basis, “*eliminating almost all the delays and litigation Pakistan claims TCC would have faced.*” Specifically, Claimant refers to Section 17 which provides the Federal Government with full discretion to take possession of land “*free from all encumbrances*” after only 15 days’ notice, with interested litigants having to “*vie for the deposited funds afterwards.*”¹⁴⁹¹

1185. As for the alleged water-related disputes, Claimant notes that it had obtained all necessary authorizations for the Fan Sediments and adds that they were chosen because there were no competing users and there would therefore be no expectation of extensive public comment. Claimant further submits that the pipeline was designed to go under riverbeds and would therefore not impact them, and Mr. Mayer confirmed that Claimant had the required permits and also planned on keeping No-Objection Certificates (NOCs). Claimant also submits that the expiry of an NOC during the PSI field study for the pipeline did not impact the survey as it was renewed within four days.¹⁴⁹²

¹⁴⁸⁸ Claimant’s Quantum Reply, ¶¶ 744-746.

¹⁴⁸⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 190 lit. b, *referring to* Transcript Hearing on Quantum (Day 7), pp. 2103-2107, 2087, 2092-2094.

¹⁴⁹⁰ Claimant’s Quantum Reply, ¶ 742 lit. f, *referring to Ahsan Corporation Karachi v. Chairman, Evacuee Trust Property Board*, PLD 1973 Kar. 403 [CA-430], p. 407 (Ebrahim, J.).

¹⁴⁹¹ Claimant’s Quantum Post-Hearing Brief, ¶ 191, *referring to Exhibit CE-1723*, Section 17(1) (admitted *de bene esse*).

¹⁴⁹² Claimant’s Quantum Post-Hearing Brief, ¶ 190 lit. c and d; Claimant’s Quantum Reply, ¶¶ 734, 742 lit. b and c.

1186. With regard to alleged permitting issues at Port Gwadar associated with the port operator, Claimant refers to “*multiple trade-off studies concerning the port*” and “*positive responses to preliminary inquiries into acquiring the necessary land.*” Claimant notes that Respondent failed to identify any permit or authorization that Claimant should have had as of the valuation date and further points to the fact that in 2013, Pakistan signed a 40-year concession contract with a new operator and the port is now operating normally.¹⁴⁹³
1187. Claimant also points out that by contrast to a difficulty of the Duddar project in relocating a small village, it had already secured voluntary relocation from all inhabitants of the Siah Reg village.¹⁴⁹⁴
1188. According to Claimant, Respondent ignored the iterative nature of the permitting process by continuing to rely on the Draft Permits Register even though Claimant had: (i) submitted later versions of the Register which addressed topics that Respondent claimed were overlooked; and (ii) referred to other chapters and appendices of the Feasibility Study and Expansion Pre-Feasibility Study as well as other documents which contained “*substantial additional information and analyses concerning permitting.*”¹⁴⁹⁵ In particular, Claimant notes that both Studies dedicated entire chapters to permitting, which confirm, in its view, that its team was well acquainted with Pakistani and Baloch bureaucracy and drew on its previous experience with the Tanjeel project to determine appropriate assumptions on the scheduling of other environmental permits.¹⁴⁹⁶
1189. Claimant also notes that the Draft Permit Register “*carefully mapped*” all necessary permits and identified the competent authority, applicable legislation, submission procedure, date by which the permit would be needed, estimate time for approval, validity period, and other relevant information. Claimant describes it as a “*live working document*” which would continue to be updated during the project and was in fact updated until 2011 when the Mining Lease Application was denied.¹⁴⁹⁷
1190. In any event, Claimant contends that even if Respondent’s allegations were true, it did not show that the alleged difficulties would have been insurmountable, that they would

¹⁴⁹³ Claimant’s Quantum Post-Hearing Brief, ¶ 190 lit. e, referring to Exhibits RE-576-22.05, p. 5, RE-576-9, p. 9-58 and CE-1318, Livesey V, ¶ 26 and Transcript Hearing on Quantum (Day 2), pp. 356-357; Claimant’s Quantum Reply, ¶ 742 lit. e, referring to Exhibits CE-1408, CE-1474 and CE-1462.

¹⁴⁹⁴ Claimant’s Quantum Post-Hearing Brief, ¶ 190 lit. f.

¹⁴⁹⁵ Claimant’s Quantum Post-Hearing Brief, ¶ 192, comparing Exhibit CE-1386 with Respondent’s Opening Presentation, p. 91 and referring to Exhibits RE-576-3, pp. 3-14 to 3-15, RE-576-12, RE-577-12, RE-576-32, p. 32-19, RE-576-22.01, CE-1381, CE-1384 and CE-1385.

¹⁴⁹⁶ Claimant’s Quantum Reply, ¶¶ 737-738, referring to Exhibits RE-576-12, pp. 12-2 to 12-4, 12-6, and RE-577-12, pp. 12-3 to 12-5.

¹⁴⁹⁷ Claimant’s Quantum Reply, ¶¶ 739-740, referring to Exhibits RE-576-22.05, RE-576-12, p. 12-15 and CE-1386.

have deterred potential investors, or that they would have substantially affected the viability or value of the project.¹⁴⁹⁸ It emphasizes that Prof. Davis has incorporated into his model “*long delays to capture the potential adverse effects of any permitting challenges,*” *i.e.*, an average delay of over two years before the start of construction, which reduced the estimated value of the project by approximately USD 1.3 billion.¹⁴⁹⁹

b. Summary of Respondent’s Position

1191. Respondent submits that any forward-looking valuation methodology to be accepted by an arbitral tribunal requires the entity to show that it had the necessary permits. By contrast, Respondent claims that “*TCC did not even know all of the permits it needed, did not appreciate the practical difficulties of operating in Balochistan, and failed to account for the specific difficulties of getting permits for the project.*”¹⁵⁰⁰

1192. Respondent notes that from 2006 to 2011, Pakistan “*slid down the rankings for ease of doing business*” and adds that while Balochistan’s capital city, Quetta, “*remained near the bottom,*” the situation in rural areas was worse. Specifically, Respondent refers to unclear processes for obtaining permits and “*a web of regulatory agencies and an array of permits at all different levels*” as well as to the involvement of numerous public hearings and “*protracted public interest litigation.*” Referring to its expert Mr. Rahman, Respondent contends that “*one of the biggest delays*” would be land acquisition, which can take “*years, even decades.*”¹⁵⁰¹

1193. Respondent points out that land acquisition “*is completely absent in the Permits Register*” and argues that there is no indication how Claimant intended to address this issue for the slurry and water pipelines or who were in fact the title holders of the lands. In Respondent’s view, Claimant provided only “*a general overview of land rights and the Land Acquisition Act with no plan for implementation.*” According to Respondent, this is insufficient, taking into account that: (i) 50-70 tribes can be found along the pipeline route; (ii) there are no land records for 90% of the land in Balochistan which means that “*hundreds of people can assert claims to the same land*”; and (iii) a “*lengthy administrative and public process ... must be undergone to get approvals.*”¹⁵⁰²

¹⁴⁹⁸ Claimant’s Quantum Reply, ¶ 729.

¹⁴⁹⁹ Claimant’s Quantum Post-Hearing Brief, ¶¶ 186, 188, 193-194, *referring to* Davis Presentation, p. 3, Transcript Hearing on Quantum (Day 8), pp. 2351-2352, Davis I ¶¶ 192-193 and pp. D-16 to D-22, *and* Davis II, ¶¶ 164, 167-171.

¹⁵⁰⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 256; Respondent’s Rejoinder on Quantum, ¶ 350.

¹⁵⁰¹ Respondent’s Counter-Memorial on Quantum, ¶¶ 390-391, *referring to* Rahman I, ¶¶ 8, 28(ii).

¹⁵⁰² Respondent’s Post-Hearing Brief on Quantum, ¶¶ 259, 268, *referring to* Exhibit RE-576-3, pp. 3-14 to 3-15, Transcript Hearing on Quantum (Day 7), p. 2081 lines 9-14 and p. 2082 line 19 to p. 2083 line 3 and lines 11-17, *and* Owen Trip Report, pp. 4, 8; Respondent’s Rejoinder on Quantum, ¶ 352, *referring to* Rahman II, p. 3.

1194. Respondent also points to “lengthy court battles” on “these issues” and maintains that regardless of the width of the land that Claimant planned to acquire, it would have to undergo the land acquisition process described by Mr. Rahman.¹⁵⁰³ Respondent emphasizes that Claimant was involved in many litigations regarding Reko Diq, including almost seven years of litigation regarding the validity of the CHEJVA, petitions filed to enjoin the Governments from issuing a mining lease to Claimant, petitions filed by the Watan party and the Sanjrani tribe in November 2010 and January 2011 as well as still pending litigation filed by Benway against Claimant in 2008 regarding an alleged infringement of its rights over Exploration License EL-24.¹⁵⁰⁴ With regard to the latter litigation, Respondent submits that the company had sued Claimant to invalidate Claimant’s surface rights and argues that Claimant could therefore not have transferred the surface rights to a third party without a risk of litigation impeding the plans for Reko Diq. In any event, Respondent considers that while surface rights “may have some effect at that time,” they do not convey ownership but a claim to ownership.¹⁵⁰⁵
1195. Respondent further relies on Mr. Rahman’s opinion that while there are also permitting issues and significant delays in urban areas, the framework in the remote parts of Balochistan is different as there is no accurate record-keeping, inter-tribal rivalries can frustrate the process of acquiring permits and the exploitation of natural resources can quickly become existential threats and trigger a backlash. In Respondent’s view, this is confirmed by previous hunger strikes at Reko Diq, a “shutter down” among merchants in Nok Kundi, the concerns raised by people in the communities along the pipeline route and the protests at Gwadar.¹⁵⁰⁶
1196. Respondent submits that a site visit of the pipeline route revealed that certain portions that PSI could not map were riverbeds but Claimant failed to describe the process of seeking permits in a riverbed or drainage. According to Respondent, it is “highly unlikely that TCC could have rapidly received a permit to run a pipeline of toxic sludge through a riverbed that provides some of the only water for miles around.” Given the scarcity of water in Balochistan, Respondent claims that the opposition to a slurry pipeline in riverbed would have been “massive.”¹⁵⁰⁷
1197. Respondent further refers to Mr. Rahman who identified numerous permits and approvals that Claimant had failed to identify, including for the construction and operation of an oil

¹⁵⁰³ Respondent’s Post-Hearing Brief on Quantum, ¶ 268, referring to Transcript Hearing on Quantum (Day 7), p. 2080 lines 18-20 and p. 2083 lines 4-22.

¹⁵⁰⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 270, referring to Decision on Jurisdiction and Liability, ¶¶ 554, 497, 499 and Exhibits RE-18, CE-173, CE-268, p. 9 and RE-562.

¹⁵⁰⁵ Respondent’s Counter-Memorial on Quantum, ¶¶ 401-402, referring to Exhibits RE-561 and RE-562.

¹⁵⁰⁶ Respondent’s Rejoinder on Quantum, ¶¶ 355-356, referring to Rahman II, ¶¶ 2, 11-12.

¹⁵⁰⁷ Respondent’s Rejoinder on Quantum, ¶¶ 353-354, referring to Exhibit RE-750 and Rahman I, p. 20

storage facility, for coastal and marine security, for the railway, and for construction in a canal or drainage. Respondent also refers to the “*largely blank*” section of the Permits Register dealing with Port Gwadar, the “*secret sludge dump,*” increased pollution at the mine site and the planned discharge into the Arabian Sea.¹⁵⁰⁸ Respondent contends that Claimant failed to address in its Permit Register the treatment and disposal of sludge, acquisition of the water rights required to ensure the viability of the project, and land acquisition for the construction and erection of the pipeline.¹⁵⁰⁹

1198. Specifically with regard to water rights, Respondent notes that Claimant acknowledged a “*high risk for permitting and approvals regarding water rights*” given that it stated in the Feasibility Study that “*draw down of water by others leaves insufficient water for project needs – caused by current legislation not explicitly protecting the rights to use water (quantity and duration), which results in the need to develop alternative sources.*”¹⁵¹⁰ Respondent further notes that Claimant’s risk mitigation strategy involved addressing the issue in the Mineral Agreement and obtaining support from the GOB and emphasizes that: (i) the risk still had a residual risk rating of M10, meaning a “*likely*” likelihood rating and an impact of 3; and (ii) the risk of not reaching a Mineral Agreement was ranked even higher.¹⁵¹¹

1199. Respondent submits that in order to obtain a permit for extracting ground water, prior permission must be sought from the District Water Committee, which invites interested stakeholders to submit objections and may then grant the permit “*subject to any conditions it deems necessary*” or “*flatly reject the application*”; any aggrieved party can file an appeal against the decision. Respondent adds that there is no provision under the law providing for “*exclusive*” water rights and a permit is subject to a specified timeframe.¹⁵¹² According to Respondent, the 2014 Balochistan Ground Water Rights Administration Rules grant discretionary power to manage groundwater sources even after a permit has been granted and refers to several provisions granting the Provincial Water Authority the authority to suspend or even cancel a permit.¹⁵¹³

1200. Respondent notes that Claimant claims to have broad water extraction rights not only with regard to the Fan Sediments but also for three other areas but emphasizes that the permit relating to these other areas covered only the exploratory phase as it was restricted to tubewells. In Respondent’s view, it is unclear whether this permit would have to be

¹⁵⁰⁸ Respondent’s Post-Hearing Brief on Quantum, ¶ 257; Respondent’s Rejoinder on Quantum, ¶¶ 351-352, referring to Rahman I, pp. 30, 23, 21 and 20.

¹⁵⁰⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 260, referring to Rahman Presentation, p. 9.

¹⁵¹⁰ Respondent’s Counter-Memorial on Quantum, ¶ 392, quoting from **Exhibit RE-576-30**, p. 30-13 and referring to **Exhibit CE-952**.

¹⁵¹¹ Respondent’s Counter-Memorial on Quantum, ¶ 393, referring to **Exhibit RE-576-30**, pp. 30-8, 30-13.

¹⁵¹² Respondent’s Counter-Memorial on Quantum, ¶¶ 395-396.

¹⁵¹³ Respondent’s Counter-Memorial on Quantum, ¶¶ 397, referring to **Exhibit RE-612**, rules 33, 35, 37, 40.

renewed once the Mining Lease had been granted. As for No-Objection Certificates relied on by Claimant, Respondent notes that an NOC “*creates some rights*” but does not convey ownership.¹⁵¹⁴

1201. More generally, Respondent refers to Mr. Rahman’s opinion that Claimant’s time estimations for the permits listed “*are very naïve*” and the Permits Register lacked sufficient information in particular on the permits required for the construction of the pipeline.¹⁵¹⁵ Respondent emphasizes that Claimant was planning to commence construction in September 2011 and maintains that it “*had not meaningfully begun the permitting process.*” According to Respondent, the Permits Register was missing “*basic information that TCC should have confirmed well in advance of project implementation*” and Claimant therefore failed to show that it was ready to execute the project.¹⁵¹⁶

1202. Respondent argues that the “*real-life examples*” utilized by Mr. Rahman demonstrate the obstacles faced by infrastructure projects in Pakistan which in some cases caused the projects to be suspended or completely abandoned or stalled for “*years on end.*”¹⁵¹⁷ Respondent notes that Claimant did not rebut these assertions, nor did it present its own expert of permitting issues in Balochistan, but only pointed to the delay incorporated into Prof. Davis’ model. In this regard, Respondent submits that Prof. Davis based his calculation on data for mines located in jurisdictions in low threat environments or with highly developed mining industries and infrastructure such as Chile and therefore considers this data not sufficiently representative to calculate the expected delay that may occur in Balochistan. Respondent further claims that Prof. Davis ignored delays that Claimant had already experienced and notes that “*the PSI team lost almost half of the planned days of fieldwork due to permitting issues.*”¹⁵¹⁸

1203. Respondent also contends that Claimant and Prof. Davis failed to account for potential additional costs caused by “*conditions to the permits or other mitigating factors*” in light of stakeholder objections.¹⁵¹⁹

1204. According to Respondent, Balochistan was not under a contractual obligation to issue permits and approvals and, in any event, its alleged obligation to provide administrative assistance did not guarantee that Claimant would face no delays or obtain the necessary

¹⁵¹⁴ Respondent’s Counter-Memorial on Quantum, ¶¶ 399-400, 402, referring to **Exhibit RE-313**.

¹⁵¹⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 260, quoting from Transcript Hearing on Quantum (Day 7), p. 2077 lines 13-14 and referring to **Exhibit RE-22.05**, p. TCCA-42455.

¹⁵¹⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 261.

¹⁵¹⁷ Respondent’s Post-Hearing Brief on Quantum, ¶ 262, quoting from Transcript Hearing on Quantum (Day 7), p. 2080 lines 7-11 and referring to Rahman I, p. 3 and Transcript Hearing on Quantum (Day 7), p. 2086 lines 7-22.

¹⁵¹⁸ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 263-264, referring to Davis I, Appendix D and Workpaper 28, and **Exhibit RE-576-6.01**, pp. 17-20.

¹⁵¹⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 265.

approvals, given that even “*national emergency projects*” face delays or stalling. Respondent notes that the types of approval and permits required for mining operations would have: (i) required public consultation; (ii) involved different stakeholders; and (iii) to be issued by both provincial and federal governments.¹⁵²⁰ Respondent emphasizes that Government-owned projects were specifically targets of insurgents and outside forces and notes that the GOB could not have prevented people from protesting or making competing claims to the same piece of land. In addition, Respondent refers to delays already incurred by the PSI team regarding NOCs and points to the Tribunal’s finding that Claimant had obtained prior approvals such as visa for its employees through a bribery scheme.¹⁵²¹

1205. In response to Claimant’s reliance on the lack of prior permitting problems, Respondent argues that the prior process is “*a poor proxy to understand the issues in 2011*” as Claimant’s prior exploratory work had had a “*much lesser impact on the community and environment and was not significantly intrusive enough to raise much objection*” and claims that permitting for large-scale mining operations that would “*stretch the length of the province, affect all nearby communities, pollute the air and ocean, and deplete precious scarce water resources would have resulted in much higher scrutiny by GoB and community stakeholders during the required public consultations.*” In particular, Respondent refers to the introduction of a slurry pipeline ending at Port Gwadar, which opened “*a new world of permitting requirements,*” and new tensions at Nok Kundi and Gwadar, which would have made the permitting process more difficult.¹⁵²²

c. Tribunal’s Analysis

1206. At the outset of its analysis, the Tribunal takes note of Respondent’s submission that “[a]ny damages valuation that relies on a forward-looking methodology must be able to show that the entity had the necessary permits.”¹⁵²³ It also argues that “[n]umerous tribunals have recognized that the absence of government approvals can keep a project from a forward-looking, income-based valuation” and generally refers to its submissions on why it considers a DCF valuation and in particular the Modern DCF methodology applied by Prof. Davis inappropriate.¹⁵²⁴

¹⁵²⁰ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 266, 269, referring to Transcript Hearing on Quantum (Day 7), p. 2087 lines 17-19.

¹⁵²¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 266, referring to **Exhibit RE-576-6.01**, pp. 17-20 and Decision on Respondent’s Application to Dismiss the Claims (with reasons), ¶ 1314; Respondent’s Rejoinder on Quantum, ¶¶ 357-359.

¹⁵²² Respondent’s Post-Hearing Brief on Quantum, ¶ 267, referring to Rahman II, p. 4; Respondent’s Rejoinder on Quantum, ¶ 357.

¹⁵²³ Respondent’s Post-Hearing Brief on Quantum, ¶ 256.

¹⁵²⁴ Respondent’s Rejoinder on Quantum, ¶ 350.

1207. The Tribunal has addressed the Parties' arguments regarding the valuation methodology to be applied in this case in detail above and has reached the conclusion that in the particular circumstances of this case, it is appropriate to determine the value of Claimant's investment by using a DCF method and, more specifically, by using the modern DCF approach presented by Claimant and its expert Prof. Davis. In its analysis, the Tribunal has taken into account the development stage of the Reko Diq project, including the fact that it had not yet received all necessary permits and approvals to commence mining operations.
1208. Consequently, and while it does not wish to make a generalized statement on this matter, the Tribunal also considers that in the circumstances of the present case, Claimant does not have to show that it already "*had the necessary permits*" in order for Prof. Davis' methodology to be applicable. Claimant rather has to establish that it was prepared for what a buyer would have expected when purchasing a project at the development stage of Reko Diq, *i.e.*, that relevant permits and approvals had either already been obtained or that Claimant had a reasonable plan and schedule to obtain them in time for the project to start construction and, subsequently, mining operations.
1209. In addition, and while it has not yet assessed whether the delays modeled by Prof. Davis are adequate, the Tribunal agrees with the general approach that any risk associated with relevant permits or approvals not being obtained in time to commence construction and/or mining operations on schedule would be factored into the valuation by modeling expected or potential delays in the start of construction or mining operations. In the Tribunal's view, the viability of the project could be affected only if there are specific indications supported by concrete evidence that a certain permit or approval could not be obtained or at least could not be obtained within an economically reasonable timeframe.
1210. Against this background, the Tribunal notes that Respondent has not identified a specific permit or approval, which Claimant had not yet obtained but which a buyer would have expected to be already obtained at the valuation date. Respondent notes that as per the ESIA, Claimant was planning to commence construction in September 2011 and claims that "*TCC had not yet meaningfully begun the permitting process.*"¹⁵²⁵ It does not, however, state which specific permit Claimant should have already obtained or applied for at the valuation date (in addition to the Mining Lease for which TCCP applied in February 2011) in order to commence construction of the project as contemplated. In this regard, the Tribunal also notes that while the ESIA provides for the start of construction in general in September 2011, it also provides for subsequent dates at which construction was to start for: (i) the plant and concentration transportation facilities (May 2012); and

¹⁵²⁵ Respondent's Post-Hearing Brief on Quantum, ¶ 261.

(ii) port infrastructure (October 2012). Mechanical completion of the mine was scheduled to occur in December 2014.¹⁵²⁶ The Tribunal therefore agrees with Claimant that “[t]o seek the permits needed to operate the mine, before TCC obtained the Mining Lease, would have been premature and cost-inefficient, and a third-party investor would not have expected TCC to have do so prior to the Valuation Date.”¹⁵²⁷

1211. Specifically with regard to the pipeline, Respondent raises concerns with regard to the acquisition of land which would necessarily have to precede the construction of the pipeline. As Respondent claims that “[I]and acquisition can take years, even decades,”¹⁵²⁸ this implies the argument that a buyer would have expected Claimant to have already started the process of acquiring the land for the pipeline at the valuation date. Therefore, the Tribunal will address this issue first before turning to the Parties’ submissions on other permits and approvals for the project.

i. Whether Claimant Had a Feasible Plan for the Acquisition of Land, in Particular for the Pipeline to Port Gwadar

1212. In support of its argument on land acquisition, Respondent relies on the opinion of its expert Mr. Rahman who explained in his first expert report the procedure for the acquisition of land under the Land Acquisition Act of 1894 and, based on his knowledge and experience, stated that “*land acquisition has been a significant hurdle in pipeline projects in Pakistan.*” Noting that the slurry pipeline would go through several districts and would therefore require approval from different Revenue Officials in each district, Mr. Rahman considered it “*difficult to say how long it would take to acquire the land and upon what conditions, specifically keeping mind local community resistance and potential objections/litigation on the basis, inter alia, of land ownership or compensation related disputes.*” He noted that he had worked on pipeline projects “*where land acquisition has taken as long as 18 months*” and expressed the opinion that it would have taken “*considerably longer*” for the slurry pipeline “*since this was a private party acquiring land, which involves extra difficulties, and the land acquisition was in Balochistan with all the challenges facing projects in the said province.*” Mr. Rahman added that he was not aware of any pipeline of the nature that Claimant proposed having been laid by a private party in Pakistan.¹⁵²⁹

1213. In his second report, Mr. Rahman specified that he considered the public objections phase the most critical aspect, because “*not only is the local populace and generally the Pakistani public hostile to the Reko Diq project, but there are practical difficulties that*

¹⁵²⁶ Exhibit RE-601, Table 1.2.

¹⁵²⁷ Claimant’s Quantum Reply, ¶ 741.

¹⁵²⁸ Respondent’s Counter-Memorial on Quantum, ¶

¹⁵²⁹ Rahman I, pp. 19-20.

will arise during the public consultations phase or otherwise.” In particular, Mr. Rahman referred to the absence of land records for most of the land in Balochistan, which he considered to be *“particularly problematic for the land acquisition procedure because there are several nomadic tribes living in the vast areas between Reko Diq and the Balochistan coast ..., who can claim ownership of the land and raise objections to its acquisition for the purposes of the Reko Diq project.”* He added that *“[a]ny forcible construction of the pipeline in such areas would have most likely led to some form of conflict with local tribes, which potentially could have turned violent.”* Mr. Rahman further expressed the opinion that the involvement of government departments or security forces would not necessarily make land acquisition easier and refers to an example in which 13,500 acres of land in Balochistan were acquired by the Pakistan Navy which *“led to several protests and public displays of anger.”* Mr. Rahman further considered that any problem associated with the acquisition of land *“would have been multiplied by the amount of land that would have been needed to be acquired for the construction of the slurry pipeline.”*¹⁵³⁰

1214. Specifically with regard to Claimant’s reliance on the participation of the GOB in the project, Mr. Rahman reiterated *“the problems faced by other government agencies”* and *“the dismal state of the land ownership record in Balochistan”* as a result of which Claimant *“could have potentially been tied up in continuous litigation thereby impeding any progress on the project for several years.”*¹⁵³¹ More generally, Mr. Rahman emphasized that *“government involvement cannot stop the public from raising objections against the project or initiating legal proceedings against it in court.”* Referring to projects in rural areas which are part of the China-Pakistan Economic Corridor and supported by the GOP and Pakistan Army but *“face numerous practical and legal issues,”* Mr. Rahman considers it *“a fallacy to assume that government support ensures a quick and smooth permitting and approval process.”*¹⁵³²

1215. At the Hearing on Quantum, Mr. Rahman again expressed the opinion that *“land acquisition is particularly challenging”* and further that *“TCC was not prepared for it.”*¹⁵³³ He specified that he considered *“[a]ny land acquisition in Pakistan, particularly in Balochistan, ... challenging”* and clarified that he was primarily referring to the slurry pipeline because *“it’s a huge land acquisition, and it’s not mentioned.”*¹⁵³⁴ Mr. Rahman noted that *“[t]he Permits Register does not identify land acquisition as something that*

¹⁵³⁰ Rahman II, pp. 2-3.

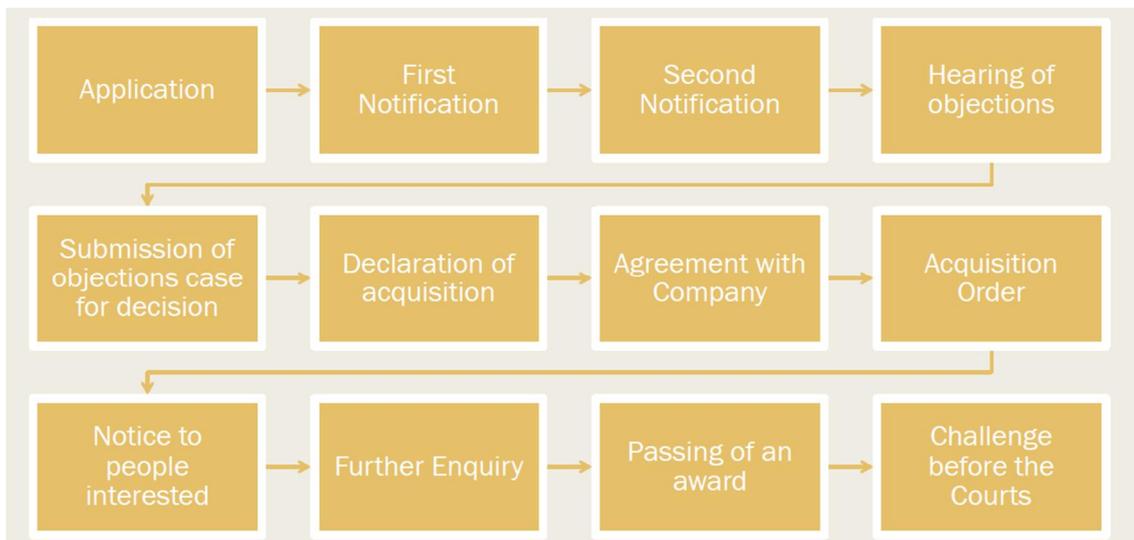
¹⁵³¹ Rahman II, ¶ 4.

¹⁵³² Rahman II, ¶¶ 10-11.

¹⁵³³ Transcript Hearing on Quantum (Day 7), p. 2078 lines 6-8.

¹⁵³⁴ Transcript Hearing on Quantum (Day 7), p. 2095 lines 11-20.

needs to be done for a 700-kilometer pipeline—almost,” which in his opinion was “*a glaring omission.*”¹⁵³⁵ He illustrated the land acquisition process as follows:¹⁵³⁶



1216. Mr. Rahman highlighted the hearing of objections before the land acquisition collector who “*has to hear everybody*” as well as the notice, which has to be made “*to the interested people whose land it is*” and who are then invited to speak. According to Mr. Rahman, the award “*is often challenged before the courts,*” which further “*often grant injunctions as to the acquisition during the pendency of the litigation.*” He therefore expressed the opinion that “[*l*]and acquisition is an extremely lengthy process in Pakistan, and land litigation is very lengthy. So, these things can stall, or even scrap, projects.”¹⁵³⁷

1217. Mr. Rahman noted that in the case of the pipeline, Claimant needed to acquire land in multiple districts in each of which it would have to complete the entire process. Mr. Rahman further referred to inefficient bureaucracy, manual measuring of the land, which “[*t*]akes forever,” and the absence of land records which made it “*hard to establish who the land belongs to, who the affected Parties are who need to be compensated.*” He further testified that these parties, even if compensated, would “*often rush to the civil court, and ... get an injunction, which stalls things for ages.*” In his opinion, “*it’s likely that there will be litigation where there is land acquisition in Pakistan. It’s well-known, well-documented that land-related litigation can last very many years.*”¹⁵³⁸

1218. The Tribunal notes that even though Mr. Rahman testified at the Hearing on Quantum that he considered “[*a*]ny land acquisition in Pakistan” challenging, both his expert reports and presentation at the Hearing and the Parties’ submissions regarding land acquisition were focused on the area needed for the slurry pipeline from Reko Diq to Port

¹⁵³⁵ Transcript Hearing on Quantum (Day 7), p. 2081 lines 10-13.

¹⁵³⁶ Rahman Presentation, p. 10.

¹⁵³⁷ Transcript Hearing on Quantum (Day 7), p. 2082 lines 4-18.

¹⁵³⁸ Transcript Hearing on Quantum (Day 7), p. 2082 line 19 to p. 2084 line 6.

Gwadar. In addition, and while Mr. Rahman explained his focus on the pipeline by referring to it as “*a huge land acquisition*” and emphasizing that land acquisition for the pipeline was not addressed in the Draft Permit Register appended to the Feasibility Study, there has been no specific challenge by Respondent or Mr. Rahman that Claimant did not have the necessary land rights over the mine site itself.

1219. As noted in the Decision on Jurisdiction and Liability, it is established by the record that Claimant had obtained a Surface Rights Lease over an area of 144,568 acres in February 2008 at an amount of 5,000 Pakistani rupees per acre, which covered the mine as well as the additional infrastructure assets to be built on site. The Surface Rights Lease was expressly granted “*initially for a period of 30 years extendable for another period.*”¹⁵³⁹ Respondent initially argued that “[t]here is no precedent for ‘surface rights’ as proposed by TCC,” and that “*while those rights may have some effect at that time, they would not have held sufficient backing in the law to truly pass as anything more than a ‘quit claim’ deed of sorts, not actual ownership but a claim to ownership.*”¹⁵⁴⁰ Claimant’s Surface Rights Lease was not addressed by Mr. Rahman, however, and Respondent did not provide any further detail or support for this argument in its subsequent submissions. Against this background, the Tribunal has no basis to assume that the rights over the land at the central mine facilities that Claimant had obtained through the Surface Rights Lease would have given a buyer cause for concern.

1220. As for the land acquisition regarding the pipeline, it is undisputed between the Parties that as of the valuation date, Claimant had not yet obtained or started the process of obtaining land rights. There is further common ground that the Draft Permit Register appended to the Feasibility Study did not make reference to the acquisition of land for the pipeline.¹⁵⁴¹ Claimant has pointed out, however, that it continued to update the Draft Permit Register after delivery of the Feasibility Study and has submitted a version dated December 2011.¹⁵⁴²

1221. The Tribunal notes that while the version appended to the Feasibility Study did not include land acquisition as a separate item for any of the off-site facilities, the updated version of December 2011 did contain an item “*Land acquisition*” and makes explicit reference to the Land Acquisition Act of 1894 for the construction of: (i) the off-site access road; (ii) certain early works site services; (iii) the water supply pipeline; (iv) plant site-site preparation; (v) preliminary road construction to access the site and lay-down area; and (vi) the supply and installation of water and sewer lines.¹⁵⁴³ This version of the

¹⁵³⁹ Decision on Jurisdiction and Liability, ¶ 391; **Exhibits CE-43, CE-66, CE-182**, pp. 8-9, **CE-220** and **CE-221**.

¹⁵⁴⁰ Respondent’s Counter-Memorial on Quantum, ¶ 402.

¹⁵⁴¹ Cf. **Exhibit RE-576-22.05**.

¹⁵⁴² **Exhibit CE-1386**.

¹⁵⁴³ **Exhibit CE-1386**.

Draft Permit Register does not contain the permits required for the slurry pipeline. It further appears from a report on the Monthly Progress on Permitting Assignment for the Reko Diq project also dated December 2011 that Claimant had not specifically added an item on land acquisition to the permits required for the pipeline.¹⁵⁴⁴ However, even if there was an omission at this point, it is apparent that Claimant was aware of the Land Acquisition Act and its requirements for the acquisition of land for the off-site facilities. The Register dated December 2011 also includes a note with regard to all items listed above that “[a]lthough the Act does not apply on private land if acquired directly from the owner, however it is recommended to involve the Revenue Department to avoid any unforeseen complexities in future.”¹⁵⁴⁵

1222. As pointed out by Claimant, Chapter 3 of the Feasibility Study on Legal and Title further provides a description regarding the right of a mineral right holder to use the lands and states that pursuant to rule 23 of the 2002 BM Rules, “*the right of licensee to enter and occupy the land which comprises the exploration area is subject to the rights of the surface holders and a mineral right holder would be required to either directly acquire private owned land through negotiations with the owners, or in the case of Government owned land to obtain the relevant Government’s permission to use the land.*” It is further noted that the rights of the surface holder are “*protected either through Government intervention in stopping operations or through the payment of compensation not only for the land but for buildings, crops, etc.*”¹⁵⁴⁶ It is then stated:

“In many cases the use of surface rights is negotiated directly with the landowners without intervention of the Government. However, in the case of difficult land owners, the provisions of the Land Acquisition Act are often invoked.

Under the Land Acquisition Act, 1894, the Provincial Government can acquire land from private parties for ‘public purposes’ or for a company. A landowner can object to the acquisition process, but the nature of the objections that can be raised has not been specified. The Government is required to determine compensation and this determination is subject to challenge on the ground that the Government determination was not based on market price. The decision of the Court does not affect the transfer of land under the land acquisition proceedings, but renders the acquirer to pay the compensation.”¹⁵⁴⁷

1223. Following further information on the payment of annual rent by the mineral title holder and the requirement of a written and registered deed as valid title, the following is noted:

¹⁵⁴⁴ Exhibit CE-1385, p. 1.

¹⁵⁴⁵ Exhibit CE-1386.

¹⁵⁴⁶ Exhibit RE-60, pp. 3-14 to 3-15.

¹⁵⁴⁷ Exhibit RE-60, p. 3-15.

“TCCP has been granted surface rights by the Government of Balochistan over 585.05 km² of land situated in Mouza Koh-Sultan, Tehsil Nok Kundi District Chagai for a period of 30 years extendable for a further period.

TCCP has also been granted surface rights by the Board of Revenue, Balochistan over 750.0 acres of land for construction of air strip for a period of 30 years and surface rights over 9 333.3 acres in Tahlab area for installation of tube wells and laying of pipelines.”¹⁵⁴⁸

1224. In Respondent’s view, Claimant thereby “*simply provided a general overview of land rights and the Land Acquisition Act with no plan for implementation.*”¹⁵⁴⁹ The Tribunal agrees with Respondent to the extent that this chapter does not make reference to land acquisition specifically for the slurry pipeline nor does it set out when Claimant planned to acquire the land. However, it is clearly stated that in the event of “*difficult land owners,*” Claimant would proceed under the Land Acquisition Act pursuant to which “*the Provincial Government can acquire land from private parties for ‘public purposes’ or for a company.*” The Tribunal also notes that Respondent did not specifically challenge the statement in Chapter 3 that, while the landowner could object to the acquisition process, it could not prevent the transfer of land but only challenge the compensation to be determined by the Government: “*The decision of the Court does not affect the transfer of land under the land acquisition proceedings, but renders the acquirer to pay the compensation.*”¹⁵⁵⁰

1225. Contrary to this statement, Mr. Rahman testified at the Hearing on Quantum that “*courts often grant injunctions as to the acquisition during the pendency of the litigation*” and that this could “*stall, or even scrap, projects.*” Mr. Rahman specifically stated that even if compensation was paid to the land owners, “*they often rush to the civil court, and ..., get an injunction, which stalls things for ages.*”¹⁵⁵¹ However, the Tribunal also notes that Mr. Rahman did not make any reference to injunctions in either of his expert reports. He also did not provide any authority in support of his opinion, including in its Presentation at the Hearing on Quantum, and did not state that any of the projects he described as being “*stalled*” was subject to an injunction legally preventing the acquisition of land.

1226. By contrast, Claimant contends that “[i]t is well-settled Pakistani law that pending litigation does not bar the alienation of immovable property rights” and refers to a decision of the Karachi High Court in *Ahsan Corporation v. Chairman, Evacuee Trust Property Board* in support of its position.¹⁵⁵² The Tribunal does not have to make a finding whether Claimant’s reference to “*well-settled Pakistani law*” is accurate. In any

¹⁵⁴⁸ Exhibit RE-60, p. 3-15.

¹⁵⁴⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 259.

¹⁵⁵⁰ Exhibit RE-60, p. 3-15.

¹⁵⁵¹ Transcript Hearing on Quantum (Day 7), p. 2082 lines 14-18; p. 2083 line 21 to p. 2084 line 2.

¹⁵⁵² Claimant’s Quantum Reply, ¶ 742 lit. f, referring to *Ahsan Corporation Karachi v. Chairman, Evacuee Trust Property Board*, PLD 1973 Kar. 403 [CA-430], p. 407 (Ebrahim, J.).

event, the Tribunal has not been pointed to any legal authority to the contrary or any support for Mr. Rahman's opinion that the land acquisition could be prevented or stalled by pending litigation.

1227. Consequently, the Tribunal is not convinced that the information included by Claimant in the Feasibility Study demonstrated an insufficient understanding of the land acquisition process and/or specifically the impact of litigation on the act of acquiring the land in Pakistan. While Mr. Rahman reiterated that he was personally involved in projects where "*two or three people have stalled a very large Project because of land acquisition,*"¹⁵⁵³ in neither of the examples he presented does the acquiring party appear to actually have been legally prevented from acquiring the land. Consequently, the Tribunal considers that Mr. Rahman's references to the likelihood of there being litigation and what he characterized as "*massive, massive delays in litigation in Pakistan generally*"¹⁵⁵⁴ are not sufficient to assume that litigation would have legally impacted Claimant's ability to proceed with the project.

1228. Mr. Rahman further pointed to certain particularities in Balochistan, such as the absence of land records for considerable parts of the land and the existence of nomad tribes, which would make it difficult to identify previous landowners who would be entitled to compensation, as well as inefficient bureaucracy of Balochistan authorities. This general description of the situation in Balochistan appears to be largely undisputed by Claimant and the Tribunal agrees with Respondent and Mr. Rahman to the extent that it would therefore be reasonable to expect certain delays also in the acquisition of land. However, as pointed out by Claimant, Prof. Davis has already accounted for certain delays in his valuation model and the question must therefore be whether any of the concerns raised by Mr. Rahman would have given a buyer reason to expect longer delays than those accounted for by Prof. Davis.

1229. In this regard, the Tribunal considers it important to recall that the Government of Balochistan was not only a regulatory authority in this case but was rather Claimant's joint venture partner under the CHEJVA. Pursuant to Clause 7.2(a) of the CHEJVA, it was to provide at its own expense, *inter alia*, "*appropriate administrative support as required for the obtaining of all leases, licences, claims, permits or other authorities of any kind whatsoever being necessary for the conduct of Joint Venture Activities.*"¹⁵⁵⁵ Pursuant to Clause 5.7.2 of the CHEJVA, the GOB was further responsible for "*liaising with relevant Provincial Government and local government authorities and with affected landholders to ensure that good relations are maintained between the Joint Venture and*

¹⁵⁵³ Transcript Hearing on Quantum (Day 7), p. 2107 lines 6-9.

¹⁵⁵⁴ Transcript Hearing on Quantum (Day 7), p. 2094 lines 7-8.

¹⁵⁵⁵ **Exhibit CE-1**, Clause 7.2(a).

*other persons during the conduct of Joint Venture Activities.*¹⁵⁵⁶ More generally, Clause 24.6.2 of the CHEJVA provides that “[t]he Parties shall be just and faithful to one another and will not do or omit to be done anything whereby the interests of the Joint Venture contemplated herein as a whole are prejudiced” and Clause 24.6.3 provides that “[e]ach Party shall execute all necessary additional documents and do all such acts as shall be reasonably required to give effect to the purposes of this Agreement.”¹⁵⁵⁷

1230. In its Decision on Jurisdiction and Liability, the Tribunal found that pursuant to these provisions, the GOB was under an obligation to provide administrative support in procuring the required licenses and permits and to perform all reasonable acts to give effect to the purposes of the CHEJVA and the interests of the Joint Venture as a whole, *i.e.*, to the exploration and exploitation of the mineral resources at Reko Diq. The Tribunal further noted that there was no dispute between the Parties that the GOB indeed provided this support for, and thus facilitated, Claimant's investment over a period of many years, *inter alia*, by defending the validity of the CHEJVA before the Balochistan High Court in 2007.¹⁵⁵⁸ The same applies to the GOP, which also supported and facilitated Claimant's investment, including by a submission to the Pakistan Supreme Court in 2010, which concerned the same proceeding regarding the validity of the CHEJVA.¹⁵⁵⁹ Based on its analysis of the contractual framework as well as the regulatory framework and the conduct of the GOB and the GOP during the period in which Claimant explored the area at Reko Diq, the Tribunal concluded that Respondent had created the legitimate expectation that: (i) Claimant would be entitled to a mining lease upon submission of an application that met the routine requirements as set out in rule 48(3)(a) of the 2002 BM Rules; and (ii) both the GOB and the GOP would support and facilitate Claimant's investment.¹⁵⁶⁰

1231. While Mr. Rahman confirmed at the Hearing on Quantum that he was aware of the GOB's contractual obligation to provide support for Claimant in obtaining permits, he noted that “[s]uch an ambitious project on this scale in Balochistan has never been contemplated” and expressed the opinion that the Government's support would not have sufficed to make permitting “a smooth process.” He also testified that Balochistan is “particularly hostile to foreign an Government projects” and that, therefore, “cooperation would not really have been part of the picture for this Project and permitting, land acquisition.” In support of his opinion, Mr. Rahman referred to the examples he had presented on stalled projects as well as to “a lot of testimony [that] has been heard to that effect over here.”¹⁵⁶¹

¹⁵⁵⁶ **Exhibit CE-1**, Clause 5.7.2.

¹⁵⁵⁷ **Exhibit CE-1**, Clauses 24.6.2 and 24.6.3.

¹⁵⁵⁸ Decision on Jurisdiction and Liability, ¶¶ 947, 953; **Exhibit CE-212**.

¹⁵⁵⁹ Decision on Jurisdiction and Liability, ¶ 954; **Exhibit CE-264**.

¹⁵⁶⁰ Decision on Jurisdiction and Liability, ¶ 958.

¹⁵⁶¹ Transcript Hearing on Quantum (Day 7), p. 2087 lines 9-15; p. 2088 lines 14-19.

1232. In terms of examples, Mr. Rahman pointed to two CPEC projects for a hydropower station and a dam both of which he described as “*stalled because of land acquisition issues*” and referred to “*many examples of land projects stalled due to land acquisition in Pakistan*” included in his expert reports. He then specified that: (i) a “*telecom giant*” had “*major issues in acquiring land in Balochistan for its [broadcast] tower sites because of inefficient bureaucracy*”; (ii) “*another mining company has had major issues with the Government of Balochistan because of land acquisition and people who are unhappy and protesting*”; (iii) an express motorway was “*completely stalled because the Court intervened and scrapped the Project because the land acquisition was not done in a proper manner*”; (iv) the Pakistan Navy’s acquisition of 13,500 acres was “*brought into question, intense protests.*”¹⁵⁶²
1233. The Tribunal is not convinced that most of these examples are sufficiently comparable to the Reko Diq project when it comes to the impact that land acquisition for the pipeline would have had on the communities. In particular, the Tribunal cannot follow the argument that it can be concluded from protests against a hydropower station and a dam, broadcast tower sites or an elevated express motorway in Lahore that there would be the same level of protest against a pipeline buried in the ground.
1234. In this regard, the Tribunal also notes that while Mr. Rahman referred to “*a huge land acquisition*” for the pipeline, he confirmed that he had “*not done a precise calculation*” but only noted that “*it’s a very lengthy pipeline.*” He further confirmed that he was not aware of the exact dimensions of the pipeline or that there would be an access road to follow the path of the pipeline. When pointed to the width of the proposed pipeline (“*a 203 mm (8 inch) outside diameter*”)¹⁵⁶³ and of the contemplated access road (7 meters),¹⁵⁶⁴ Mr. Rahman maintained that “[i]t’s still a whole lot of land.”¹⁵⁶⁵ However, in the absence of any inquiry into the amount of land to be acquired in the districts and thus any assessment of the impact that the land acquisition would have had on the existing land owners, the Tribunal again considers that this is not sufficient to establish that there would likely have been significant protest against the land acquisition for the pipeline.
1235. Mr. Rahman was further pointed to the ESIA for the project, which states in the section on the concentrate pipeline corridor and specifically the sub-section on physiography and landscape that “[a]gricultural areas are generally localized near the Kech river crossing,

¹⁵⁶² Transcript Hearing on Quantum (Day 7), p. 2084 line 20 to p. 2086 line 14. *See also* Rahman Presentation, pp. 16-17.

¹⁵⁶³ Exhibit RE-576-6.01, p. 7.

¹⁵⁶⁴ The exhibit initially referred to by Claimant’s counsel for this statement (Exhibit RE-576-12.03) is not in the record but is marked as “*intentionally omitted*” in the index of Respondent’s exhibits. Respondent objected to the size represented by Claimant’s counsel to Mr. Rahman. Transcript Hearing on Quantum (Day 7), p. 2101 and 2104 lines 7-10.

¹⁵⁶⁵ Transcript Hearing on Quantum (Day 7), p. 2097 line 16 to p. 2102 line 14.

*Buleda and Parom, although the size of the developments indicates these are mainly for subsistence use and are unlikely to be directly affected by Project activities (Physical and Cultural Baseline Study for Reko Diq Transport Corridors and Marine Terminal, HBP, 2010e). All other areas of the pipeline route are not considered suitable for cultivation by local communities.”*¹⁵⁶⁶ When asked whether the owners of the land close to the pipeline, if they had sold some of their land, would see the value of their remaining land increase, Mr. Rahman noted that this “*depends on the whole situation over there regarding the Market Value of the land, which is affected by a number of factors.*” He confirmed that some of the local community along the pipeline route were relatively isolated; when asked whether the construction or expansion of a road along the pipeline route would provide those communities with greater access, he testified that he “*ha[d]n’t really looked at this*” as it was not part of his report.¹⁵⁶⁷

1236. In the Tribunal’s view, the consideration raised by Claimant that it may have been an incentive for the land owners to agree to the transfer of land in return for being provided with access to a road connecting Reko Diq with Port Gwadar is supported by the fact that one of the contemporaneous requests from the GOB was in fact that a road be built from Reko Diq to Port Gwadar. For example, it is recorded in Claimant’s notes of a meeting with Chief Secretary Lehri in March 2010 that when asked what “*more*” Balochistan was asking to get from the project, Mr. Lehri stated that “[*t]he politicians/population from Makran are looking for a rode [sic] from Gwadar to Reko Diq; recently several Makran representatives called on the CS asking what will happen with their road now that the GOB wants to take the project over.*” While Claimant pointed out that the Feasibility Study identified the slurry pipeline as the least costly solution, Mr. Lehri responded that “*maybe so, but finding a way to build a road from Gwadar to Reko Diq is very important.*”¹⁵⁶⁸

1237. The Tribunal appreciates that the request from the GOB was presumably aimed at the construction of a larger road than the contemplated access road for the pipeline. However, in the Tribunal’s view, this confirms that access to infrastructure for communities along the way from Reko Diq to Port Gwadar was indeed an issue at the time and indicated that even the construction of an access road could have been viewed favorably by the affected communities. In any event, the Tribunal also recalls that no concern was raised by the GOB at the time that it might be difficult or a lengthy process to obtain the land required for building a pipeline and/or an access road.

1238. Mr. Rahman also referred to land acquisition issues faced by the Duddar project, which might be considered comparable to the extent that it was also a mining project and located

¹⁵⁶⁶ Exhibit RE-601, p. 5-54.

¹⁵⁶⁷ Transcript Hearing on Quantum (Day 7), p. 2106 line 7 to p. 2107 line 5.

¹⁵⁶⁸ Exhibit CE-84, p. 2.

in Balochistan. Mr. Rahman referred to numerous complaints regarding the non-completion of roads and bridges as well as the “*non-settlement of land acquisition issues*,” specifically the relocation of a village for which compensation had been paid to the land owners but the Government had not allocated alternative land as a result of which “*the locals were resisting the project causing costly work stoppages*.”¹⁵⁶⁹

1239. As pointed out to Mr. Rahman at the Hearing on Quantum, it is stated in the PSI Bankable Feasibility Report for the pipeline that “[t]he final route was selected avoiding towns, private farms, military installation and facilities, and away from the Iran border as much as practically feasible.”¹⁵⁷⁰ While Mr. Rahman maintained that “[t]his land was owned by somebody, and, therefore, land acquisition would have needed to take place with all the challenges it brings,”¹⁵⁷¹ the Tribunal is not convinced that it would have to be expected that Claimant would face a similar issue as described for the Duddar project, taking into account that the pipeline route was intentionally designed to minimize interference with populated areas. In particular, Respondent did not dispute Claimant’s submission and supporting evidence that while there was a contemplated relocation of the Siah Reg village, all inhabitants had agreed to the relocation and therefore no similar issues would have to be expected.¹⁵⁷²

1240. In any event, the Tribunal sees no indication in Mr. Rahman’s description of the issues faced by the Duddar project that they prevented the company from acquiring the land or proceeding to operating the mine without unreasonable delays. In addition, there is no indication that in the case of the Duddar project, the GOB would also have been under a contractual obligation to provide administrative support to the project and perform all reasonable acts to give effect to the purpose and interests of the project.

1241. As for Mr. Rahman’s reference to a hostility in Balochistan towards projects of foreign investors and the GOB in general and towards the Reko Diq project in particular, the Tribunal notes that he apparently relied on the testimony of Respondent’s other witnesses and experts. Based on the evidence in the record, the Tribunal does not consider it

¹⁵⁶⁹ Rahman II, ¶ 6.

¹⁵⁷⁰ Exhibit RE-576-6.01, p. 16.

¹⁵⁷¹ Transcript Hearing on Quantum (Day 7), p. 2103 lines 11-13.

¹⁵⁷² Claimant’s Quantum Post-Hearing Brief, ¶ 190 lit. f; Exhibits CE-1716 and CE-1720 (admitted *de bene esse*). The Tribunal notes that in Mr. Zandvliet’s trip report of April 2009, he makes reference to Siah Reg, stating that “[I]and ownership issues are being dealt with at the moment.” However, as his further report makes clear, renewed issues had arisen because there was “*a renewed discussion within TCC whether Siah Reg needs to be resettled at all*” and he emphasized that it was “*important to make this decision (preferably with support of an external resettlement expert) and provide clarity to the Siah Reg people*.” There is no indication in the report that the all or some of the village inhabitants were no longer willing to relocate but Mr. Zandvliet identified “*a risk that the stop-and-go approach of the past two years will lead to fatigue among residents and may, in the future, lead to additional demands*.” Exhibit RE-644, p. 7. The Siah Reg settlement was not raised as an issue by Respondent and the Tribunal does not consider that Mr. Zandvliet’s report would warrant a different conclusion as to whether it was to be expected that the Siah Reg relocation would have caused significant delays with regard to the acquisition of land.

established that there was significant general hostility towards the project which would have significantly impacted Claimant's ability to acquire the land rights it needed for the project. In the Tribunal's view, this is also confirmed by the fact that Claimant had already acquired the Surface Rights Lease over the mine area without facing any such major issues. In addition, and while the Tribunal does not wish to belittle the issues faced by investors and also the Government in Balochistan with regard to insurgents and even terrorist groups, it is also not convinced that these issues would have affected specifically the acquisition of land in a manner that would have caused delays beyond those accounted for by Prof. Davis.

1242. Mr. Rahman stated in his first report that he had been involved in pipeline projects "*where land acquisition has taken as long as 18 months*" and expressed the opinion that it would have taken "*considerably longer*" for the slurry pipeline "*since this was a private party acquiring land, which involves extra difficulties, and the land acquisition was in Balochistan with all the challenges facing projects in the said province.*"¹⁵⁷³ However, as it would not have been a private party acquiring the land but rather the GOB in accordance with its contractual obligations under the CHEJVA and having considered the particular challenges for a project in Balochistan that Respondent and Mr. Rahman identified, the Tribunal is not convinced by Mr. Rahman's opinion that it would have taken "*considerably longer*" than the "*as long as 18 months*" he had experienced in other projects to acquire the land for the pipeline.

1243. Finally, as to the timing of starting with the permitting and land acquisition process for the pipeline, Respondent itself pointed out at the Hearing on Quantum¹⁵⁷⁴ that Mr. Livesey testified already at the Hearing on Jurisdiction on Liability that "*as the pipeline construction was only going to be late in the entire construction period of the project, the permitting would only start when the construction on the rest of the project started. We had about a two year window in which to get all the permits up to speed.*"¹⁵⁷⁵ Mr. Livesey also testified that "*the proposal was that we would not start to acquire the land until after the Mining Lease had been granted. Obviously we wouldn't want to commit capital into surface rights leases until we had security of tenure on the mine. And we put in a program at that stage to look at the right of ways and the leeways for the pipeline.*"¹⁵⁷⁶

1244. The Tribunal finds this testimony plausible and concludes that there is no basis to assume that this timing, together with the delays modeled by Prof. Davis, which will be addressed in more detail below, would have been considered insufficient by a buyer as of the valuation date.

¹⁵⁷³ Rahman I, pp. 19-20.

¹⁵⁷⁴ Respondent's Opening Presentation, p. 91.

¹⁵⁷⁵ Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1310 lines 3-8.

¹⁵⁷⁶ Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1169 line 20 to p. 1170 line 4.

ii. Whether Claimant Failed to Identify Relevant Permits and Approvals

1245. As noted above, Respondent did not identify a specific permit or approval that Claimant should have, but had not, already obtained at the valuation date. However, Respondent claims that Claimant “*did not even know all of the permits it needed, did not appreciate the practical difficulties of operating in Balochistan and failed to account for the specific difficulties of getting permits for the project.*”¹⁵⁷⁷

1246. Respondent argues that Mr. Rahman has identified several permits in his first report that were not included in Claimant’s Draft Permit Register appended to the Feasibility Study. While Claimant takes the position that some of these permits would not be required, it does not allege that the Draft Permit Register was complete or final. It rather refers to the Chapter on Permitting and Approvals in the Feasibility Study, which states in the section on the Permit and Obligation Register:

“The permit register is considered to be a ‘live working document’ that is subject to continuous revision as the project proceeds through the FS, detailed design, procurement, construction management and operational Phases. During the FS phase of the IMD project, a revised permit list and permit registry has been developed (see Appendix 22.05).

...

*As indicated at the start of Section 12.1, although the full obligations register has not been completed, the requirements to be incorporated are understood. The obligations register will continue to be developed and updated during the project, incorporating information obtained from a number of sources, including information obtained through the ESIA and conditions of approvals, TCC’s community relations team, TCC’s legal counsel and any preliminary discussions with possible lenders.”*¹⁵⁷⁸

1247. Section 12.1 as referenced in the extract above provides at its beginning that “[a]ll regulatory requirements for the project have been identified in the Permit Register which was prepared by Hagler Bailly on behalf of TCC (Section 12.2).”¹⁵⁷⁹

1248. In the section on Legal Requirements, it is further stated that “*the focus to date has been on environmental and water supply related permissions. Other legislation that may affect the project is also being reviewed, with a preliminary list of permits discussed in Section 12.2.1.*”¹⁵⁸⁰ Section 12.2.1 on the Current Status of Permitting in Pakistan provides:

“At present, there are a number of permissions which have already been granted to the Reko Diq project, as identified in the Permit Register (Section 12.3.1). These include the approved Tanjeel EIA, permissions relating to the

¹⁵⁷⁷ Respondent’s Post-Hearing Brief on Quantum, ¶ 256.

¹⁵⁷⁸ Exhibit RE-576-12, p. 12-15.

¹⁵⁷⁹ Exhibit RE-576-12, p. 12-2.

¹⁵⁸⁰ Exhibit RE-576-12, p. 12-2.

‘No Objection Certificates’ issued to TCC to enable water exploration, access to potential port areas etc.

From an environmental perspective, the ESIA process is proceeding with the preparation of a detailed impact assessment report that expands on the initial assessment undertaken for Tanjeel. It will be submitted to the authorities when complete (Section 12.3.3). At this stage, no other submissions or permits are required from an environmental perspective. In addition to the environmental permits, there may need to be a number of submissions and subsequent permits obtained in terms of non-environmental legislation. These generally relate to building and equipment approvals and are identified in the permit register.”¹⁵⁸¹

1249. Section 12.2.1 then lists the water permits issued to date, which will be discussed in more detail below.

1250. In a subsequent section on the Approvals plan, it is noted that “[a] *project approvals plan is being developed. The details of the plan are captured in a draft permit register which is presented in Appendix 22.05, which forms part of the overall project’s obligation register.*”¹⁵⁸²

1251. In the Tribunal’s view, it is made clear at various points of the Chapter that the Draft Permit Register appended to the Feasibility Study was not yet final and complete. It was also made clear that the focus had so far been on environmental and water supply regulatory requirements, which are addressed in detail in the Chapter, and that the work on permitting and approvals would continue after the finalization of the Feasibility Study. That this was in fact the case is confirmed by the updated version of the Draft Permit Register dated December 2011 as well as the reports on the Monthly Progress on Permitting Assignment for the Reko Diq Project, which were continued to be prepared until December 2011, *i.e.*, shortly after the Mining Lease Application was denied. In the Tribunal’s view, it is therefore clear that a buyer would have looked at the updated Draft Permit Register as of the valuation date in order to determine whether Claimant had a reasonable plan and schedule for obtaining the relevant permits for the project.

1252. Neither Respondent nor Mr. Rahman addressed the updated version of the Draft Permit Register or the monthly progress reports both of which were submitted together with Claimant’s Reply on Quantum. Mr. Rahman continued to refer to the Draft Permit Register appended to the Feasibility Study in his presentation at the Hearing on

¹⁵⁸¹ Exhibit RE-576-12, p. 12-11.

¹⁵⁸² Exhibit RE-576-12, p. 12-14.

Quantum.¹⁵⁸³ Similarly, Respondent continued to point to the allegedly missing permits in Appendix 22.05 in its Post-Hearing Brief.¹⁵⁸⁴

1253. Specifically with regard to Respondent's allegation that Claimant "*had failed to address in its Permit Register ... acquisition of the necessary water rights to ensure viability of the project,*"¹⁵⁸⁵ the Tribunal notes that the Draft Permit Register specifically identified a "Permit for Water Supply Wells, and water supply pipeline" (as well as two other permits for potable water treatment and sewage treatment) and provided additional information on the relevant legislation, competent agencies, required submission and procedure, estimated approval time and further comments. In addition, the Chapter on Permitting and Approvals provided further detail on the applicable water legislation and summarized the implications for the project as follows:

- *water law for industrial abstraction is currently absent; however, the Balochistan Ground Water Rights Administration Ordinance (1978) theoretically applies, and it is through this Ordinance that the water supply NOCs were issued;*
- *there is no consistent application of the Ordinance by the Provincial Water Board and District Water Committees leading to uncertainty on likely conditions of approval, or even if formal approval for abstraction is necessary;*
- *the District Water Committees may comprise local tribal leaders with a political agenda putting a consistent and transparent approval process at risk;*
- *new water policies and regulations are proposed indicating that the future of water law in Pakistan could be significantly different to that currently in place, putting any existing water rights at risk (particularly if the long term sustainability of water resources is perceived to be at risk); and*
- *water charges for abstraction are being considered and could result in additional costs for the project that are not currently accounted for.*¹⁵⁸⁶

1254. Making reference to "*the challenges facing confirmation of water rights,*" in particular that "*the process may not have been appropriately followed and it is not clear if the issuing authorities have been appropriately established,*" each of the six water permits issued to date was listed and assessed as to its scope.¹⁵⁸⁷

¹⁵⁸³ Cf. Rahman Presentation, p. 9, referring to **Exhibit RE-576-22.05**. In its updated Draft Permit Register, Claimant had identified a longer time period (180 days instead of 120 days as presented by Mr. Rahman) for the acquisition of land for the off-site facilities. **Exhibit CE-1386**.

¹⁵⁸⁴ Cf. Respondent's Post-Hearing Brief on Quantum, ¶ 260.

¹⁵⁸⁵ Respondent's Post-Hearing Brief on Quantum, ¶ 260.

¹⁵⁸⁶ **Exhibit RE-576-12**, pp. 12-4 to 12-5.

¹⁵⁸⁷ **Exhibit RE-576-12**, p. 12-12.

1255. As pointed out by Respondent, the risk register of the Feasibility Study specifically included the risk of “*Draw down of water by others leaves insufficient water for project needs – caused by the current legislation not explicitly protecting the rights to use water (quantity and duration) results in the need to develop alternative sources.*” In terms of its risk mitigation strategy, Claimant had identified that protection of water rights should be included in the Mineral Agreement and support should be obtained from the GOB after restructuring of the shareholders agreement. Based on the consideration that the issue was addressed in the current draft of the Mineral Agreement, the OPEX impact assigned to this risk was reduced to USD 2 million (from USD 19.9 million without mitigation).¹⁵⁸⁸
1256. Based on the evidence in the record, the Tribunal cannot agree with Respondent that Claimant failed to address the acquisition of necessary water rights. To the contrary, Claimant had analyzed the legislation and had specifically identified the risk that due to the absence of a law on industrial abstraction of water, there might be interference by other users. Claimant also noted that there might be future legislation putting existing water rights at risk and providing for water charges which were not accounted for in the current cost estimate.
1257. Claimant had further planned on mitigating the first risk by including a protection of its water rights in the Mineral Agreement. Respondent argues that Claimant thereby “*planned to mitigate this risk with another risk, which ranked even higher on the impact scale, and was not likely to materialize (the parties not reaching a mineral agreement.)*”¹⁵⁸⁹ As pointed out by Respondent, the risk of “*Inability to negotiate Mineral Agreement*” was ranked “*High*” in the Draft Permit Register.¹⁵⁹⁰ However, the Tribunal has already found above that the high risk rating assigned by Claimant to that particular risk at the time it delivered the Feasibility Study to the GOB was based on the actual situation in which negotiations had stalled due to the GOB’s decision not to go ahead with them. The Tribunal further found that, if the GOB had not decided to take over the project from Claimant, it would have continued to negotiate with Claimant and an agreement would likely have been reached between the negotiating parties, including the GOB. On that basis, the Tribunal also considers it reasonable that Claimant assigned a lower risk rating and a lower OPEX impact to the risk of insufficient water due to interference by other water users based on the assumption that the protection of its water rights would be addressed in the Mineral Agreement.
1258. The Tribunal notes that in its Chapter on Permitting and Approvals, Claimant also made reference to proposed new water policies and regulations which might put existing water rights at risk and/or result in water charges for abstraction, which were not yet considered

¹⁵⁸⁸ Exhibit CE-952.

¹⁵⁸⁹ Respondent’s Counter-Memorial on Quantum, ¶ 393.

¹⁵⁹⁰ Exhibit CE-952.

in the cost estimate. However, as neither Respondent nor Mr. Rahman have addressed the topic of future legislation or contemplated any water charges, the Tribunal sees no basis to assume that Claimant failed to fully account for the risks associated with these aspects.

1259. Respondent further refers specifically to one of the No-Objection Certificates issued for one of the alternative water sources and emphasizes that this Certificate limited the number of tubewells to “*two at the moment*” and therefore covered only the exploratory phase of the project.¹⁵⁹¹ However, while the Tribunal found above that Claimant’s experts could not exclude that Claimant might have to resort to alternative water sources at some point, it had chosen the Fan Sediments as its primary water source to be developed for the initial mine development scenario considered in the Feasibility Study. Consequently, it appears reasonable to the Tribunal that, as confirmed by Mr. Mayer in his first expert report,¹⁵⁹² Claimant retained its NOCs for the alternative sources which it had indeed obtained for exploratory purposes but had not yet applied for further water extraction rights with regard to these alternative sources.

1260. Respondent has not specifically challenged Claimant’s submission that it had obtained all necessary authorizations for the extraction of water from the Fan Sediments.¹⁵⁹³ Rather, it places emphasis on the absence of “*exclusive*” water extraction rights as well as the discretion of the relevant authorities to impose conditions on, suspend or even cancel water permits.¹⁵⁹⁴ In the Tribunal’s view, however, these aspects were addressed by Claimant by aiming to include a provision protecting its water rights in the Mineral Agreement. There is also no indication in the contemporaneous discussions with the Governments that water rights were a point of debate in the Mineral Agreement negotiations. Finally, the Tribunal also recalls the GOB’s contractual obligation to provide support in obtaining the relevant permits as well as its own participation in the project as a result of which it would have been in the GOB’s own interest to ensure that the necessary water permits were obtained and maintained.

1261. As a further matter, Respondent takes the position that Claimant “*had little grasp of the issues related to Port Gwadar,*” with reports on the challenges faced by the existing operator China’s interest to take over the port, and further claims that Claimant’s “*section of the Permits Register dealing with Gwadar is largely blank*” because it failed to identify any details regarding the permits it had identified.¹⁵⁹⁵

¹⁵⁹¹ **Exhibit CE-1314**, p. 14.

¹⁵⁹² Mayer I, ¶ 101.

¹⁵⁹³ Cf. Claimant’s Quantum Reply, ¶ 742 lit. b, referring to **Exhibits CE-1314 and RE-576-24.05**.

¹⁵⁹⁴ Respondent’s Counter-Memorial on Quantum, ¶¶ 394-398.

¹⁵⁹⁵ Respondent’s Counter-Memorial on Quantum, ¶¶ 298-299; Respondent’s Rejoinder on Quantum, ¶ 351.

1262. In response, Claimant referred to the fact that a site-selection trade-off study was conducted which assessed four potential marine terminal sites in the Gwadar area and identified Port Gwadar as the most suitable port site for the project.¹⁵⁹⁶ Claimant also pointed to Mr. Livesey's testimony during the liability phase that "*TCC's preliminary inquiries into the leasing of land at port sites were met favorably and gave no indication that there would be issues in leasing land packages to accommodate the pipeline's construction.*"¹⁵⁹⁷ Mr. Livesey also testified at the Hearing on Quantum that the team had met with Port Gwadar officials and discussed, *inter alia*, the disposal facility for the sludge generated by the water treatment. He confirmed that the disposal would require a permit but did not know whether it was included in the permit register.¹⁵⁹⁸
1263. While Respondent continues to assert that Claimant had not identified the need for its "*secret sludge dump,*"¹⁵⁹⁹ the Tribunal notes the Draft Permit Register did include an item "*Permits for construction of run-off-waste collection and treatment facilities, fire protection, water supply, and sewage services required from the Balochistan Coastal Development Authority.*"¹⁶⁰⁰ Consequently, the Tribunal is not convinced that Claimant had failed to identify this permit. In addition, and while the Draft Permit Register appended to the Feasibility Study indeed did not contain any further information on this and three other permits identified for the port facilities, these permits formed part of the areas on which the Permits team focused in December 2011.¹⁶⁰¹ Respondent does not allege that Claimant would have had to apply for these permits before being granted the Mining Lease and it does not provide any argument as to why it would not have been sufficient to address these permits in December 2011 as Claimant contemplated to do.
1264. As for Respondent's more general argument regarding uncertainties surrounding Port Gwadar and its operator in 2011, the Tribunal notes that Respondent has failed to identify any measure that Claimant should have taken to address this uncertainty or any specific risk that Claimant should have accounted for in addition to those regarding security which have already been addressed above. Consequently, the Tribunal does not consider it necessary to address this assertion in any further detail.
1265. Finally, as for the remaining permits that Respondent claims to have identified as missing in Claimant's Draft Permit Register, the Tribunal recalls that as discussed in detail in the Decision on Jurisdiction and Liability, the GOB was under a contractual obligation to provide administrative support to Claimant in procuring the required licenses and permits for the project. Consequently, even if Claimant had failed to identify a certain permit or

¹⁵⁹⁶ **Exhibit RE-576-9**, p. 9-58; **Exhibit CE-1318**.

¹⁵⁹⁷ Livesey V, ¶ 26.

¹⁵⁹⁸ Transcript Hearing on Quantum (Day 2), p. 357 lines 9-17.

¹⁵⁹⁹ Respondent's Rejoinder on Quantum, ¶ 352; Respondent's Opening Presentation, p. 91.

¹⁶⁰⁰ **Exhibit RE-576-22.05**.

¹⁶⁰¹ **Exhibit CE-1385**.

approval, it could expect that the GOB would draw its attention to such an omission and assist it in obtaining the required permit or approval if and when required.

1266. In conclusion, the Tribunal is therefore not convinced that Claimant failed to identify relevant permits or approvals that it required in order to commence construction or mining operations. The Tribunal further has no reason to believe that a buyer would have expected Claimant to have obtained or applied for any additional permits or approvals as of the valuation date.

iii. Whether Claimant Had a Reasonable Plan and Schedule for Obtaining the Required Permits and Approvals

1267. Respondent further argues that Claimant “*the process of getting the permits and approvals necessary to build a large project in Pakistan is no easy task.*”¹⁶⁰² Mr. Rahman expressed the opinion in his first report that “[t]he permitting process can be long and difficult, and the results are hard to predict. Based on the process of public input and poor relations that TCC had with local communities, it is unlikely that the process of getting permits would have proceeded smoothly. These difficulties would have caused any investor substantial concerns if it had wanted to buy the Reko Diq project from TCC.”¹⁶⁰³

1268. Claimant in turn considers that Respondent “*has not shown that these alleged difficulties would have been insurmountable, that they would have deterred potential investors from investing in the Project, or that they would have materially affected the Project’s viability or fair market value.*” In Claimant’s view, the Reko Diq project did not face “*any greater permitting-related risks than would be expected in connection with any large-scale mining project.*” It further points to Prof. Davis’ model which, in Claimant’s view, “*already properly accounts for unmonetized risks associated with permitting.*”¹⁶⁰⁴

1269. Consequently, the question for the Tribunal to address is not whether the permitting process would have run “*smoothly*” but rather whether the delays accounted for by Prof. Davis would have been considered insufficient by a buyer to account for the risks associated with the permitting process.

1270. Claimant’s risk register identified the risk of “*Failure to secure all required permits in good time resulting in project delay*” but did not assign a CAPEX or OPEX impact to this risk.¹⁶⁰⁵ Prof. Davis classified this risk in his valuation as a risk that could cause project start-up delay.¹⁶⁰⁶ He explained that he incorporated “*negative events related to permitting, financing, and negotiating a mineral agreement*” into his model by “*adding*

¹⁶⁰² Respondent’s Counter-Memorial on Quantum, ¶ 390.

¹⁶⁰³ Rahman I, ¶ 29.

¹⁶⁰⁴ Claimant’s Reply on Quantum, ¶¶ 729-730.

¹⁶⁰⁵ Exhibit CE-952.

¹⁶⁰⁶ Davis I, Workpaper 27, p. H-68.

time between the Valuation Date and the start of construction (initial project delay).” Based on information about “*the time between completion of the feasibility study and start of construction for open pit mines among the largest 100 copper mines in the world by in situ reserves and resources,*” which in his opinion face similar issues with regard to these particular risks, he came up with an average of 4.4 years (if pre-construction projects for which only estimates are available are excluded) or 5.4 years (if pre-construction estimates are included); the median duration is 4 years.¹⁶⁰⁷

1271. Taking into account that Claimant had expected to start construction within 1.5 years after obtaining the mining lease, which implied three years between the Feasibility Study and construction start, Prof. Davis considered that this “*put Reko Diq in the range of actual experience at most other projects in [his] database.*” Based on the data from these other projects, he then assumed that “*delay is a random draw from a Poisson distribution with a mean of 4 years,*” with a minimum level of 3 years as estimated by Claimant and an additional six months duration to account for the fact that the DCF model runs annually. On that basis, the mean would increase to approximately 5.3 years, which means that “*construction would start no sooner than two years after the Valuation Date, and that on average it would take 3.8 years from the Valuation Date to reach start of construction.*”¹⁶⁰⁸

1272. In his second report, Prof. Davis pointed out that his assumption amounted to “*an average delay of over two years relative to management’s projected construction start date,*” with a minimum delay of 6 months and up to a maximum delay of 13.5 years. He further stated that “*removing delay from the model and starting construction two years after the Valuation Date in each simulation*” would have increased the value by over USD 1.3 billion.¹⁶⁰⁹

1273. Respondent addresses Prof. Davis’ modeling of these delays only in its Post-Hearing Brief, noting that the model “*does not allow one to zoom in to understand how exactly this delay was applied to TCC’s valuation*” and arguing that the mines on whose data he based his assumption “*are located in jurisdictions that are in low threat environments or have highly developed mining industries and infrastructure, such as Chile.*” In Respondent’s view, the data is therefore “*not sufficiently representative for calculating the expected delays that may occur in an environment such as Balochistan.*” Respondent refers in particular to the “*unique challenges of large infrastructure projects in Balochistan*” and the absence of “*real-life examples in Pakistan to factor the permitting uncertainty and risk TCC would likely face.*” Respondent also relied on “*the delays TCC*

¹⁶⁰⁷ Davis I, ¶ 192, Appendix D, ¶¶ 16-20 and Workpaper 28.

¹⁶⁰⁸ Davis I, ¶ 193 and Appendix D, ¶¶ 21-22; Davis II, ¶ 169.

¹⁶⁰⁹ Davis II, ¶¶ 170, 85 and note 102.

*had already faced” when “the PSI team lost almost half of the planned days of fieldwork due to permitting issues.”*¹⁶¹⁰

1274. Respondent’s expert Mr. Rahman did not express an opinion as to whether the delays modeled by Prof. Davis would adequately account for the permitting delays that he considered likely to occur. Mr. Rahman also did not provide an estimate as to how long it would have taken in his opinion to obtain the required permits and land rights he had identified in his report. In his second report, he only reiterated that *“the permitting process would have been a significantly difficult task, one potentially riddled with a multitude of problems arising out of, inter alia, potential litigation, difficulties with land acquisition, an insufficiently resourced and understaffed bureaucracy, poor law and order situation and several laws that allow for the local populace (which has been hostile to foreign and national projects in the area, including Reko Diq) to raise objections.”*¹⁶¹¹ Specifically in response to Claimant’s argument that there was no evidence that the Reko Diq project would have faced greater permitting-related risks than other large-scale mining projects, Mr. Rahman expressed the opinion:

*“There is a false equivalency that the Reply Memorial seeks to make between any large-scale mining project and one such as the Reko Diq project, which is located in one of the most remote, unstable and politically volatile regions in Pakistan. The Reko Diq area and the Province of Balochistan in general is unfortunately a host to various problems highlighted in the Expert Report that are unique to the region. To compare the Reko Diq project with a large-scale mining project in rural United States (for example) does not make sense. Most rural mining projects do not involve constructing and maintaining an extremely lengthy slurry pipeline through large tracts of land that face constant water shortages, have little or no ownership records and belong to hostile local populations. The threat of terrorism in the region is likewise unique to the Reko Diq project. This plethora of problems would have been injurious to the future viability of the Reko Diq project. Accordingly, these problems would have consequently been a significant deterrence for any reasonable investor.”*¹⁶¹²

1275. While the Tribunal agrees with Mr. Rahman that a large-scale project in Balochistan would likely face different risks or a different degree of risk than a project in the United States, it must be noted that the projects on which Prof. Davis based his data are not only located in the United States but include projects located in Chile, Mongolia, Russia, Mexico, Panama, Peru, Democratic Republic of Congo, China, Philippines, Argentina, Afghanistan, Ecuador, Fiji, Zambia, Brazil, Canada, Iran, Kazakhstan, Poland, and Burma (Myanmar). The Tribunal also does not agree with Respondent that all of these

¹⁶¹⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 264.

¹⁶¹¹ Rahman II, ¶ 1.

¹⁶¹² Rahman II, ¶ 2.

projects could be considered as being located in a low threat environment. As pointed out by Claimant, five of these countries ranked lower than Pakistan in the 2010 index of the ranking for ease of doing business on which Respondent and Mr. Rahman had relied.¹⁶¹³

1276. In addition, and while Mr. Rahman criticized Claimant for not presenting “*evidence refuting the findings of [his] Expert Report by showing examples of similar major projects in the Balochistan area that were able to acquire and hold onto the permits without any substantial difficulties,*”¹⁶¹⁴ Mr. Rahman himself stated at the Hearing on Quantum that “[s]uch an ambitious project on this scale in Balochistan has never been contemplated.”¹⁶¹⁵ The latter statement can be considered undisputed between the Parties not only for Balochistan but also for other provinces of Pakistan. Consequently, Prof. Davis could not have taken into account other large mining projects in Pakistan in his dataset. Respondent also did not provide any data for other infrastructure projects which it would have considered more representatives of the “*unique challenges of large infrastructure projects*” faced by Reko Diq. In addition, as pointed out by Claimant, Respondent has also not made any submissions on permitting issues faced by other, smaller-scale mining projects in Balochistan, such as the Duddar and Saindak projects and has not produced any documents to Claimant in this regard.

1277. In addition, taking note of the emphasis placed by Respondent and Mr. Rahman on the security situation in Balochistan, the Tribunal recalls that it has already addressed in detail above the security risks faced by the project and the adjustments to the value of Claimant’s investment that need to be made to account for these risks. The Tribunal sees no justification for further adjustments with regard to security-related risks in the present context.

1278. As for the inefficiencies of bureaucracy referred to by Mr. Rahman, the Tribunal is not convinced that these would be unique for Balochistan and would therefore not be accounted for in the delays faced by at least some of the other projects in Prof. Davis’ dataset. In this regard, the Tribunal also again recalls the GOB’s contractual obligation to provide administrative support in procuring the required permits and approvals. While Mr. Rahman emphasized his opinion that “*it is a fallacy to assume that government support ensures a quick and smooth permitting and approval process,*” the Tribunal notes that Prof. Davis did not assume a “*quick and smooth*” process but rather that construction would, on average, start two year later than provided in Claimant’s schedule and, in absolute terms, 3.8 years after the Mining Lease would have been granted in the but-for scenario. In the Tribunal’s view, neither Respondent nor Mr. Rahman have provided the

¹⁶¹³ Exhibit ZR-4.

¹⁶¹⁴ Rahman II, ¶ 3.

¹⁶¹⁵ Transcript Hearing on Quantum (Day 7), p. 2087 lines 9-10.

Tribunal with a convincing argument as to why this average delay would have been considered insufficient by a buyer in the present circumstances.

1279. As a final matter, the Tribunal notes that at the Hearing on Quantum and again in its Post-Hearing Brief on Quantum, Respondent referred to “*permitting issues*” of the project in the past,¹⁶¹⁶ always pointing to an issue regarding a No-Objection Certificate faced by the PSI team when making its field trip along the pipeline route in August / September 2009. However, the Tribunal is not convinced that this would serve as evidence of major permitting issues faced by the project at the feasibility stage. The issue concerned an expired NOC for PSI’s Construction Manager, which was raised on 29 August 2009. Mr. Mayer, who was contacted by the PSI team, requested the team to return to the hotel to put a scope and schedule together for what was left to complete in the field. The team spent the next day at the hotel awaiting the NOC but carried out further work on the following day without the Construction Manager. Following another day awaiting the extension of the NOC, the Certificate was extended on 2 September 2009 and the full team continued its field trip.¹⁶¹⁷ Respondent did not point to any further permitting issue at the feasibility stage or prior stages of the project.

1280. While the Tribunal agrees with Respondent that the absence of major permitting issues in the past may not be sufficient evidence in and of itself to demonstrate that the project would also not face permitting issues in the future, the absence of any such issues does show that the GOB acted in accordance with its contractual obligations in the past and was able to support and facilitate the project. As the Tribunal found in the Decision on Jurisdiction and Liability, the GOB and also the GOP also created a legitimate expectation that they would continue to support and facilitate Claimant’s investment. While this does not guarantee that Claimant would not have faced any permitting issues in the future, the Tribunal considers that the legitimate expectation for continued support by both Governments confirms the Tribunal’s conclusion that the delays modeled by Prof. Davis in his valuation would have been considered sufficient by a buyer as of the valuation date.

9. Whether Claimant Has Established That It Could Have Obtained the Necessary Funding for the Project

a. Summary of Claimant’s Position

1281. Claimant submits that in the absence of Respondent’s breaches, the Reko Diq project would have attracted the necessary financing, as it had the full support of its sponsors,

¹⁶¹⁶ Respondent’s Opening Presentation, p. 93; Transcript Hearing on Quantum (Day 1), p. 268 line 4; Respondent’s Post-Hearing Brief on Quantum, ¶ 264.

¹⁶¹⁷ **Exhibit RE-576-6.01**, Appendix Q, pp. 17-20.

Antofagasta and Barrick. As the Tribunal found in its Decision on Jurisdiction and Liability, “*two of the world’s largest mining companies ... were willing to contribute large amounts of equity to the project.*”¹⁶¹⁸

1282. In Claimant’s view, the Tribunal already rejected “*substantially identical financing arguments,*” holding that Claimant had or could obtain the financial resources to carry out mining operations at Reko Diq and that the information provided in the Feasibility Study satisfied the requirement under rule 48(3)(a)(iii) of the 2002 BM Rules, and Respondent failed to provide any evidence to undermine the Tribunal’s previous conclusions.¹⁶¹⁹ Specifically, Claimant considers the Tribunal’s previous conclusions confirmed by Antofagasta’s chairman Mr. Luksic, Antofagasta’s executive Mr. Sepúlveda, and Claimant’s expert on financing, Mr. Pingle, and maintains that it would have been “*premature to engage in detailed financing decisions*” before obtaining the mining lease. Claimant refers to Mr. Pingle’s explanation that “*it made no sense for TCCA or its Sponsors to engage directly and in detail with Lenders before obtaining the mining lease.*”¹⁶²⁰

1283. Claimant also rebuts five arguments advanced by Respondent as to why the question before the Tribunal would be different from the question decided in the liability phase: (i) Respondent fails to justify why the burden of proof should be any different from the liability phase and, in any event, the Tribunal did not rely on the burden of proof; (ii) the argument that “*nothing on the record indicates that ... financing was available*” was already rejected by the Tribunal, which considered the requirement that Respondent was trying to impose on Claimant to be not realistic given Mr. Luksic’s confirmation of the statement in the Feasibility Study that it would be premature to have more than general discussions on financing before the project is approved and its financial requirements are determined; (iii) the Tribunal already considered the absence of a Mineral Agreement which “*would have made such financing more challenging*” but there was “*no indication that it would have been impossible*”; (iv) the Tribunal did not find that Claimant’s owners would have provided full equity financing but rather that Claimant would successfully have arranged third-party financing; and (v) Respondent itself chose not to adduce expert evidence on the ability to finance the project in the liability phase.¹⁶²¹

¹⁶¹⁸ Claimant’s Quantum Post-Hearing Brief, ¶¶ 261, 269-270, *quoting from* Decision on Jurisdiction and Liability, ¶ 1245.

¹⁶¹⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 262, *comparing* Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1225 *with* Respondent’s Closing Presentation, pp. 60-63; Claimant’s Quantum Reply, ¶¶ 747, 749, *referring to* Decision on Jurisdiction and Liability, ¶¶ 1240-1247.

¹⁶²⁰ Claimant’s Quantum Post-Hearing Brief, ¶ 262, *quoting from* Pingle, ¶ 72; Claimant’s Quantum Reply, ¶ 767.

¹⁶²¹ Claimant’s Quantum Reply, ¶¶ 751-756, *quoting from* Decision on Jurisdiction and Liability, ¶¶ 1246, 1245, 1239.

1284. Specifically with regard to Respondent's argument that the absence of a Mineral Agreement and thus a negotiated fiscal regime was "*a key flaw*," Claimant also refers to Mr. Pingle who noted that he had "*rarely seen a Fiscal Stability Agreement 'pre-agreed,' particularly in jurisdictions unused to large scale investments in projects. Usually, these agreements are among the last items agreed*" and "[m]ost often, these documents are agreed at the request and insistence of the ECAs and/or the DFIs." Consequently, Claimant argues that the absence of a Mineral Agreement would not have prevented financing, but the arrangement of financing by ECAs and DFIs would rather have facilitated the conclusion of the Mineral Agreement.¹⁶²²

1285. In any event, Claimant relies on Mr. Pingle's experience in limited recourse project finance to argue that the project was "*eminently financeable*" and that it would have secured financing if Respondent had complied with its obligations under the Treaty.¹⁶²³ Claimant emphasizes that, contrary to what Respondent's experts suggested in their first report, it does not have to show that it would have actually sold the project to an actual specific buyer in November 2011, given that in the absence of Respondent's breaches, it would have financed the project and would therefore not have sold it. In this regard, Claimant refers to Mr. Luksic's testimony that they "*wanted to be the ones to build [the mine]*" and that his conversations with Barrick "*confirmed that they felt the same way*"; he stated unequivocally: "*We were simply not in the market to sell; we were in the market to build.*"¹⁶²⁴ Claimant considers this testimony unchallenged and confirmed by Mr. Pingle's statement that "[m]ajor mining projects like this, I've never been involved in one that got sold. They get completed and they get financed, but they don't get sold."¹⁶²⁵

1286. Claimant argues that in order to determine the fair market value of Claimant's investment, it also does not have to show that it *would* in fact have financed the project after the valuation date but rather that the project *could* have been financed, *i.e.*, that it was financeable. Claimant claims that, in light of the Tribunal's previous findings, "*there can be no reasonable dispute that TCC could have financed the project.*"¹⁶²⁶

1287. According to Claimant, Respondent presented an "*entirely new*" argument in its Closing Presentation, suggesting that the "[i]mpact of the uncertainty on financing" is that value must go down. Claimant considers this argument irrelevant, arguing that "*Prof. Davis addressed any uncertainty about the precise nature of financing from third parties by*

¹⁶²² Claimant's Quantum Reply, ¶¶ 786-789, quoting from Pingle, ¶ 213.

¹⁶²³ Claimant's Quantum Reply, ¶¶ 748, 758.

¹⁶²⁴ Claimant's Quantum Reply, ¶¶ 759-760, referring to Henry/Howden, pp. 20-23 and quoting from Luksic II, ¶¶ 7, 11.

¹⁶²⁵ Claimant's Quantum Post-Hearing Brief, ¶ 272, quoting from Transcript Hearing on Quantum (Day 7), p. 2163.

¹⁶²⁶ Claimant's Quantum Reply, ¶¶ 762-764 (emphasis in original).

conservatively assuming all equity financing from TCC's owners."¹⁶²⁷ In addition, Claimant argues that any uncertainty is the result of Respondent's Treaty breaches and maintains that, as Mr. Pingle testified, there was "no doubt that, with the mining lease, Reko Diq would have certainly attracted the required financing" because "Reko Diq had experienced Sponsors making a significant equity investment. They had a world-class comprehensive Feasibility Study that was prepared under the supervision of SNC-Lavalin. They [had] attractive economics in a very conservative case, and it had numerous financing options."¹⁶²⁸

1288. As for the alleged "fatal flaws" detected by Respondent, Claimant rejects each of them as "baseless" but maintains that even if they were not baseless, market practice shows that "Sponsors and Lenders would have worked together to solve any issue, if there was any issue at all." Claimant refers to Mr. Pingle who described the process of lenders' review in mining projects undertaken by major mining companies as "cooperative" and giving the Sponsors "the benefit of the doubt" and who noted that he had never seen a project in which the sponsors committed 60% of the project costs but then failed to secure financing for technical reasons.¹⁶²⁹

1289. Claimant also rejects the argument that it adhered to an outdated standard provided in the CHEJVA, emphasizing that the CHEJVA does not dictate any standard to which the work was to be performed and adding that, in any event, its feasibility work was performed "in accordance with the highest contemporaneous industry standards, and indeed set a new bar for Barrick's later feasibility work at other mines."¹⁶³⁰

1290. Claimant considers that the first report of Respondent's experts Mr. Henry and Mr. Howden contained "a hodgepodge of assertions on a range of topics" and asserted without any supporting evidence that there was no capacity in the market to finance Reko Diq in 2011 because the Oyu Tolgoi mining project in Mongolia had sucked up all available financing. According to Claimant, Mr. Pingle demonstrated, however, that there was "ample capacity—hundreds of billions of dollars—in the market in 2011," which was only confirmed by the Oyu Tolgoi project.¹⁶³¹ Specifically, Claimant refers to various contemporaneous statements and statistics about major ECAs as well DFIs, which in its view confirm that these agencies were not capacity constrained, in particular when taking into account that the drawdown schedule of mining projects is dictated by the construction

¹⁶²⁷ Claimant's Quantum Post-Hearing Brief, ¶¶ 262-263, referring to Respondent's Closing Presentation, p. 64 and Davis I, ¶ 191.

¹⁶²⁸ Claimant's Quantum Post-Hearing Brief, ¶ 264, quoting from Transcript Hearing on Quantum (Day 7), p. 2127.

¹⁶²⁹ Claimant's Quantum Reply, ¶¶ 781-783, quoting from Pingle, ¶¶ 211, 204 and referring to ¶ 206.

¹⁶³⁰ Claimant's Quantum Reply, ¶¶ 785, 765 referring to Henry/Howden, ¶ 3.1.2 and Livesey IV, ¶ 71.

¹⁶³¹ Claimant's Quantum Post-Hearing Brief, ¶¶ 265-266, referring to Henry/Howden I, pp. 11-14 and Pingle, ¶¶ 138-198; Claimant's Quantum Reply, ¶¶ 776, 780, referring to **Exhibit CE-1418**, p. 18.

schedule and the required debt financing must thus be broken down by year of construction.¹⁶³² In Claimant's view, Mr. Henry and Mr. Howden then abandoned their capacity argument, conceding that "[t]here is no denying [the relevant lenders] are well funded institutions in their own right," but instead raising a new argument that "*mining finance transactions are always arranged by a group of commercial lenders acting as Mandated Lead Arrangers.*"¹⁶³³

1291. Claimant claims that Mr. Howden admitted at the Hearing on Quantum that "*he had simply assumed the case away*" by clarifying that his opinion referred to the financeability of the project as it existed "*in its current form*" on the valuation date, including the assumption that Claimant "*did not have a mining lease*" and that the critiques made by Respondent's experts were well-founded. In Claimant's view, the expert reports of Mr. Henry and Mr. Howden can therefore be given no evidentiary weight.¹⁶³⁴

1292. Claimant again refers to Mr. Pingle who testified that "*the most important single issue in a project is the Sponsors, their capability, their experience, and the amount of money they are committing.*" Claimant emphasizes that the Sponsors were contemplating an equity contribution of 60% of the total project costs, which Mr. Pingle described as "*an extremely high contemplated equity investment,*" demonstrating a "*high level of confidence in the Project,*" and which Mr. Howden acknowledged to be a "*significant equity investment*" and "*relevant to a lending decision.*"¹⁶³⁵

1293. According to Claimant, the project had the full support of its sponsors, as confirmed by Mr. Luksic's testimony as well as the fact they they had invested hundreds of millions of US dollars in the Feasibility Study and were willing to contribute 60% of the project costs. Claimant quotes from Mr. Pingle who stated that lenders "*would have given great weight not only to the sponsors' financial capacity but also to their managerial, technical, and operating expertise.*"¹⁶³⁶

1294. Claimant further contends that Reko Diq would have had numerous options for debt financing of the remaining 40% of project costs, referring to a combination of Export Credit Agencies (ECAs), Development Finance Institutions (DFIs), Islamic Banks and

¹⁶³² Claimant's Quantum Reply, ¶¶ 777-779, referring to Exhibits CE-1418, pp. 18, 5, CE-1416, p. 7, CE-1404, p. 118, CE-1399, p. ii, CE-1403, pp. 26-27, CE-1402, p. 6, CE-1430 and CE-1398, p. 1, and Pingle, ¶¶ 140-145.

¹⁶³³ Claimant's Quantum Post-Hearing Brief, ¶¶ 267, quoting from Henry/Howden II, pp. 15 and 8.

¹⁶³⁴ Claimant's Quantum Post-Hearing Brief, ¶¶ 268, referring to Transcript Hearing on Quantum (Day 7), pp. 2205, 2208, 2224-2225 and quoting from pp. 2197, 2208.

¹⁶³⁵ Claimant's Quantum Post-Hearing Brief, ¶ 271, quoting from Transcript Hearing on Quantum (Day 7), pp. 2113, 2213 and (Day 8), p. 2248.

¹⁶³⁶ Claimant's Quantum Reply, ¶ 766, referring to Luksic II, ¶ 7 and Decision on Jurisdiction and Liability, ¶ 958 and quoting from Pingle, ¶ 23.

government-supported funds as presented by Mr. Pingle at the Hearing on Quantum.¹⁶³⁷ Claimant also notes that the Feasibility Study contemplated that *“the anchor of the financing plan will be the multilateral agencies and export credit agencies (ECAs).”*¹⁶³⁸

1295. According to Claimant, ECAs alone could have financed the entire debt portion of the financing, relying on Mr. Pingle’s testimony that *“[t]ypically 60 percent of a large mining project’s Project Costs are eligible for ECA financing.”*¹⁶³⁹ According to Claimant, there would thus have been little uncertainty as to the lenders as well as to the terms of their lending given that ECA financing must comply with the standardized OECD Arrangement of Officially Supported Export Credits.¹⁶⁴⁰ Claimant further notes that Mr. Henry and Mr. Howden stated in their second report that ECAs can finance up to 85% of an export contract, implying that commercial lenders would have to fund the remaining 15% of the debt, but Mr. Howden acknowledged at the Hearing on Quantum that the 15% down payment can be made with equity.¹⁶⁴¹

1296. Claimant submits that, *“[t]hough not strictly needed,”* DFIs such as the International Finance Corporation (IFC), Asian Development Bank (ADB) and the German KfW *“would have provided additional funding, mitigated risks, and potentially structured and syndicated the transaction.”* In Claimant’s view, Reko Diq clearly *“fit the DFIs’ mandate”* as the IFC stated in its 2012 annual report that *“IFC’s mission in the oil, gas, and mining sector is to help developing countries realize these benefits.”* Claimant also refers to Mr. Pingle’s explanation that *“[e]ach of these insitutions supports Pakistan, and is open for business and has a long history there.”*¹⁶⁴²

1297. Specifically, with regard to the argument raised by Respondent that ECAs and DFIs would have been reluctant to lend in *“frontier”* markets such as Pakistan, Claimant submits that the distinction between *“frontier”* and *“emerging”* markets is primarily used in equity financing but has *“little relevance in limited recourse project financing.”* According to Claimant, ECAs focus on developing their country’s exports and DFIs on promoting private sector development regardless of whether the project is in a *“frontier”* market, which can even strengthen the case for financing it given the IFC’s explanation in its 2012 Annual Report that *“strengthening the focus on frontier markets”* was one of

¹⁶³⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 273, referring to Pingle Presentation, pp. 6-11 and Transcript Hearing on Quantum (Day 7), pp. 2117-2125.

¹⁶³⁸ Claimant’s Quantum Reply, ¶ 768, quoting from **Exhibit RE-576-29**, p. 29-5.

¹⁶³⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 274, quoting from Transcript Hearing on Quantum (Day 7), p. 2118; Claimant’s Quantum Reply, ¶ 769, referring to Pingle, ¶ 140.

¹⁶⁴⁰ Claimant’s Quantum Reply, ¶ 769, referring to Pingle, ¶¶ 89-93.

¹⁶⁴¹ Claimant’s Quantum Post-Hearing Brief, ¶ 275, quoting from Henry/Howden, p. 14 and referring to Transcript Hearing on Quantum (Day 8), p. 2238.

¹⁶⁴² Claimant’s Quantum Post-Hearing Brief, ¶¶ 276-277, quoting from **Exhibit CE-1403**, p. 13; Claimant’s Quantum Reply, ¶ 770, referring to Pingle, ¶¶ 106-108 and quoting from ¶ 108.

its “*strategic focus areas*.”¹⁶⁴³ In any event, Claimant describes the definition of “*frontier*” markets as “*blurry*” and notes that the FTSE Global Equity Index Series classified Pakistan as an emerging, not a frontier, market as of September 2010, while Morgan Stanley classified Pakistan as an emerging market until December 2008 and as of June 2017.¹⁶⁴⁴ Specifically with regard to the Fraser Institute relied on by Mr. Henry and Dr. Howden, Claimant contends that it is a “*libertarian think tank, without any particular expertise in mining*,” whose classification of Pakistan in its country risk ratings “*says literally nothing about the financeability of Reko Diq*.”¹⁶⁴⁵

1298. Claimant also refers to a November 2008 ADB loan proposal to Balochistan relied on by Respondent, which, in Claimant’s view, shows that “*the very purpose of the proposal was to provide a US\$ 200 million loan to Balochistan to help it develop its mining sector, including by way of private participation*.” Quoting from Mr. Pingle, Claimant submits that this document “*is an indication that the ADB recognized the importance of the mining sector [in Balochistan], recognized the importance of the Reko Diq Project*.”¹⁶⁴⁶

1299. Claimant further refers to Mr. Pingle’s testimony that Reko Diq could also have benefitted from the support of Islamic Banks and government-supported funds, which it considers to be un rebutted.¹⁶⁴⁷

1300. Therefore, Claimant argues that no commercial bank tranche would have been needed and quotes from Mr. Pingle’s testimony that “[t]he commercial banks would not be central to the financing process or the project funding.” Claimant notes that Mr. Howden acknowledged at the Hearing on Quantum that DFIs and specifically the IFC regularly act as mandated lead arrangers, which leaves no more than “*an administrative role for the banks*.”¹⁶⁴⁸

1301. Claimant maintains that the Oyu Tolgoi project illustrates that the Reko Diq project would have been financed as “*all of the commercial lending in the Oyu Tolgoi deal was either ECA- or MIGA-insured, or under the umbrella of an IFC or EBRD B loan*” and the IFC

¹⁶⁴³ Claimant’s Quantum Reply, ¶ 771, referring to Pingle, ¶¶ 85, 106, 124-126, 136-137 and quoting from **Exhibit CE-1403**, p. 2.

¹⁶⁴⁴ Claimant’s Quantum Reply, ¶ 772, referring to **Exhibits CE-1355**, p. 2 and **CE-1444**.

¹⁶⁴⁵ Claimant’s Quantum Reply, ¶¶ 773-774, referring to Henry/Howden I, pp. 3-4, Pingle, ¶ 135 and quoting from **Exhibit CE-1516**, p. 2.

¹⁶⁴⁶ Claimant’s Quantum Post-Hearing Brief, ¶ 279, referring to **Exhibit RE-782** and quoting from Transcript Hearing on Quantum (Day 7), pp. 2174-2175.

¹⁶⁴⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 279, referring to Pingle Presentation, p. 9 and Transcript Hearing on Quantum (Day 7), pp. 2117, 2122-2123.

¹⁶⁴⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 280, quoting from Transcript Hearing on Quantum (Day 7), p. 2124 and referring to (Day 8), p. 2271.

served as Joint Mandated Lead Arranger, thus leaving no uncovered commercial loan risk.¹⁶⁴⁹ In Claimant's view:

*“Reko Diq is a world-class copper and gold asset, with no serious technical risk, good economics even in a conservative case, the substantial backing of two of the most successful mining companies in the world, and 25% local government participation. It is located in a jurisdiction that the World Bank and other multilateral agencies want to promote. It was to be financed during a commodity boom. There is no doubt that, but for Pakistan's breaches, Reko Diq would have attracted the relatively modest financing required.”*¹⁶⁵⁰

b. Summary of Respondent's Position

1302. Respondent takes the position that the Reko Diq project would not have been financially feasible from a bankability perspective because there was “*no financing appetite*” in the market for the Reko Diq project given the “*significant flaws in the standards underlying the IMD FS and an array of other problems that made the project not bankable.*” In addition, Respondent argues that any decision by Claimant's owners to fund the development of the project on an equity basis would have required them to break their internal policies and risk their market reputation.¹⁶⁵¹
1303. According to Respondent, the issue to be decided by the Tribunal at this stage is “*quite different*” from the question decided in the Decision on Jurisdiction and Liability because Respondent then sought to prove a negative, *i.e.*, that Claimant could not secure financing, whereas Claimant now has to show that it could secure financing. Respondent argues that there are substantial issues to be decided by the Tribunal at this point: (i) the Tribunal has now for the first time received expert testimony on mining finance, with Respondent's experts showing that “*the Resource could never have been financed given the severe deficiencies in the IMD FS and the investment appetite for a Resource such as Reko Diq in 2011*”; (ii) Claimant has not provided any evidence of its ability to obtain financing other than the testimony of Mr. Livesey at the Hearing on Jurisdiction and Liability, who described the financing as “*particularly challenging,*”¹⁶⁵² and the Tribunal only concluded that “*it appears improbable that [TCC] would not have been able to obtain third-party financing from financial institutions*”¹⁶⁵³ but did not make a finding that there was actual interest in financing the project; it must therefore now decide on the effect of the “*critical challenges*” raised by Respondent and its experts “*in the context of the valuation of the Resource*”; (iii) the Feasibility Study does not contemplate full equity

¹⁶⁴⁹ Claimant's Quantum Post-Hearing Brief, ¶¶ 281-283, referring to **Exhibit CE-1739**, p. 18 and **CE-1754**, p. 69.

¹⁶⁵⁰ Claimant's Quantum Post-Hearing Brief, ¶ 284.

¹⁶⁵¹ Respondent's Counter-Memorial on Quantum, ¶ 378.

¹⁶⁵² Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1241 lines 10-12.

¹⁶⁵³ Decision on Jurisdiction and Liability, ¶ 1245.

financing “*or equity financing of any kind*” and Claimant has not presented any evidence in support of its assertion that Barrick and Antofagasta would have approved “*such an aggressive financing method*” and further that they could “*successfully lobby their shareholders and convince them to risk a significant portion of their investment on a mine that would not be operational for years*”; and (iv) the Tribunal has not yet considered Claimant’s prospects of financing in light of a failed Mineral Agreement which, in Respondent’s view, “*would have been instrumental in obtaining third-party financing, or in proceeding with full-equity funding.*”¹⁶⁵⁴

1304. Respondent further submits that both the CHEJVA and the 2002 BM Rules required that a feasibility study supporting a mining lease application include a sufficient description of the project’s financial structure in order to allow the GOB to make a decision whether and on what terms to participate in the mining proposal and to enable the regulatory authority to make a proper review of the financial viability of the project.¹⁶⁵⁵

1305. Respondent notes that Claimant stated in its Mining Lease Application that it contained a detailed description of the “*type and source and extent of financing*” as well as “*particulars of the applicant’s ... financial resources and those of any person to be engaged to provide such resources, together with supporting documentary evidence and copies of relevant contractual agreements.*”¹⁶⁵⁶ Respondent contends that contrary to these statements, the Mining Lease Application “*did not provide any certainty of this type*” as the Feasibility Study had been prepared on the premise that the financial terms would be defined following several contingencies: (i) the approval of the Feasibility Study; (ii) the conclusion of shareholders’ agreement among Claimant’s owners; (iii) the GOB’s review and decisions regarding the financials; (iv) the investment decision being made and issued; and (v) formal discussion of financing with third-party financiers. Respondent emphasizes that none of this occurred.¹⁶⁵⁷ In Respondent’s view, these “*regulatory and contractual shortcomings are extremely relevant as a matter of damage quantification*” because the price any buyer would have been willing to pay for Reko Diq would have been “*severely diminished by the knowledge that the mining lease application, even if obtained, would have been secured based on premises that did not comply with TCC’s regulatory and contractual obligations.*”¹⁶⁵⁸

1306. Respondent contends that the Feasibility Study did not include any description of the estimated financial structure of the proposed venture but was “*only the starting point for a long and complex process which, at the time of the mining lease application and even*

¹⁶⁵⁴ Respondent’s Counter-Memorial on Quantum, ¶¶ 22-26.

¹⁶⁵⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 282.

¹⁶⁵⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 283, quoting from **Exhibit CE-8**, ¶ 8.

¹⁶⁵⁷ Respondent’s Post-Hearing Brief on Quantum, ¶ 284.

¹⁶⁵⁸ Respondent’s Post-Hearing Brief on Quantum, ¶ 285.

at the Valuation Date, still required massive work in the identification of pending work, followed by a quantification of several areas of cost and risk.” Respondent adds that the boards of Claimant’s shareholders would consider the project only once that work was finalized and, if approved by them, discussions with external financiers would start; only at the end of these discussions could the costs of equity and debt financing be quantified and “*financial studies of the type required by BMR Rules 47*” be submitted as part of a mining lease application. According to Respondent, Claimant was therefore in default under the 2002 BM Rules and the CHEJVA as of the valuation date.¹⁶⁵⁹

1307. Respondent considers it confirmed by the testimony of Claimant’s witnesses at the Hearing on Quantum that “*any decision by the prospective providers of equity and debt financing was indeed far from being seriously procured.*”¹⁶⁶⁰ Respondent refers to Chapter 29 of the Feasibility Study, stating that there would be a further review of many risks in the Risk Register for which an itemized cost had not yet been quantified.¹⁶⁶¹ According to Respondent, these itemized costs would then be submitted to the boards of directors of Antofagasta and Barrick, who have to this date not approved the Feasibility Study and would have to vote on whether to invest in the mining proposal on the basis of the aggregate financial exposure. Respondent emphasizes that only if a decision to invest was reached by them and, as the case may be, by the GOB, discussions with third-party financiers would commence and, only if those were fruitful, the estimated cash flows “*called for under BMR Rule 47*” could be estimated.¹⁶⁶²

1308. In support of its submission on this decision path, Respondent refers to Claimant’s Forward Work Plan in the Feasibility Study:¹⁶⁶³

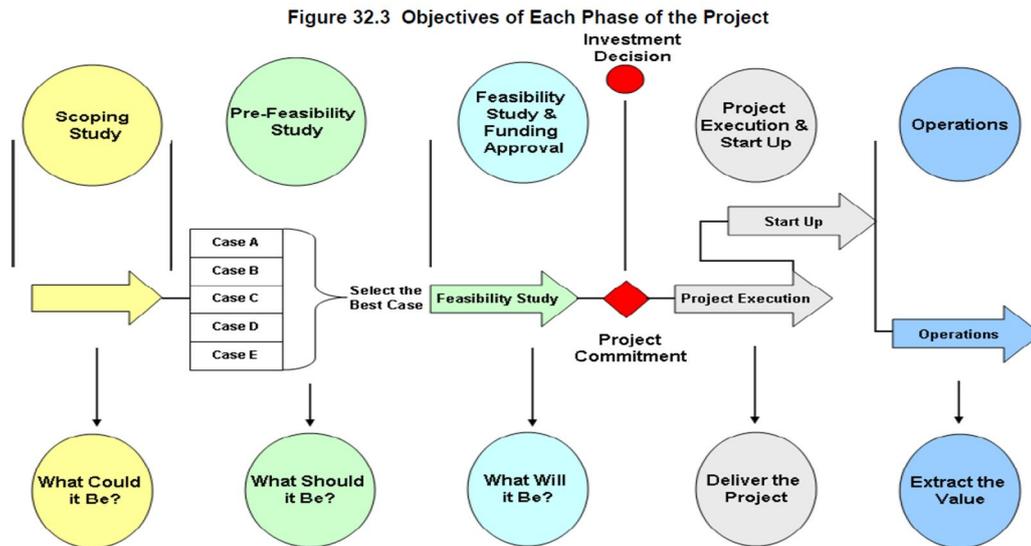
¹⁶⁵⁹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 286-288.

¹⁶⁶⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 289, referring to Transcript Hearing on Quantum (Day 2), p. 497 lines 3-14 and (Day 5), p. 1283 lines 8-12.

¹⁶⁶¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 291, referring to **Exhibit RE-576-29** and Transcript Hearing on Quantum (Day 3), p. 853 line 8 to p. 854 line 7 and p. 855 lines 1-3.

¹⁶⁶² Respondent’s Post-Hearing Brief on Quantum, ¶ 292, referring to Transcript Hearing on Quantum (Day 3), p. 866 line 15 to p. 870 line 5.

¹⁶⁶³ **Exhibit RE-576-32**, p. 32-7.



1309. Respondent also refers to Claimant’s own description of the funding arrangements in the Feasibility Study:

“At the feasibility stage, funding arrangements have been considered only on a preliminary basis with a view to adding considerable fundability certainty to the project during the project’s review and approval stage, after conclusion of the FS. The FS together with the mining lease, the shareholder agreement between the GOB and TCCA and the investment protection agreement (Mineral Agreement) are the key prerequisites to effectively approach the potential lenders to the project and finalise the design of the financing plan.”¹⁶⁶⁴

1310. According to Respondent, Claimant’s witnesses and experts “openly contradicted each other—and in some cases the IMD FS” with regard to the financial structure of the proposed venture. Respondent notes that: (i) the Feasibility Study is based on the premise that Claimant and GOB would supply 60% of the required financing; (ii) Mr. Luksic maintained that Antofagasta and Barrick would provide 100% of financing through debt or equity; (iii) Mr. Sepúlveda stated that external financing from commercial banks with some assistance from ECAs would be required; and (iv) Mr. Pingle testified that the financing would instead be obtained through ECAs with no significant involvement from commercial banks. In Respondent’s view, this confirms that the time of submitting the Mining Lease Application, there was no financial plan that could meet “the strict requirement of Article 1 of the CHEJVA and Rule 47 of the BMR.”¹⁶⁶⁵

¹⁶⁶⁴ Exhibit RE-576-29, p. 29-4.

¹⁶⁶⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 295, referring to Exhibit RE-576-29, p. 29-4, Transcript Hearing on Quantum (Day 5), p. 1289 line 9 to p. 1290 line 1 and (Day 3), p. 490 lines 16-18 and Pingle Presentation, p. 8.

1311. Respondent further submits that as of the valuation date, there were no agreements in place among Claimant's shareholders or with any third party regarding the funding of the Reko Diq project. In particular, Respondent considers that neither Antofagasta nor Barrick had expressed any commitment to actually fund the project or any indication as to the financial costs. Respondent also contends that that in the absence of a definitive position on royalties and taxes, there could be no bankable feasibility study.¹⁶⁶⁶
1312. Specifically with regard to the alleged commitment by Claimant's owners, Respondent contends that "*Antofagasta did not have the corporate credit rating or access to international debt markets sufficient to take on Reko Diq.*" According to Respondent, any decision to proceed without financing would have meant for it to assign almost half of its cash to one project which would have been "*a reckless commitment of the company's finances*" that no reasonable board would have approved.¹⁶⁶⁷ As for Barrick, Respondent notes that Claimant has not provided testimony from any senior member of its ownership or management structure but only Mr. Luksic's testimony on his impressions of conversations with his joint venture partner. Respondent acknowledges that Barrick "*had a broader access to the debt markets in November 2011*" but argues that it had "*rigid policies that would not have permitted the kind of debt raising or cash spend necessary to finance the Reko Diq project*" and that "*Barrick told its investors in 2011 that it was looking for projects with a return on equity of 22%. Reko Diq's financials were merely half of that.*" According to Respondent, Barrick would therefore have been unwilling and even unable to approve the construction of Reko Diq, which had only a "*quite low*" post-tax IRR of 12%.¹⁶⁶⁸ Respondent notes that Oyu Tolgoi projected an ITT of more than 20%, reaching even as high as 29%, and claims that by contrast, the Reko Diq project when including "*all of the costs left out*" would have had an IRR far below 12%. In Respondent's view, the "*subpar numbers at Reko Diq were far below any notion of a solid return.*"¹⁶⁶⁹
1313. Respondent further refers to its experts who confirmed that there was only "*very limited*" market appetite to provide financing for a project of the size and in the geographic location of Reko Diq.¹⁶⁷⁰ Respondent argues that "[t]he Oyu Tolgoi project was consuming a large part of the available capital, both from the commercial banks and the

¹⁶⁶⁶ Respondent's Post-Hearing Brief on Quantum, ¶ 297, referring to Transcript Hearing on Quantum (Day 2), p. 390 lines 16-20, p. 394 lines 16-17, p. 490 line 22, and (Day 5), p. 1280 lines 12-21 and p. 1283 lines 8-12, p. 1291 line 2 and p. 1294 lines 2-4.

¹⁶⁶⁷ Respondent's Rejoinder on Quantum, ¶¶ 385-386; Respondent's Counter-Memorial on Quantum, ¶ 388, referring to Henry/Howden I, Section 3.7.2.

¹⁶⁶⁸ Respondent's Rejoinder on Quantum, ¶¶ 387, 389; Respondent's Counter-Memorial on Quantum, ¶ 389, referring to Henry/Howden I, Section 3.7.2.

¹⁶⁶⁹ Respondent's Rejoinder on Quantum, ¶¶ 389-391.

¹⁶⁷⁰ Respondent's Post-Hearing Brief on Quantum, ¶ 298, referring to Henry/Howden I, pp. 4, 7 and Howden Presentation, p. 3; Respondent's Counter-Memorial on Quantum, ¶ 378.

ECAs and DFIs” and it was therefore “*not a good time to look for over one billion dollars for a high-risk project with a low return*” as “[n]o financier would have simultaneously financed a low-grade, pre-development project located near taliban-occupied territory, especially with the kinds of financials contemplated by Claimant.” In Respondent’s view, Claimant has not provided any meaningful evidence to rebut this argument, considering Claimant’s assertion “*bizarre*” that the financing for Oyu Tolgoi would confirm the capacity for financing for Reko Diq; Respondent maintains that “[i]f the available mining finance capital is one jurisdiction, there is no room for another” and that, in the absence of any demonstration that there was excess, available capital, its argument stands untouched, *i.e.*, that “*there was no capacity in commercial banks to even consider Reko Diq.*”¹⁶⁷¹

1314. Respondent also submits that mining financiers would not have been interested in Reko Diq “*without complete risk insurance, something which TCC had chosen not to purchase.*” In the absence of any discussion in the previous phase of the proceedings on political risk insurance or financing by ECAs or the MIGA, Respondent considers that Claimant failed to undertake “*the basic step to ‘de-risk’ the political risk that would have been one of the primary concerns of a financier.*”¹⁶⁷²

1315. According to Respondent, the absence of capacity in commercial banks “*dooms*” Claimant’s other arguments as commercial banks are necessary to arrange financing. Referring to its experts, Respondent argues that: (i) it is market reality that commercial banks act as mandated lead arrangers, which are in charge of leading the financing; (ii) ECAs would not cover the entirety of any necessary financing but only up to 85% of the value of the contracts and services originating from their home jurisdictions; and (iii) DFIs also have limited ability to finance a project, funding only up to 30% of the total loan.¹⁶⁷³

1316. In response to Claimant’s reliance on financing by ECAs and DFIs, Respondent submits that these institutions are conservative investors which follow the lead of commercial banks but are not first movers. As for ECAs, Respondent argues that they provide largely insurance cover but “*would likely not make financing available.*” In addition, Respondent considers that the Feasibility Study did not have “*a full picture of the capital costs, relying largely on estimates*” and argues that “[w]ithout knowing the source of inputs, once cannot begin to even construct a pictures [sic] of the ECAs involved.” In any event, Respondent contends that the ECAs would not have been eager to increase their exposure

¹⁶⁷¹ Respondent’s Rejoinder on Quantum, ¶¶ 375-376; Respondent’s Counter-Memorial on Quantum, ¶ 384, referring to Henry/Howden I, Section 3.4.

¹⁶⁷² Respondent’s Counter-Memorial on Quantum, ¶ 386, referring to Henry/Howden I, Section 3.2.

¹⁶⁷³ Respondent’s Rejoinder on Quantum, ¶ 377, referring to Henry/Howden II, pp. 8, 9, 14.

to Pakistan, and particularly Balochistan, “*due to the risks and difficulties of doing business in that part of the world.*”¹⁶⁷⁴

1317. With regard to DFIs, Respondent argues that they “*have a focused mandate relative to the part of the world they support*” and dedicate only a small portion of their balance sheets to the extractive industries. Respondent notes that the ADB apparently did not make investments in mining projects in 2012 which, in its view, “*show[s] a disinterest in the area.*” According to Respondent, DFIs would have “*limited interest in Reko Diq*” given that investing in Pakistan would have been a new market and they would have taken “*a cautious approach with strict limits to keep from stretching themselves too thin in an unknown area.*”¹⁶⁷⁵

1318. In any event, Respondent submits that the process of finding ECAs and DFIs is “*a time-consuming process involving lengthy due diligence*” and requiring approval by various boards of directors of each institution. Respondent emphasizes that Claimant has never reached the decision makers at any of these institutions and maintains that “[t]he story of financing that TCCA has told is nothing more than that—a story.”¹⁶⁷⁶ Respondent points out that the Oyu Tolgoi project, which was already in construction, required the participation of numerous financing institutions, MIGA and multiple ECAs; by contrast, Claimant had not even started to look for financiers and political risk insurance underwriters, “*a process that it was months and probably years from achieving.*”¹⁶⁷⁷

1319. Respondent further contends that in the absence of a proper assessment and mitigation of the environmental and social impacts of the project, the project would not have been eligible for financing from the multilateral agencies and ECAs identified as primary source of financing in the Feasibility Study.¹⁶⁷⁸

1320. Respondent emphasizes that the credit committees of financial institutions do not accept feasibility studies at face value but perform their own due diligence, “*hiring many of the same kinds of people that Pakistan has assembled*” for technical, environmental, legal and financial advice. Respondent notes that the financing for Reko Diq would have been limited recourse, meaning that financiers had to base their risk assumptions on the project’s risk and not, as suggested by Mr. Pingle’s view on financing, any corporate guarantees or other collateral. In Respondent’s view, they would thus have detected the same issues as Respondent did in the course of this arbitration and “*no mining finance*

¹⁶⁷⁴ Respondent’s Rejoinder on Quantum, ¶¶ 381-383, referring to Henry/Howden II, pp. 6-7.

¹⁶⁷⁵ Respondent’s Rejoinder on Quantum, ¶ 383, referring to Henry/Howden II, p. 11.

¹⁶⁷⁶ Respondent’s Rejoinder on Quantum, ¶ 384.

¹⁶⁷⁷ Respondent’s Counter-Memorial on Quantum, ¶ 386.

¹⁶⁷⁸ Respondent’s Post-Hearing Brief on Quantum, ¶ 298, referring to **Exhibit RE-576-29**, p. 29-5.

*institution would have gone forward with a loan based on the status of the work done for the IMD FS.”*¹⁶⁷⁹

1321. In this regard, Respondent also contends that “[a]ny attempt to get financing for the Reko Diq project would have departed from a flawed foundation: the requirements of the CHEJVA.” Respondent argues that “the standards at the Reko Diq project” were not updated to the rules in place in 2006 when the Novation Agreement, pursuant to which Claimant became a party to the CHEJVA (replacing BHP) on 1 April 2006 (the “**2006 Novation Agreement**”) was signed and adds that a mining finance institution would have required a feasibility study “fit for regulatory practice in 2011, not an antiquated version based on contractual standards forsworn by the mining finance world.”¹⁶⁸⁰ Referring to Mr. Henry and Dr. Howden, Respondent asserts that the Feasibility Study would not have been considered “bankable” by the financial markets due to the standards of the CHEJVA but also other “core issues not treated adequately by the IMD FS,” such as the uncertain fiscal regime which Respondent considers to be “a key flaw undermining the bankability of the IMD FS, which is before even getting to the technical flaws.”¹⁶⁸¹ Respondent argues that further “key concerns,” which would have prevented mining finance institutions from financing the project, were the availability of water as well as security.¹⁶⁸² Also referring to the other “issues on the face of the IMD FS,” which Respondent raised throughout its submissions, it considers it clear that “without a doubt Reko Diq was not bankable.”¹⁶⁸³

1322. Respondent claims that the “little information” available regarding the views of financiers on the project reveal that “the project would have faced deep issues if it tried to obtain financing,” in particular given the “very large amounts” and “underwhelming plans” described in the Feasibility Study.¹⁶⁸⁴ In Respondent’s view, this is confirmed by the Feasibility Study itself, which states that “the financing of the project will be ... particularly challenging, and ... will require Antofagasta and Barrick to provide guarantees until the project starts operations and reaches completion. It is likely that commercial appetite for the financing of the project will be limited.”¹⁶⁸⁵

1323. Respondent submits that by November 2011, “copper prices were already falling, and the sentiment was that the decrease in copper prices would continue.” According to Respondent, the major mining companies, *i.e.*, the principal acquirers, were focusing on “traditional, stable mining jurisdictions like Chile, Canada, and Australia,” which

¹⁶⁷⁹ Respondent’s Rejoinder on Quantum, ¶¶ 372-374, referring to Henry/Howden II, p. 15.

¹⁶⁸⁰ Respondent’s Counter-Memorial on Quantum, ¶ 380.

¹⁶⁸¹ Respondent’s Counter-Memorial on Quantum, ¶ 381, referring to Henry/Howden I, Section 3.1.2 and p. 23.

¹⁶⁸² Respondent’s Counter-Memorial on Quantum, ¶ 382, referring to Henry/Howden I, Sections 3.1.3 and 3.1.4.

¹⁶⁸³ Respondent’s Counter-Memorial on Quantum, ¶ 383.

¹⁶⁸⁴ Respondent’s Post-Hearing Brief on Quantum, ¶ 299, referring to Transcript Hearing on Quantum (Day 5), p. 1280 line 12.

¹⁶⁸⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 299, quoting from **Exhibit RE-576-29**, p. 29-5.

accounted for 53% of the acquisitions, while only 9% of all acquisitions were in “*emerging*” regions and “*no significant transactions*” in “*frontier (new) markets like Pakistan*.”¹⁶⁸⁶

1324. With regard to Claimant’s critique of the classification of Pakistan as a “*frontier*” market, Respondent notes that it merely criticizes the Fraser Institute for its ideology but not for its methodology. Noting that the Institute is supported, *inter alia*, by Barrick’s founder, Respondent maintains that it “*accurately identifies the issues at play in Pakistan that make investment difficult*.”¹⁶⁸⁷ Quoting from its experts, Respondent claims that there were “*no circumstances, from a country risk perspective, under which a credit committee of a diligent mining institution would approve a mining project to be financed*.” Arguing that Claimant would have to convince “*not just one credit committee but rather almost every credit committee*,” Respondent considers it confirmed that “*there was no appetite for financing in November 2011 for Reko Diq*.”¹⁶⁸⁸
1325. Respondent notes that the ADB analyzed the prospects of mining ventures in Balochistan and stated that “*continued reports of instability, attacks, plots, bombings, and even less-destructive activities such as protests and work stoppages [in Pakistan] affect investor’s views of the country’s overall stability. These perceptions affect Balochistan even more, given the security concerns in the province*.” It further reported that “*some infrastructure, logistics, and security-related obstacles need to be removed before investors begin to consider investing in the province*,” and that “[f]or mining operations to thrive, the benefits that accrue to the local community need to be emphasized. This requires well-designed contractual arrangements that result in a coordinated community development plan endorsed by the local community, the government and the mine operator.”¹⁶⁸⁹
1326. According to Respondent, none of the issues it identified had been resolved before the Mining Lease Application was submitted or at the valuation date, as a result of which “*financing would be rather hard to negotiate and guarantee, resulting in increased costs and/or a reduced chance of the project ever coming to fruition*.”¹⁶⁹⁰
1327. Respondent also maintains the argument that no mining company would actually have been interested in buying the project from Claimant and claims that this should lead to a reduction in value, considering the limited size of the asset for sale in relation to the market. According to Respondent, a liquidity premium would have been considered by

¹⁶⁸⁶ Respondent’s Counter-Memorial on Quantum, ¶ 379.

¹⁶⁸⁷ Respondent’s Rejoinder on Quantum, ¶ 392 and note 806.

¹⁶⁸⁸ Respondent’s Counter-Memorial on Quantum, ¶ 386, *quoting from* Henry/Howden I, Section 3.2.

¹⁶⁸⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 300, *quoting from* **Exhibit RE-782**, pp. v, 4, ¶ 2 and p. 10, ¶ 32, and referring to Transcript Hearing on Quantum (Day 5), p. 1290 line 1 to p. 1295 line 11.

¹⁶⁹⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 301.

any buyer using financing to account for “*numerous features*” such as the concentration risk identified by Mr. Henry and Dr. Howden.¹⁶⁹¹

1328. Respondent clarifies that it does not take the position that Claimant would have to find financing for itself and a buyer but rather that “[t]he issue of financing arises from the necessity of the market” as a buyer would have had to find financing for this purchase, “especially since no company would have wanted to put a project with such low returns on its books on an equity basis.”¹⁶⁹²

c. Tribunal’s Analysis

1329. At the outset of its analysis of the question whether Claimant has established that it could have obtained the necessary financing for the project, the Tribunal recalls that Respondent argued already in the liability phase of this proceeding that TCCP failed to establish that it had or could obtain the resources to carry out the mining operations effectively as required under rule 48(3)(a)(iii) of the 2002 BM Rules because the Feasibility Study addressed third-party financing only in the “*vaguest and most incomplete and unsatisfactory of terms.*”¹⁶⁹³ Similarly to the alleged failure to fully assess the water source and the alleged failure to adequately address the security risks of the pipeline, Respondent raised this argument for the first time in this arbitration. While finding that Respondent should not be allowed to rely on reasons additional to those invoked in the Notice of Intent to Reject, the Tribunal in any event found that none of these additional reasons, including the reason invoked with regard to the financing of the project, would justify the denial of the Mining Lease Application.¹⁶⁹⁴

1330. At the liability stage, the Tribunal was pointed in particular to the Introduction of the Feasibility Study, which includes the following sub-sections:

“Prospective Fundability and Affordability

Prospective funding and affordability are important aspects of each stakeholders’ investment decision: whether any required equity contribution along with any required corporate guarantees are affordable, and whether the project is fundable through conventional financial institutions, particularly given the challenging aspects of the project.

While certain preliminary work has been undertaken during the FS stage in relation to both ‘fundability’ and ‘affordability’, it is generally not deemed appropriate to attend too much to these aspects of the project until completion

¹⁶⁹¹ Respondent’s Rejoinder on Quantum, ¶¶ 378-380, referring to *Vestey Group Ltd. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/06/04, Award of 15 April 2006 [RLA-402], ¶¶ 403-404.

¹⁶⁹² Respondent’s Rejoinder on Quantum, ¶ 393.

¹⁶⁹³ Respondent’s Post-Hearing Brief, ¶ 129.

¹⁶⁹⁴ Decision on Jurisdiction and Liability, ¶¶ 1231-1233.

of the FS and, wherein, there is a well defined project and well defined financial requirements.

Nevertheless, since financing often finds itself on a large capital project's critical path, certain preliminary work that had the potential to save subsequent time and effort has been undertaken. Furthermore, the Balochistan Mineral Rules require that the anticipated source of funding is addressed within the FS. The following satisfies that requirement.

Financing Strategy

TCC's Financing Plan for the project is to finance the development and commissioning of the project with a combination of Senior Debt advanced by a group of lenders and Shareholder Equity and subordinated Shareholder Loans provided by the project sponsors.

The Senior Debt will be a traditional 'Project Financing' structure, similar to the structure that the sponsors have successfully put in place for other projects. Project Financing is typically sourced via consortiums consisting primarily of large international financial institutions (IFIs), governmental Export Credit Agencies (ECAs) and commercial banks.

Given the large capital requirement for Reko Diq the funding approach to be undertaken will involve discussions with a large number of ECAs, IFIs, and commercial banks. Additional funding sources, including the potential for an Islamic tranche or funding tied to off-take will be evaluated. Finally, the potential to fund particular items that make up the overall capital number is being evaluated, particularly in connection with the power solution for Reko Diq and the port.”¹⁶⁹⁵

1331. Mr. Luksic testified at the Hearing on Jurisdiction and Liability that the Asian Development Bank and a few agencies “*were very, very interested*” in being part of the financing of the project but that “*you need to have a fully approved project before you get the financing.*” In the context of the suggestion that the absence of a Mineral Agreement would have made financing impossible or at least very difficult, he also testified that the World Bank appeared “*very committed to Pakistan developing mining.*”¹⁶⁹⁶

1332. In light of Mr. Luksic's testimony and also taking into account that Antofagasta and Barrick as two of the world's largest mining companies were willing to contribute large amounts of equity to the project, the Tribunal considered it improbable that Claimant's owners would not have been able to obtain third-party financing from financial institutions, such as the World Bank and/or the Asian Development Bank. The Tribunal further noted that while the absence of a Mineral Agreement might have made third-party financing more challenging, there was no indication of it being impossible.¹⁶⁹⁷ Besides the fact that the Parties might have resumed negotiations after the grant of a mining lease,

¹⁶⁹⁵ Exhibit CE-86 / RE-576-2, pp. 2-9 to 2-10.

¹⁶⁹⁶ Transcript Hearing on Jurisdiction and Liability (Day 3), p. 635 lines 5-10 and 15-18 and p. 675 lines 6-17.

¹⁶⁹⁷ Decision on Jurisdiction and Liability, ¶ 1245.

the Tribunal considered the requirement that Respondent tried to impose on Claimant regarding the financing details to be included in the Feasibility Study to be not realistic and noted that Mr. Luksic had confirmed the statement made in the Feasibility Study that it would have been premature to have more than general discussions on financing before the project is approved and its financial requirements are determined. In the Tribunal's view, this applied in particular where, as in the present case, a project-financing structure was contemplated, which naturally requires that basic parameters of the project are fixed before any financing institution would enter into a commitment or make a binding offer on financing conditions.¹⁶⁹⁸

1333. On that basis, the Tribunal considered that the information provided in the Feasibility Study satisfied the requirement under rule 48(3)(a)(iii) of the 2002 BM Rules and did not justify a denial of the Mining Lease Application.¹⁶⁹⁹

1334. Claimant takes the position that the arguments raised by Respondent on financing in the present quantum phase are "*substantially identical*" to those raised in the liability phase and have therefore been already rejected by the Tribunal in its Decision on Jurisdiction and Liability.¹⁷⁰⁰ Respondent, on the other hand, has pointed to the expert evidence on financing which was adduced only in the quantum phase, the issues raised by Respondent and its experts in various areas with regard to the Feasibility Study in the context of which the Tribunal must re-evaluate the alleged lack of actual evidence on financing interest, a new argument on the ability to proceed on 100% equity financing which triggered submissions on Barrick and Antofagasta's ability and willingness to contribute the required amounts of equity as well as the impact of the lack of a Mineral Agreement.¹⁷⁰¹ Claimant has rebutted those arguments and maintains that Respondent "*has offered no good reason to reconsider the Tribunal's holding [in the Decision on Jurisdiction and Liability], and there is none.*"¹⁷⁰²

1335. The Tribunal notes that the arguments at liability stage concerned the regulatory requirement of rule 48(3)(a)(iii) of the 2002 BM Rules that the mining lease applicant must show that it "*has or can obtain the technical and financial resources and experience to carry out mining operations effectively.*"¹⁷⁰³ In the present quantum phase, Respondent has argued that "*the Resource could never have been financed given the severe deficiencies in the IMD FS and the investment appetite for a Resource such as Reko Diq in 2011*" and that "*from a bankability perspective, the Reko Diq project was not*

¹⁶⁹⁸ Decision on Jurisdiction and Liability, ¶ 1246.

¹⁶⁹⁹ Decision on Jurisdiction and Liability, ¶ 1247.

¹⁷⁰⁰ Claimant's Quantum Post-Hearing Brief, ¶ 262.

¹⁷⁰¹ Cf. Respondent's Counter-Memorial on Quantum, ¶¶ 22-26.

¹⁷⁰² Claimant's Quantum Reply, ¶¶ 749-757.

¹⁷⁰³ **Exhibit RE-1**, rule 48(3)(a)(iii).

*financially feasible.*¹⁷⁰⁴ In its Rejoinder, Respondent maintains “*Reko Diq would not have attracted the required financing.*”¹⁷⁰⁵ In its Post-Hearing Brief, Respondent refers to regulatory requirements of the 2002 BM Rules as well as to contractual requirements under the CHEJVA and argues that in breach of these requirements and contrary to Claimant’s own representation in the Mining Lease Application that it would provide a detailed description of the “*type and source and extent of financing*” and the “*particulars of the applicant’s ... financial resources and those of any person to be engaged to provide such resources, together with supporting documentary evidence and copies of relevant contractual agreements,*” Claimant did not provide any certainty of this type in the Mining Lease Application, including in the Feasibility Study. In Respondent’s view, this would have “*severely diminished*” the price that a hypothetical buyer would have been willing to pay for Claimant’s stake in Reko Diq.¹⁷⁰⁶

1336. Specifically, Respondent refers to rule 47 of the 2002 BM Rules and Clause 1 of the CHEJVA which, in its view, were not complied with in the Mining Lease Application. Respondent’s reference to Claimant’s submissions in the liability phase indicates that it is referring to: (i) rule 47(2)(j)(i) of the 2002 BM Rules, which provides that an application for a mining lease “*shall contain or be accompanied by – (i) a statement giving a detailed forecast of capital investment, operating costs and revenues and the anticipated type and source and extent of financing;*”¹⁷⁰⁷ (ii) the definition of “*Feasibility Study*” in Clause 1.1 of the CHEJVA, which provides that the Feasibility Study shall, *inter alia*, include “*financial studies relating to the estimation of discounted cash flow, net present values, returns, fixed and working capital and operating costs and revenue escalated to commencement of production*”;¹⁷⁰⁸ and (iii) Article 3.2 of the 2000 Addendum to the CHEJVA dated 4 March 2000 (“**2000 Addendum**”) in which it was agreed to include an additional requirement in the definition of “*Feasibility Study,*” *i.e.*, “*a plan for providing financing of all development costs of the mining project including external debt agreements and equity contributions required from the Parties.*”¹⁷⁰⁹

1337. As Respondent’s reference in its Post-Hearing Brief on Quantum to Claimant’s Memorial on Liability indicates, these regulatory and contractual requirements were already the subject of submissions in the liability phase. However, the Tribunal considers it noteworthy that neither of the above quoted requirements was raised by Respondent in the context of its argument in the liability phase that Claimant failed to show that it had or could obtain the necessary financing. Respondent also does not allege in the present

¹⁷⁰⁴ Respondent’s Counter-Memorial on Quantum, ¶¶ 23, 378.

¹⁷⁰⁵ Respondent’s Rejoinder on Quantum, Section I.

¹⁷⁰⁶ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 282-285.

¹⁷⁰⁷ **Exhibit RE-1**, rule 47(2)(j)(i). *See* Respondent’s Post-Hearing Brief on Quantum, ¶ 282 and note 635.

¹⁷⁰⁸ **Exhibit CE-1**, Clause 1.1 (p. 5).

¹⁷⁰⁹ **Exhibit CE-2**, Article 3.2 (p. 3).

quantum phase that these requirements played any role in the denial of the Mining Lease Application or that the GOB considered the Feasibility Study and/or Mining Lease Application to be deficient at the time due to an alleged failure to comply with these requirements. Respondent rather argues that these alleged shortcomings would have been “*extremely relevant as a matter of damage quantification*” as they would have “*severely diminished*” the price that a buyer would have been willing to pay based on “*the knowledge that the mining lease application, even if obtained, would have been secured based on premises that did not comply with TCC’s regulatory and contractual obligations to the GoB.*”¹⁷¹⁰

1338. As pointed out by Claimant, the argument that uncertainty on financing would have an impact on the quantification of value was raised for the first time in Respondent’s Closing Presentation at the Hearing on Quantum;¹⁷¹¹ it was addressed by Claimant in its Post-Hearing Brief and will be discussed further below. However, the argument that the alleged uncertainty amounted to non-compliance with regulatory and contractual requirements was raised only in Respondent’s Post-Hearing Brief on Quantum.

1339. The Tribunal is not convinced by this argument. In the absence of any indication that the GOB or the Licensing Authority considered the description of the financing strategy and/or the Chapter on Financing Analysis in the Feasibility Study to be non-compliant with regulatory or contractual requirements, the Tribunal sees no basis to assume that a buyer would have considered this to be an issue lowering the price it would be willing to pay for the project.

1340. However, while Respondent placed great emphasis in its Post-Hearing Brief on the argument that the Feasibility Study did not include a financial plan “*that could meet the strict requirements of Art. 1 of the CHEJVA and Rule 47 of the BMR,*”¹⁷¹² it also maintained its previous arguments, *i.e.*, that there was no commitment on the part of Claimant’s owners to actually fund the project, that the market appetite to provide third-party financing to the Reko Diq project was “*very limited,*” that the alleged environmental and social shortcomings in the Feasibility Study and Expansion Pre-Feasibility Study rendered the project ineligible for financing from multilateral and export credit agencies, and that the evidence in the record allegedly revealed that the project “*would have faced deep issues if it tried to obtain financing.*” According to Respondent, the issues it had identified meant that “*financing would be rather hard to negotiate and guarantee, resulting in increased costs and/or a reduced chance of the project ever coming to fruition.*”¹⁷¹³

¹⁷¹⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 285.

¹⁷¹¹ Respondent’s Closing Presentation, p. 64.

¹⁷¹² Respondent’s Post-Hearing Brief on Quantum, ¶ 295.

¹⁷¹³ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 297-301.

1341. Against this background, the Tribunal does not agree with Claimant that the arguments raised by Respondent in the quantum phase have already conclusively been dealt with in the Decision on Jurisdiction and Liability. As noted in a more general manner in its Decision on Respondent's Reconsideration Request, the Tribunal "*did not make a finding in the liability phase that the Feasibility Study fully reflected the true value of the project at the time. It only assessed the arguments presented by Respondent at the time in support of its position that denial of the Mining Lease Application was based on justifiable reasons.*"¹⁷¹⁴ Similarly to the issues regarding water and metallurgy, which were explicitly discussed in the Decision on Respondent's Reconsideration Request, as well as the question on security for the pipeline and the project in general, which was not explicitly discussed in that Decision, neither of the Parties presented any opinions from independent experts on the financeability of the project through third-party financing and/or equity financing by Claimant's owners in the liability phase as they have now done in the quantum phase.
1342. The Tribunal also did not address the impact that any remaining uncertainty as to whether and at what cost the project would have been financed had on the value of Claimant's investment. In this regard, the Tribunal notes that, as pointed out by Claimant, Prof. Davis addressed the uncertainty regarding the nature of third-party financing by assuming all equity financing by Claimant's owners. Respondent, on the other hand, takes the position that there is no evidence that the owners would have been willing or even able to provide 100% equity financing. These arguments were naturally raised only after Prof. Davis had presented his valuation model in the quantum phase of this proceeding. Consequently, the Tribunal considers it appropriate to make its conclusive findings on whether and, if so, at what cost the project would have obtained financing based on the Parties' completed written submissions and the hearing of the fact and expert witnesses during the Hearing on Quantum.
1343. The Tribunal understands that Prof. Davis assumed all equity financing in his model, not because Claimant considered this to be the most likely financing scenario, but rather because Respondent had previously raised the argument that the failure to conclude a Mineral Agreement could have presented a risk to arrange external debt financing. In Prof. Davis' opinion, this assumption was conservative because if he "*had prepared a model that included external borrowing, the interest tax deductions associated with debt financing would have increased the Project's value, even if [he] had then discounted that benefit to account for some risk that it would not materialize because the parties had failed to conclude a mineral agreement.*"¹⁷¹⁵

¹⁷¹⁴ Decision on Respondent's Reconsideration Request, ¶ 99.

¹⁷¹⁵ Davis I, ¶ 191.

1344. The Tribunal recalls that it has already reached the conclusion above that if the GOB had not decided to take over the project from Claimant in breach of Respondent's obligations under the Treaty, a Mineral Agreement providing in particular for fiscal stability would have been concluded after the mining lease was granted to TCCP. Consequently, the Tribunal does not have to address in further detail Respondent's argument that Claimant's prospects of obtaining both third-party financing and full-equity funding for the project would have been "*that much more remote*" in the absence of a Mineral Agreement.¹⁷¹⁶

1345. In the Tribunal's view, Prof. Davis' assumption does not mean, however, that the Tribunal can dispense with assessing the Parties' arguments regarding the availability of third-party financing. Apart from the dispute between the Parties as to whether there was any commitment at all from Claimant's owners to provide equity funding for the project, which will be addressed in more detail below, the Tribunal does not consider it established that Antofagasta and Barrick would in fact have funded the project all by themselves if all attempts to arrange third-party funding failed. There is no indication to this effect in the Feasibility Study and all equity funding was apparently not contemplated at the time.

1346. The Chapter of the Feasibility Study on Financial Analysis, the contents of which will be addressed in more detail below, includes the following summary of project funding as assumed in the financial model attached to the Feasibility Study:¹⁷¹⁷

Table 29.1 Summary of Project Funding

Item	US\$M
Equity contribution by the GOB	580
- With own resources	0
- With Equity Debt provided by TCCA	580
Equity contribution by TCCA	1 740
Third party loans	1 550
Total funding	3 870
- For start up capital cost	3 290
- For certain taxes and financial expenses	580

1347. The same section also provides a summary of the Loans Terms as Considered in the Financial Analysis:

¹⁷¹⁶ Respondent's Counter-Memorial on Quantum, ¶ 26.

¹⁷¹⁷ Exhibit RE-576-29, Table 29.1.

Table 29.2 Loans Terms as Considered in the Financial Analysis

Item	Terms
Gearing ratio	40% of total cash needs
Principal amount	US\$1 550 M - Agencies tranche: US\$1 250 M - Commercial tranche: US\$300 M
Interest payment	Payable during the loans withdrawal period (4 years) and the principals repayment periods (9 and 6 years)
Principal repayment	Agencies tranche: In 9 years starting the first year of commercial production Commercial tranche: In 6 years starting the first year of commercial production
Interest rate	Libor + 5.0%
Up front fee	2% of principal amount
Commitment fee	1% of unwithdrawn principal amount
Advisory expenses	US\$30 M
Withholding tax on interests	0%

1348. It is also noted that the 40% debt capacity was “*estimated so that the commonly used debt coverage ratios are deemed to be acceptable to the lenders for loans as described in Table 29.2*” and that the 40% debt capacity “*is only indicative and for the purpose of performing the financial analysis of this FS.*”¹⁷¹⁸

1349. Mr. Luksic testified in his second witness statement that “[i]n the very unlikely event that project-level financing was not available, Antofagasta and Barrick could have funded the project through corporate-level debt, whether bonds, loans, or some combination thereof, or through all equity.”¹⁷¹⁹ However, as Mr. Luksic himself confirmed both in his witness statement as well as at the Hearing on Jurisdiction and Liability and the Hearing on Quantum, Antofagasta and Barrick were contemplating to obtain third-party financing for a part of the project and the Tribunal cannot see sufficient indication in the contemporaneous record that both owners would have been ready to fund the entire project cost by themselves if project finance turned out to be unavailable for the project.

1350. Consequently, the Tribunal will address two questions: (i) whether Claimant has established that its owners were able and willing to provide the contemplated amount of 60% equity funding to the project; and (ii) whether Claimant has further established that it could have financed the remaining amount of 40% of the project costs through limited recourse funding to be obtained from third parties. As Prof. Davis has not included the

¹⁷¹⁸ Exhibit RE-576-29, p. 29-5.

¹⁷¹⁹ Luksic II, ¶ 9.

costs of project financing in his calculated model, the Tribunal will also assess whether he has accurately accounted for any remaining uncertainty as to the identity of the lenders and costs of financing for the project.

i. Whether Claimant Has Established That Its Owners Were Able and Willing to Provide the Contemplated Amount of Equity Funding to the Project

1351. As to the amount of equity funding contemplated in the Feasibility Study, there is common ground to the extent that the project did not reach the stage at which the boards of Claimant's owners Antofagasta and Barrick gave their approval to start executing the project and/or to formally commit the contemplated amounts of equity to the project. As pointed out by Respondent, the Forward Work Plan provided that the "*Investment Decision*" and "*Project Commitment*" would be made after the Feasibility Study and funding approval.¹⁷²⁰

1352. The question is therefore whether Claimant has established that Antofagasta and Barrick would have made the contemplated commitment in the absence of Respondent's Treaty breaches, *i.e.*, if TCCP's Mining Lease Application had been granted in November 2011. In this regard, Claimant refers to the testimony of Antofagasta's chairman Mr. Luksic, who stated:

"By the time we had completed our Feasibility Study in 2010, we had done all the work we needed to satisfy ourselves that this was an extremely attractive project. There was absolutely no doubt in my mind that this was a mine that was worth building and that we wanted to be the ones to build it. My conversations with our partners at Barrick confirmed that they felt the same way and I would not have expected anything else. We had found what we had been looking for—a world class deposit—and we were eager to get to work.

A large mine, of course, requires large capital expenditure but the economics of the Reko Diq project were sufficiently robust that we expected that we would be able to repay the initial investment in seven years, a comparatively short payback period. Once the payback period was over, we expected very healthy cash flows. Indeed, as I mentioned in Paris, the cost of production was very low, which meant that we would have had very attractive margins, even in times of depressed commodities prices, not to mention major profits in times when commodities prices were high.

As I began to explain to the Tribunal in Paris, we had already started speaking informally to financial institutions and other investors about the project and found that there was a lot of interest among both groups in financing it. For example, I recall speaking to the World Bank, the Asian Development Bank, and a few others, who all expressed interest. Although it

¹⁷²⁰ Exhibit RE-576-32, p. 32-7.

was too early to enter into serious project financing negotiations, there was no doubt in my mind that financing was readily available. Antofagasta and Barrick are well-known and highly credit-worthy sponsors and I believe there are many banks and other investors who would have funded us. In the very unlikely event that project-level financing was not available, Antofagasta and Barrick could have funded the project through corporate-level debt, whether bonds, loans, or some combination thereof, or through all equity.”¹⁷²¹

1353. While the Tribunal noted above that the contemporaneous record does not provide sufficient support for Mr. Luksic’s statement that both Antofagasta and Barrick would in fact have been willing to provide 100% funding to the project if all attempts to secure third-party financing failed, Mr. Luksic’s testimony makes clear that Antofagasta was committed to developing this project, including by providing equity funds to the project. In Respondent’s view, however, Mr. Luksic’s testimony at the Hearing on Quantum that 100% of the funds would be provided by Antofagasta and Barrick contradicted not only the contemplated financing structure in the Feasibility Study but also the testimony of Claimant’s other witnesses.

1354. Mr. Luksic clarified in his oral testimony that his statement regarding the expectation that the initial investment would be paid back in seven years was based on an estimate of certain financing conditions in the Feasibility Study.¹⁷²² Mr. Luksic could not confirm, however, whether the weighted cost of capital to which Mr. Sepúlveda had referred in his explanations on the financial model of the Feasibility Study, also included the costs of third-party financing but merely presumed, confronted with a document he had not seen before, that the cost of capital he was looking at was based on pure equity financing. When asked whether it was his understanding at the time the Feasibility Study was drafted and submitted to the GOB that Antofagasta and Barrick would contribute 100% of the financing, Mr. Luksic stated: “*I presume so. I don’t remember exactly this particular issue.*” More specifically, when asked whether it was his understanding that Antofagasta would have contributed USD 1.75 billion to finance the project, he clarified that Antofagasta “*could have done it. Yes*” but that there was no decision to do that because they “*never got that far.*”¹⁷²³ Mr. Luksic then explained:

“Q. Why would you have been talking to multilateral agencies and commercial banks and ECAs if the funds would have come from Antofagasta’s treasury?”

A. It is not unusual when you’re looking at a project that you, as owners, start with the first scenario, which is you looked at the possibility of all equity

¹⁷²¹ Luksic II, ¶¶ 7-9.

¹⁷²² Transcript Hearing on Quantum (Day 5), p. 1282 lines 6-15.

¹⁷²³ Transcript Hearing on Quantum (Day 5), p. 1287 line 6 to p. 1291 line 9.

finance, and then you move to alternative financings, like bank financing, agency financing, and other mechanisms.

So it's just a stage that you're at. And I presume they didn't have firm offers from banks to say--or to look at the Cost of Capital, Cost of Financing of the Project.”¹⁷²⁴

1355. Mr. Luksic was then presented with an excerpt of Mr. Livesey’s testimony at the Hearing on Jurisdiction and Liability in which he had stated that “*the owners were going to finance 60 percent of this from their own treasuries,*” and testified as follows:

“What I was trying to explain is that, looking at the other page, I didn't see the split between bank financing and the cost of bank financing that you were referring to, and so I took the view that probably that spreadsheet you showed me there was accounting for full equity financing.

Now, of course, I'm sure that the company was already devising ways of financing this, and they were already thinking which could be, and a 60 percent owner's finance with a 40 percent bank or institution finance made sense, but my recollection is that we never got to the point where we had firm offers from banks. That's what I was saying. I may be wrong. Maybe there were.”¹⁷²⁵

1356. Respondent also referred to the testimony of Mr. Sepúlveda, Finance Manager at Antofagasta at the relevant time, who was involved in assembling the final version of the financial model for the Feasibility Study.¹⁷²⁶ Mr. Sepúlveda testified about the efforts to obtain project financing, which will be discussed in more detail below, and was then asked whether there was any decision by the shareholders or the Board of Directors of Antofagasta to commit any actual amount to financing the development of Reko Diq. In response, Mr. Sepúlveda stated that “*to my knowledge, the Feasibility Study says that 60 percent of the initial Capex was going to be funded by the shareholders, and never heard that Antofagasta wouldn't provide its pro rata for that capital.*” He further confirmed his understanding that the plan was for Antofagasta and Barrick to each provide half of the 60% of USD 3.8 billion but that he did not recall “*any written commitment in paper*” and was not aware of a resolution of Antofagastas’ shareholders or Board to commit 30% of the required capital costs to the project.¹⁷²⁷ When asked where the 30% to be contributed by Antofagasta would have come from, he stated that “*Antofagasta is a company that normally holds a lot of cash. Actually, if the the Board so decided, it could have financed the Project 100 percent in cash.*” He also confirmed that “[i]f we approached the banks after obtaining the Mining Lease, it would have been with the commitment of Antofagasta

¹⁷²⁴ Transcript Hearing on Quantum (Day 5), p. 1291 lines 10-22.

¹⁷²⁵ Transcript Hearing on Quantum (Day 5), p. 1292 line 16 to p. 1294 line 5.

¹⁷²⁶ Sepúlveda, ¶¶ 8, 10.

¹⁷²⁷ Transcript Hearing on Quantum (Day 2), p. 499 line 15 to p. 501 line 5.

to provide the funds” but that there had not yet been a mandate to look for the financing “because we didn’t obtain the Mining Lease, and the Mining Lease was the main milestone to approach the banks.”¹⁷²⁸

1357. Finally, Respondent also referred to the testimony of Claimant’s expert Mr. Pingle, who based his expert opinion on the assumption that 60% of costs would be funded by Sponsor Equity and further testified that, in his opinion, the remaining 40% could have been funded by ECAs, without additional sources of funding, as will discussed in more detail below.¹⁷²⁹

1358. In the Tribunal’s view, there is no contradiction between the testimony of Mr. Luksic and the contemplated financing structure in the Feasibility Study or the testimony of Claimant’s other witnesses. Mr. Luksic made clear that while Antofagasta would have been able to do 100% equity financing, any presumption of full equity financing for the purposes of calculating the project’s capital costs would have been due to the stage of the project in which financing offers from third parties were not yet available and the costs of financing were therefore not yet clear. Mr. Luksic also confirmed that the contemplated 60% owner finance plus a 40% bank or institution finance “*made sense*” but simply noted that the project had not yet proceeded to a stage where it had received firm offers from banks. Consequently, the Tribunal does not agree with Respondent that the alleged contradictions would confirm the absence of a financial plan for the project.

1359. As pointed out by Respondent, Claimant has not submitted a document in which Antofagasta’s Board of Directors or shareholders approved the commitment of an amount equal to 30% of the project’s capital cost. Mr. Sepúlveda testified that he was not aware of such a document and that a confirmation of that commitment would have been required when approaching financing institutions for funding offers. He also emphasized that a mandate from Antofagasta to obtain funding offers would have come only after the mining lease was granted. Mr. Pingle likewise considered that it would have been premature to obtain the final commitment from Antofagasta’s Board of Directors at the stage of the Reko Diq project. He explained:

“Typically, the Board doesn’t want to make a final commitment until both the equity and the--they can give approval for signing the loan documents as well. And they’ll ask for that information. You’ll have indications from the Board before that, but typically it doesn’t go for final approval until you have a number of things in place that were not in place yet. So, it was premature, in my opinion, to take this to the Board of Directors for a final commitment.”¹⁷³⁰

¹⁷²⁸ Transcript Hearing on Quantum (Day 2), p. 501 line 6 to p. 502 line 13.

¹⁷²⁹ Pingle Presentation, p. 8.

¹⁷³⁰ Transcript Hearing on Quantum (Day 7), p. 2159 lines 7-16.

1360. In the Tribunal's view, the absence of an actual commitment of funds to the project therefore does not provide any indication that Antofagasta would not have been willing to make that commitment at the relevant time, *i.e.*, after the Mining Lease Application was granted.
1361. Respondent further argues that Antofagasta did not have a corporate credit rating and would therefore have faced difficulties to access international debt financing facilities, as a result of which it would have had to assign "*almost half of its cash on hand to one project with all the risks described above and for an IRR near 12%.*" Respondent claims that "[n]o reasonable board would have approved such a reckless commitment of the company's finances."¹⁷³¹
1362. The Tribunal notes that Respondent apparently does not dispute that Antofagasta would have had sufficient cash reserves to approve the contemplated equity funding for the project. That this was in fact the case was confirmed by Mr. Sepúlveda who testified that "*if the Board so decided, it could have financed the Project 100 percent in cash.*" Mr. Pingle also pointed out that the amounts of cash and cash equivalents, liquid investments and undrawn lines of credit that were available to Antofagasta as of 31 December 2011 were considerably larger than the amount of USD 1.16 billion it would have had to contribute to the project.¹⁷³²
1363. Respondent rather claims that it would have been "*reckless*" for Antofagasta to commit this sum to the project, taking into account the various risks identified by Respondent in its submissions. Respondent's experts also expressed an opinion on Antofagasta's willingness to fund the project in their first report:

"Given its more limited financial capacity, Antofagasta had one key development asset in 2011, which was the US\$1.3B Antucoya development project. By comparison, the Project was noted by Antofagasta's management in their 2010 Annual Report as growth 'beyond the core business' and as an 'earlystage growth' opportunity – already signalling to capital markets that it was peripheral to their main corporate strategy. We do not see any clear evidence from Antofagasta's market disclosures and financial reporting that it was (i) undertaking any serious internal processes to commit existing capital to the Project, (ii) considering mitigating the inherent geopolitical risks that it would be exposed to if it directly equity funded the Project in a jurisdiction that it was very unfamiliar with or (iii) positioning the Project as a core part of its growth to raise its profile ahead of an institutional capital raising (either debt or equity). Given its conservative nature and its core corporate objectives ..., we do not believe that financing of its interest in the Project was being seriously considered at the time in question or that

¹⁷³¹ Respondent's Counter-Memorial on Quantum, ¶ 388; Respondent's Rejoinder on Quantum, ¶ 386.

¹⁷³² Pingle, ¶¶ 146, 148.

preparatory steps were being undertaken to mitigate subsisting financing risk that should have been very obvious to Antofagasta's management."¹⁷³³

1364. At the Hearing on Quantum, Dr. Howden further clarified with regard to Antofagasta that *"I don't think I've ever made that statement, that it was not serious about going forward with the project. I'm saying that it was not serious about starting the funding for the Project at that point."*¹⁷³⁴ When pointed to Antofagasta's 2011 annual report in which it is stated that *"[t]he Group is seeking to develop the Reko Diq deposit in Pakistan via the Tethyan joint venture company. International arbitration has been initiated to protect Tethyan's legal rights in relation to the project,"*¹⁷³⁵ Dr. Howden maintained that *"the fact that it's going through arbitration to obviously--as it says here, to help develop the project doesn't necessarily mean that that Project would be one of the first to be developed in its pipeline of opportunities. That's what I'm saying."* He maintained that *"it wasn't serious about taking the Project forward in terms of its position in the pipeline of transactions."*¹⁷³⁶

1365. Mr. Pingle stated in his report that he had *"no doubt that the Sponsors would have wanted to go forward with the development of the Project and would have committed to fund the equity portion of the Project financing."* He added that, in his experience, *"it would be remarkable for the Sponsors to invest hundreds of millions of US\$ on feasibility studies that demonstrated a world class reserve, low cost mining operations and the economic viability of the Project, only to abandon it."*¹⁷³⁷ Specifically with regard to the alleged lack of clear evidence in Antofagasta's market disclosures that it was willing to finance the project, Mr. Pingle considered that this could not detract from the amounts already invested to demonstrate the profitability of the project. Mr. Pingle further stated that having reviewed the sponsors' financial statements, he had *"no doubt that the Sponsors could have funded the Project at the corporate level, either with equity or some combination of equity and debt, had financing at the Project level been unavailable for some unforeseen reason."*¹⁷³⁸

1366. The Tribunal agrees with Mr. Pingle that the previous investments made by both Antofagasta and Barrick with regard to the exploration work, in particular the Feasibility Study and Expansion Pre-Feasibility Study, as well as their close involvement in the preparation of these Studies are a strong indication that they were committed to developing the project. Mr. Livesey described this at the Hearing on Jurisdiction and

¹⁷³³ Henry/Howden I, Section 3.7.2.

¹⁷³⁴ Transcript Hearing on Quantum (Day 7), p. 2218 lines 4-7.

¹⁷³⁵ Exhibit CE-1023, p. 3.

¹⁷³⁶ Transcript Hearing on Quantum (Day 7), p. 2222 line 9 to p. 2223 line 1.

¹⁷³⁷ Pingle, ¶¶ 69-70.

¹⁷³⁸ Pingle, ¶ 76.

Liability as follows: “*Barrick and Antofagasta are backing this project all the way through. They made all the payments up to this point. It’s, I think, perfectly reasonable to expect that TCC can obtain the technical and financial resources and experience to carry out the mining operation.*”¹⁷³⁹

1367. While the Tribunal also appreciates the fact that the amount to be invested to actually build the mine would be considerably higher than the previously invested amounts, the Tribunal sees no indication that either of the sponsors was not serious about its commitment to the project, including the contemplated portion of equity funding. In particular, the Tribunal is not convinced by the conclusion drawn by Mr. Henry and Mr. Howden’s from Antofagasta’s 2010 annual report, which listed the completion of the Reko Diq Feasibility Study and ESIA among certain items of “*Growth beyond the Core Business.*”¹⁷⁴⁰ Dr. Howden himself clarified at the Hearing on Quantum that he was not questioning the seriousness of Antofagasta’s intent to go forward with the project but rather considered that it “*was not serious about starting the funding for the Project at that point.*”¹⁷⁴¹

1368. As noted above, the Tribunal does not consider the absence of an actual commitment of funds to the project as an indication that Antofagasta would not have been willing to make that commitment at the relevant time. In the Tribunal’s view, no conclusion to the contrary can be drawn from the excerpt of Antofagasta’s 2010 annual report on which Mr. Henry and Dr. Howden relied.

1369. In addition to the previous investments made by both owners, the fact remains that the financial model of the Feasibility Study, which was prepared with the involvement of, *inter alia*, Mr. Sepúlveda for Antofagasta, expressly contemplated that the owners would contribute 60% equity. Mr. Livesey testified already at the Hearing on Jurisdiction and Liability that “[t]he funding section of the Feasibility [Study] was put together primarily by the owners’ teams back in Santiago and Toronto,”¹⁷⁴² which confirms that both owners were well aware of the assumptions underlying the financial model of the Feasibility Study. In the absence of any indication in the record that Antofagasta was not willing to contribute its share of the contemplated equity funding, the Tribunal sees no basis to doubt Antofagasta’s willingness (or ability) to provide its 30% share of the project costs.

1370. As for Barrick, Respondent acknowledged that it had “*broader access to the debt markets in November 2011*” but claims that its “*rigid internal policies*” would not have permitted it to raise debt or spend cash on the Reko Diq project. Specifically, Respondent argues

¹⁷³⁹ Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1225 line 22 to p. 1226 line 5.

¹⁷⁴⁰ Exhibit MED-2, p. 3.

¹⁷⁴¹ Transcript Hearing on Quantum (Day 7), p. 2218 lines 4-7.

¹⁷⁴² Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1218 lines 15-17.

that “Barrick told its investors in 2011 that it was looking for projects with a return on equity of 22%. Reko Diq’s financials were merely half of that.”¹⁷⁴³ Mr. Henry and Mr. Howden expressed the following opinion on Barrick’s willingness to fund the project:

“With respect to its internal Treasury policy and decisionmaking processes, we note that Barrick maintained a series of rigorous internal risk controls with respect to market risks (commodity, FX &c.) as well as other nonmarket risks that could have involved the use of credit derivatives in order to mitigate counterparty risks. From an internal returns hurdle perspective, in its 2011 Annual Report, Barrick notes to its shareholders that it is achieving a 22% return on equity (2010 Barrick Annual Report: 19% RoE) and that a key management objective at this time was to maximise return on equity. On the basis of this key objective communicated to its shareholders, in context, Reko Diq’s project return was only 11% as per the IMD FS. When taking the Project return into account along with its inherent frontier market risk being assumed to build such a project in Pakistan in 2011 and in the absence of project finance debt from the global debt market being genuinely available in order to bolster the return on equity allocated by TCC’s sponsors, we do not believe that the Project would have passed the rigorous internal hurdles that Barrick describes in general terms to its shareholders. We note that, in Barrick’s 2010 Annual Report, the Project did not rank among its advanced-stage projects that were being provided with capital commitments by internal treasury – putting this in context, by 2011, with the copper market already showing signs of weakness, it is our belief that the Project would still not have advanced through Barrick’s internal treasury decision making process to be allocated committed capital – this means that, in all events, we believe that the Project would not have been advanced. Furthermore, beyond its internal hurdles and stated corporate objectives, we believe that the wider capital markets would have questioned why Barrick would develop an additional project beyond its existing project pipeline where the incremental gain would be only c.US\$250M (Barrick’s share of the Project NPV gain) compared to its share of capital expenditure outlayed being over US\$1.5B on the Project.”¹⁷⁴⁴

1371. Mr. Pingle noted in his expert report that “IRR and return on equity are two different concepts.” He explained that an all-equity, Project IRR is unleveraged and “designed to test project viability on a conservative basis,” i.e., without adding leverage that would increase the IRR; by contrast, return on equity is “an annual calculation based on earnings and shareholder equity.” Mr. Pingle further stated that the 22% return on equity that Barrick earned in 2011 was not stated in the annual report to be a “hurdle rate” for investment and was in any event “anomalously high both for the industry in that year and Barrick historically.” In his opinion, the suggestion that Barrick would have refused to

¹⁷⁴³ Respondent’s Counter-Memorial on Quantum, ¶ 389; Respondent’s Rejoinder on Quantum, ¶ 387.

¹⁷⁴⁴ Henry/Howden I, Section 3.7.2.

finance a project with an IRR below 22% would be “*not only speculative but also utterly implausible.*”¹⁷⁴⁵

1372. Mr. Henry and Dr. Howden did not respond to this argument in their second report. The Tribunal also notes that in the excerpt of Barrick’s 2011 annual report submitted by Mr. Henry and Dr. Howden in support of their initial report, the President and CEO stated in his message to the shareholders that “[c]apturing the benefits of margin expansion and strong operating results, Barrick achieved a return on equity of 22% in 2011.”¹⁷⁴⁶ As pointed out by Mr. Pingle, there is no indication in this excerpt that Barrick considered this return on equity achieved to be a hurdle rate for future investments. Mr. Henry and Dr. Howden themselves noted that the achieved return on equity was 3% higher than in 2010, which is in line with Mr. Pingle’s testimony that the 2011 figure was extraordinarily high in 2011. In any event, Mr. Pingle explained why the IRR calculated in the Feasibility Study cannot be compared to an actual return on equity achieved. As will be discussed in further detail below, the Tribunal finds it plausible that the financial model of the Feasibility Study was not intended to capture the full value of the cash flows that Reko Diq would generate over the years but was designed to test whether the project was viable when applying conservative assumptions.

1373. Against this background, the Tribunal again cannot accept the conclusion drawn by Mr. Henry and Dr. Howden from Barrick’s annual reports and again sees no indication that Barrick was not willing to contribute its share of the equity financing contemplated in the Feasibility Study. In particular, the fact that Barrick had not yet ranked the Reko Diq project among the projects to which it committed capital from its internal treasury in its 2010 annual report does not provide an indication that Barrick was not serious about doing so at the relevant time, *i.e.*, after the Mining Lease Application was granted.

1374. There was no dispute between the Parties that Barrick was able to provide the required funds. Mr. Pingle pointed to the amounts of cash and cash equivalents available to Barrick as of 31 December 2011 as well as a Credit Facility of USD 4 billion finalized by Barrick in January 2012.¹⁷⁴⁷

1375. Consequently, the Tribunal concludes that it has no reason to doubt that Claimant’s owners would have been willing and able to provide the contemplated amount of equity funding to the project.

¹⁷⁴⁵ Pingle, ¶¶ 73-75.

¹⁷⁴⁶ Exhibit MED-3, p. 8.

¹⁷⁴⁷ Pingle, ¶ 149.

ii. Whether Claimant Has Established That It Could Have Financed the Remaining Amount of the Project Costs Through Limited Recourse Funding

1376. The second question for the Tribunal to address is whether Claimant has established that it could have financed the remaining amount of the project's capital cost through limited recourse funding.

1377. Respondent's experts, in their first report, reached the conclusion that "*there was unlikely to be global debt market capacity to directly fund the Project based on 2011 market conditions,*" relying in particular on the fact that another, more advanced copper-gold porphyry project in Oyu Tolgoi was in the process of obtaining financing from the same agencies and financing institutions in 2011. In addition, they expressed the opinion that "*TCC had not yet completed a 'bankable' feasibility study and had not taken necessary steps to de-risk the Reko Diq project with respect to tenure (licencing and agreed fiscal terms)*" and that therefore "*a diligent mining finance institution would not have considered advancing a frontier market debt transaction based on the level of studies that had been undertaken.*"¹⁷⁴⁸

1378. By contrast, Mr. Pingle stated in his report that "[t]here was ample capacity in the market from ECAs and DFIs to finance [the remaining 40%]" and expressed the opinion that the Feasibility Study's financing chapter was "*unduly conservative*" as there was "*ample liquidity among ECAs and DFIs, and there would have been no need for a commercial tranche, meaning that no commercial bank would be asked to consider taking Project or country risk.*" He specifically rejected the argument that there was shortage of liquidity or capacity in the 2011-2012 period and presented contemporaneous statements and figures from various ECAs and DFIs in support of his opinion¹⁷⁴⁹ Mr. Pingle further explained why, in his opinion, the financing for the Oyu Tolgoi project confirmed, rather than contradicted, the assumption that there was ample capacity in the market to also fund the Reko Diq project. Specifically, he stated:

"I find the arguments of Respondent's Experts bizarre. Oyu Tolgoi does not show that Reko Diq could not have been financed. In fact, precisely the contrary is true. The successful financing of the Oyu Tolgoi project demonstrates that there was significant appetite and ample capacity for the financing of world-class mining projects, even in a challenging place like Mongolia, with an open pit mine dependent upon shipment by road to smelters in China, political turmoil, and no precedent of a large mining project in Mongolia. Oyu Tolgoi indicates that there was substantial

¹⁷⁴⁸ Henry/Howden I, pp. 13-16.

¹⁷⁴⁹ Pingle, ¶¶ 151-187.

financing capacity available, suggesting that Reko Diq could have secured the required financing.”¹⁷⁵⁰

1379. In their second report, Mr. Henry and Dr. Howden did not reiterate their argument that there was not sufficient capacity in the market to fund the project. They rather expressed the opinion that Claimant took “*a very naïve approach to debt finance and ma[d]e the critical error of believing that financial capacity of an institution is akin to willingness and credit approval to invest in a specific project in a specific jurisdiction.*” They further considered that “[s]imply having the balance sheet capability to fund a project is irrelevant and ignores the process and internal requirements before funding can be committed. Further this ‘capacity concept’ ignores the requirement for ECA’s to provide funding on the back of commercial contracts with national sponsors and, even then, funding is in most cases provided via commercial lenders with insurance cover from the ECA.”¹⁷⁵¹ In the absence of “*any meaningful*” engagement with commercial lenders during the period in question, they noted that “*any conversations with ECAs would not have been materially advanced.*” In addition, Mr. Henry and Dr. Howden noted that “[e]ven if TCC’s argument that the capacity of the DFIs and ECAs was sufficient to show appetite for funding, TCC has not shown that these institutions were deploying significant amounts into the mining space generally, let alone to a mining project in Pakistan specifically.”¹⁷⁵²

1380. In the Tribunal’s view, Mr. Henry’s and Dr. Howden’s arguments make clear that they did not uphold their initial opinion that there was unlikely to be sufficient capacity in the global debt market to provide funding for the Reko Diq project. Their argument with regard to Oyu Tolgoi rather evolved towards the issue of concentration risk which might be a factor to be considered by agencies that were already involved with the Oyu Tolgoi project. They further rejected Mr. Pingle’s opinion that no commercial tranche of funding would have been required and pointed out that “*ECA financing can cover 85% of the contract value of the export of goods and services from the ECA’s home country. The impact of this clause means that commercial lenders typically have 15% of the debt uninsured and therefore lenders take political and commercial risk on a substantial portion of the debt even where ECA cover is provided.*”¹⁷⁵³ Mr. Henry and Dr. Howden emphasized:

“It must be remembered that commercial banks take full political and credit risk on the uninsured 15% of the debt and as such, like any typical credit institution, require full assessment of the project to repay the debt facility in

¹⁷⁵⁰ Pingle, ¶¶ 188-196.

¹⁷⁵¹ Henry/Howden II, p. 10.

¹⁷⁵² Henry/Howden II, pp. 10-11.

¹⁷⁵³ Henry/Howden II, pp. 13-14.

full; ECA insurance is a risk mitigation tool for lenders and they cannot rely on this as the primary source of repayment.

The process undertaken by lenders to assess the creditworthiness of a project is rigorous, time consuming and highly involved. To a certain extent, ECAs rely on the work of the lenders, but also have additional items they require to provide the insurance cover which can materially delay the project funding.”¹⁷⁵⁴

1381. Mr. Henry and Dr. Howden considered that there was “*no evidence that banks were, in fact, lining up to fund the Reko Diq project specifically*” and noted that “*TCC had barely started engaging with ECAs, DFIs and lenders to discuss funding for Reko Diq, a process that from our own experience can take many years of hard work to complete.*” In particular, they referred to the process of structuring the financing for the Oyu Tolgoi project which took almost five years.¹⁷⁵⁵

1382. It is undisputed that Claimant had not yet received offers from any financing institutions but, as the Tribunal has already held in its Decision on Jurisdiction and Liability and as was confirmed by Mr. Luksic and also Mr. Sepúlveda at the Hearing on Quantum, it would have been premature to approach financing institutions for specific offers before the mining lease was granted. The question can therefore only be a hypothetical one, *i.e.*, whether Claimant could have obtained the necessary financing in the future if the mining lease had been granted in November 2011.

1383. As pointed out by Respondent, the Feasibility Study states in this regard:

“It is expected that the financing of the project will be possible yet particularly challenging, and that it will require Antofagasta and Barrick to provide guarantees until the project starts operations and reaches completion. It is likely that commercial appetite for the financing of the project will be limited; therefore, the anchor of the financing plan will be the multilateral agencies and export credit agencies (ECAs), with international and local commercial banks plus Islamic banks only contributing a small proportion of the financing. Among the multilateral agencies, it is anticipated that Islamic Development Bank and the Asian Development Bank will be approached, as well as the International Finance Corporation (IFC). Furthermore, the level of visibility of the procurement plan will allow the approach to certain ECAs such as JBIC, NEXI, KExim, KEIC, China Exim and European ECAs.”¹⁷⁵⁶

1384. Mr. Pingle stated in his report that he considered this to be “*an unduly pessimistic assessment*” and did not believe that the financing of the project would have been “*particularly challenging*” or that a commercial bank tranche would have been necessary.

¹⁷⁵⁴ Henry/Howden II, pp. 14-15.

¹⁷⁵⁵ Henry/Howden II, p. 16.

¹⁷⁵⁶ **Exhibit RE-576-29**, p. 29-5.

In his opinion, the entire debt financing could have been obtained from ECAs and DFIs.¹⁷⁵⁷ At the Hearing on Quantum, Mr. Pingle further stated that the necessary funding could have been provided by ECAs only, with DFIs as well as Islamic Banks and Funds being possible additional sources of funding.¹⁷⁵⁸

1385. Specifically, Mr. Pingle agreed with Mr. Henry and Dr. Howden that the OECD Arrangement Terms allow ECAs to fund up to 85% of the contract value to be covered but noted that the remaining 15% were a “*down payment*” that was initially required to be paid out of equity and it was only later that banks started to lend these 15%. He added that “*the Sponsors here have plenty of equity to fund that 15 percent down payment.*”¹⁷⁵⁹ He further explained that “[t]ypically 60 percent of a large mining project’s Project Costs are eligible for ECA financing” and noted that together with the 60% equity from the project sponsors, this would already amount to 120% of the project costs.¹⁷⁶⁰ Also referring to the DFIs and the Islamic Development Bank as a form of risk mitigation, Mr. Pingle stated that “*there’s a very limited role for commercial banks here.*” In particular, he noted that even if commercial banks were funding loans covered by ECAs, they would be taking the risk of the country standing behind the ECA. Similarly, for the ADB or IFC B loans, their risk would be non-payment by the IFC or ADB and thus “*a substantially different risk than an uncovered commercial loan would be.*”¹⁷⁶¹ He concluded:

“The commercial banks would not be central to the financing process or the project funding. There is an administrative role for the banks in terms of the ECAs, in terms of collecting drawdown documentation, submitting it for drawdown and getting payments. This is not a lending or a risk issue.

*And it’s true in all of the countries where we’re talking about ECAs. Any licensed commercial bank in that country can perform that function, including foreign banks licensed to do business in that country.”*¹⁷⁶²

1386. Mr. Pingle clarified that he was not ruling out the possibility of any funding provided by commercial banks but rather the necessity of a tranche where commercial banks would be taking country risk. He explained:

“If the ECAs only provided insurance, there could have been a commercial bank tranche. All of the institutions that are talked about can give direct loans, and people like U.S. EXIM Bank prefer to give direct loans, and during the financial crisis, direct loans were far more prevalent than--this is the period we’re talking about here--were far more prevalent than the commercial bank loans because the commercial bank loans had a liquidity

¹⁷⁵⁷ Pingle, ¶ 83.

¹⁷⁵⁸ Pingle Presentation, p. 8.

¹⁷⁵⁹ Transcript Hearing on Quantum (Day 7), p. 2119 line 18 to p. 2120 line 4.

¹⁷⁶⁰ Transcript Hearing on Quantum (Day 7), p. 2118 lines 17-19 and p. 2120 lines 8-11; Pingle Presentation, p. 8.

¹⁷⁶¹ Transcript Hearing on Quantum (Day 7), p. 2123 line 10 to p. 2124 line 3.

¹⁷⁶² Transcript Hearing on Quantum (Day 7), p. 2124 lines 4-14.

problem and the export credit agencies being government funded did not. So it would--I'm not ruling out the possibility, but it would have been less likely that there would have been any commercial bank funding."¹⁷⁶³

1387. Mr. Pingle emphasized that an ECA-insured tranche funded by a commercial bank was a "different category" than a commercial bank tranche and considered it "misleading to count it as a commercial bank tranche." When pointed to the fact that the Feasibility Study had assumed a "Commercial tranche" of USD 300 million, in addition to an "Agencies tranche" of USD 1,250 million in its financial analysis,¹⁷⁶⁴ Mr. Pingle maintained that "I don't happen to agree that they would have needed it" but confirmed that "[t]hat's what they considered they would use." Mr. Pingle also confirmed that he did not agree with Mr. Sepúlveda as to whether ECAs would provide direct funding or insurance to commercial banks.¹⁷⁶⁵ Mr. Sepúlveda had stated in this regard that "it's usual that you don't talk directly to the Export Credit Agencies. You do that through the banks because the ECAs provide insurance to commercial banks so that the commercial banks gives [sic] you the credit line. So, that is a normal practice."¹⁷⁶⁶

1388. Before addressing the differences in opinion expressed by the Parties' witnesses and experts, the Tribunal notes that it appears to be undisputed that Claimant could not have obtained uncovered commercial loans, *i.e.*, without insurance or coverage by ECAs or DFIs. Mr. Pingle specifically confirmed that "[w]e never see the commercial banks taking uncovered risk in that area, and that's true--been true for the Philippines, it's been through for Indonesia. Now, as these countries have gotten more developed and so on, the situation has improved. But I don't believe that uncovered commercial risk would have been available for this Project, and if it had been, it would have been so short a term as to have been irrelevant."¹⁷⁶⁷

1389. The Tribunal recalls that Mr. Henry and Dr. Howden initially argued that the limit of 85% being funded by ECAs meant that the remaining 15% would have to be funded by commercial lenders at their own risk. At the Hearing on Quantum, Dr. Howden agreed, however, that "the remaining amount [can be] provided in some form. It can be provided in equity, yes."¹⁷⁶⁸ He then stated that ECAs would normally insure only 95% of that 85% so that commercial banks would "still have to take a 5 percent risk on that portion of the debt being uninsured." He clarified that there would "potentially be a portion that the

¹⁷⁶³ Transcript Hearing on Quantum (Day 7), p. 2163 line 15 to p. 2164 line 5.

¹⁷⁶⁴ **Exhibit RE-576-29**, Table 29.2.

¹⁷⁶⁵ Transcript Hearing on Quantum (Day 7), p. 2166 line 7 to p. 2167 line 17.

¹⁷⁶⁶ Transcript Hearing on Quantum (Day 2), p. 496 lines 16-21.

¹⁷⁶⁷ Transcript Hearing on Quantum (Day 7), p. 2169 lines 13-22.

¹⁷⁶⁸ Transcript Hearing on Quantum (Day 8), p. 2254 lines 17-21.

banks will hold that is uninsured by the Export Credit Agency” but confirmed that he had not provided any support for this statement in his report.¹⁷⁶⁹

1390. In addition to the admitted lack of support for Dr. Howden’s statement at the Hearing on Quantum, the Tribunal also sees no reason why such a 5% or other portion could not have been paid with equity rather than having to resort to an uninsured commercial loan which, according to Mr. Pingle, would not have been available on reasonable terms. Given the contemplated amount of equity to be contributed by the owners, the Tribunal sees no reason to assume that any limitation on the amount of funding provided by ECAs would have resulted in the necessity to obtain an uninsured commercial loan.

1391. The question is therefore whether Claimant would have been able to obtain financing from ECAs or insured by ECAs and/or DFIs. Dr. Howden agreed at the Hearing on Quantum that ECAs *“can direct lend, but also lend via the commercial lenders covered by insurance”* but maintained that *“the idea that the DFIs and the ECAs themselves could have funded Reko Diq, in our view, is not grounded in the reality of the market”* and that *“you also then need the commercial lenders.”* Specifically, he maintained that ECAs would *“be generally looking to provide insurance to lenders rather than funding themselves”* as a result of which *“actual commercial banks would be involved in the transaction.”*¹⁷⁷⁰ Dr. Howden further presented the funding structure of the Oyu Tolgoi project and added:

*“So, in our view, the Reko Diq would have had a similar structure to the Oyu Tогоi transaction which included, as I said, multilaterals, Export Credit Agencies, and lenders, as a group, to actually fully fund the Project.”*¹⁷⁷¹

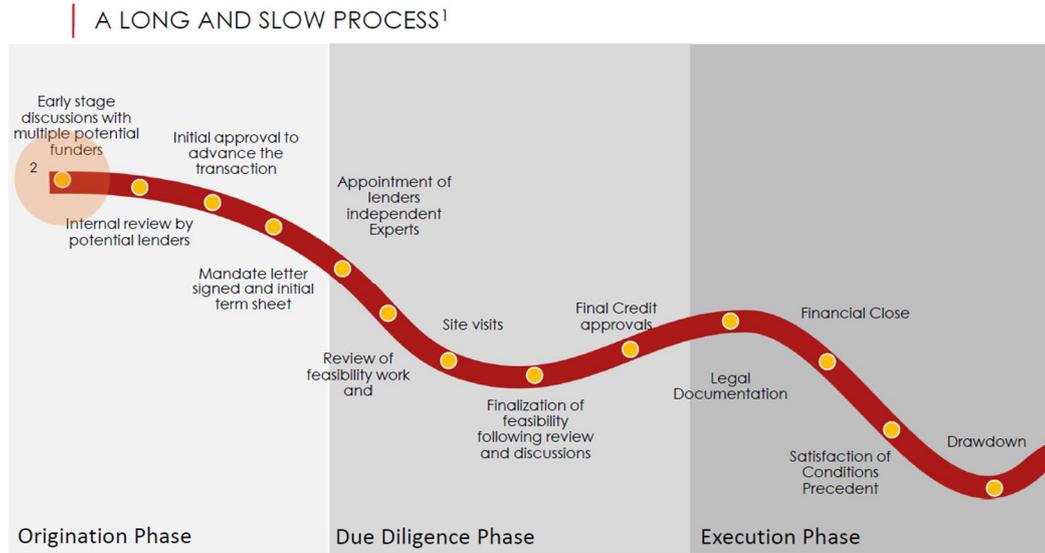
1392. Dr. Howden further emphasized that *“we’re talking about a long and slow process”* consisting of *“three distinct phases,”* which he illustrated as follows:¹⁷⁷²

¹⁷⁶⁹ Transcript Hearing on Quantum (Day 8), p. 2255 line 13 to p. 2256 line 8.

¹⁷⁷⁰ Transcript Hearing on Quantum (Day 7), p. 2185 line 1 to p. 2187 line 2.

¹⁷⁷¹ Transcript Hearing on Quantum (Day 7), p. 2188 lines 10-14. *See also* Howden Presentation, p. 4.

¹⁷⁷² Transcript Hearing on Quantum (Day 7), p. 2191 lines 1-3; Howden Presentation, p. 6.



1393. He further testified that “given the testimony we heard on Day 2 from Mr. Sepúlveda, Reko Diq was--the Sponsors were, at that point here, right at the beginning of the process. They had just engaged with lenders. They had not gone through any of the standard review processes or the mandating of any of the lenders to actually structure the transaction on their behalf.”¹⁷⁷³

1394. With regard to the timing issue raised by Dr. Howden, the Tribunal agrees that the time period it took for the Oyu Tolgoi project to finalize the structure of its debt financing could indeed be considered significant in that it may indicate a potential significant delay that the Reko Diq project could also have faced. However, the Tribunal also takes note of Dr. Howden’s testimony that for the Oyu Tolgoi project, “the first phase was completely funded by equity. The second phase was when the banks came in.”¹⁷⁷⁴ This indicates that construction of the Oyu Tolgoi project could commence and proceed while the negotiations on the debt financing were still ongoing. Also taking into account that Dr. Howden considered it likely that the funding for Reko Diq would have had a similar structure as Oyu Tolgoi, the Tribunal considers it reasonable to assume that ongoing negotiations on the structure of the debt financing for Reko Diq would not have delayed the project beyond the delays modeled by Prof. Davis as construction could have commenced based on the 60% equity contribution by Claimant’s owners.

1395. In addition, the Tribunal also takes note of Mr. Pingle’s testimony at the Hearing on Quantum that while the delay in finalizing the financing for Oyu Tolgoi was caused in part by a change in the financing concept, he did not believe that the delays were caused by financing issues but rather because certain financing commitments expired and had to

¹⁷⁷³ Transcript Hearing on Quantum (Day 7), p. 2192 lines 4-10.

¹⁷⁷⁴ Transcript Hearing on Quantum (Day 7), p. 2223 lines 9-10.

be re-established due to delays caused by other factors.¹⁷⁷⁵ This testimony was not called into question by Respondent or its experts. Taking into account that the delays modeled by Prof. Davis, which were based on data for a considerable number of copper mines around the world, the Tribunal has no basis to conclude that these delays did not also account for the risk of delays in finalizing external debt financing.

1396. The Tribunal further does not consider it necessary to express an opinion on the disagreement between Mr. Pingle and Dr. Howden as to the likeliness of commercial lenders being involved as funders of ECA-insured loans rather than direct funding by the ECAs themselves. There is no dispute that under either approach, the relevant risks of the project would have been allocated to the ECAs and not the commercial banks. While Dr. Howden placed emphasis on the fact that the likeliness of funding depended on the review and approval by the credit committees of commercial banks, the Tribunal is not convinced that the requirements would have been significantly different from those imposed by ECAs giving direct loans. The real disagreement appears to be whether the ECAs and/or a credit committee from a commercial bank would have shared the concerns raised by Respondent's experts on which Mr. Henry and Dr. Howden relied in their opinion.

1397. At the Hearing on Quantum, Dr. Howden referred to "*a number of red flags*" that "*would have potentially led to the transaction not being approved by the banks.*" In this regard, Dr. Howden referred to: (i) the "[a]vailability of water resources and rights & transnational impacts"; (ii) "[l]ack of clear fiscal terms to determine cashflows"; (iii) "[s]ecurity risks to pipeline from which revenues used to repay the debt come from"; and (iv) "[s]ecurity of tenure risk due to lack of a mining lease."¹⁷⁷⁶ On that basis, Dr. Howden concluded that "*in our view, that would mean that at this point in time, given what the Project was, that it was very unlikely that a credit committee of a mining finance bank would actually approve a transaction to lend to the project.*" He added that "*in the current form, the Project was not bankable, which would impact any quantification on the value.*"¹⁷⁷⁷

1398. In the Tribunal's view, the "*red flags*" identified by Dr. Howden show that his opinion was based on the one hand on the "*as is*" situation of the project in November 2011 in which it did not have a mining lease and on the other hand on the assumption that the water, environmental and security concerns raised by Respondent's experts would have been shared by lenders. As stated in their second report, Mr. Henry and Dr. Howden considered that "*at the time in question, ... there were clear issues around technical merits, fiscal regime, security, and water etc. that would have needed to be*

¹⁷⁷⁵ Transcript Hearing on Quantum (Day 7), p. 2131 line 4 to p. 2132 line 20.

¹⁷⁷⁶ Transcript Hearing on Quantum (Day 7), p. 2196 lines 9-12; Howden Presentation, p. 7.

¹⁷⁷⁷ Transcript Hearing on Quantum (Day 7), p. 2197 lines 10-18.

comprehensively resolved in the eyes of diligent Mining Finance institutions before debt could be advanced to Reko Diq,” referring in particular to environmental issues raised by Ms. Filas and issues regarding the security of the project site and the pipeline.¹⁷⁷⁸

1399. In this regard, the Tribunal recalls that it has addressed all of the aspects referred to by Dr. Howden in detail above. In particular, the Tribunal was not convinced by Ms. Filas’ and Dr. Connor’s opinion that the ESIA failed to conform the Equator Principles and IFC Performance Standards nor by their further criticisms regarding alleged environmental and social impact issues that they considered to be insufficiently addressed in the ESIA. As Ms. Cessford testified at the Hearing on Quantum, it was to be expected that potential lenders would require certain additional work on the ESIA but the Tribunal sees no indication based on its findings above that any of the alleged issues would have prevented lenders from considering funding for the project.
1400. The Tribunal has also concluded that none of the issues raised by Prof. Spiller or Dr. Nanni would have affected the feasibility of Claimant’s plan for the supply of water for the project. In addition, it concluded that while Claimant apparently did not account for potential extra costs associated with having to implement an aquifer injection system to mitigate possible drawdown effects into Afghanistan, these costs would not have affected the value of the Reko Diq project from the perspective of a buyer in November 2011. Consequently, even if lenders had required Claimant to include a cost estimate for this mitigation measure, the Tribunal is not convinced that this would have been a “red flag” preventing lenders from providing funding to the project.
1401. The Tribunal further concluded that Claimant’s security plans for the project’s central facilities would have been considered adequate for a project at the development stage of Reko Diq. With regard to the pipeline, the Tribunal also considered Claimant’s security plan adequate for the development stage of the project and noted that if the risks turned out to be higher than anticipated, Claimant would have been able to adapt its security plan and react to the new level of threat. The Tribunal further maintained the conclusion it had already drawn in the Decision on Jurisdiction and Liability that not all risks could be fully assessed and quantified at such an early stage and that the risk mitigation strategy would evolve over time. This might also involve the development of additional security measures following discussions with lenders but the Tribunal is not convinced that these issues would have prevented lenders from considering funding for the project.
1402. As for the lack of clear fiscal terms, the Tribunal refers to its conclusion that in the absence of Respondent’s Treaty breaches, a Mineral Agreement providing, *inter alia*, for fiscal stability would have been concluded. In this regard, the Tribunal also recalls Mr. Pingle’s

¹⁷⁷⁸ Henry/Howden II, p. 17.

statement that the involvement of lenders such as ECAs and/or DFIs often facilitates the conclusion of an agreement providing for fiscal stability with the host Government.¹⁷⁷⁹

Mr. Henry and Dr. Howden did not dispute that statement and the Tribunal therefore has no basis to assume that the absence of a Mineral Agreement would have been considered a “red flag” in that it would have prevented ECAs and DFIs from considering funding for the project. This conclusion is also confirmed by Mr. Sepúlveda’s testimony regarding the approach to obtaining project finance. In addition to the mining lease which he described as the “main milestone,” Mr. Sepúlveda explained that “with the banks, especially--or probably the World Bank, the Asian Development Bank and the ECAs, [we] form a team, and, together with these banks and the GoB, form a table with the GoP to make progress in the Mineral Agreement. So, that was the strategy of the financing.”¹⁷⁸⁰

1403. Finally, the Tribunal notes that the lack of tenure due to the absence of a mining lease must be eliminated in the but-for scenario and is therefore irrelevant to the Tribunal’s present assessment.

1404. On that basis, the Tribunal is not convinced that any of the “red flags” identified by Dr. Howden would have led the relevant committees of ECAs, DFIs and/or commercial lenders not to approve funding for the project.

1405. While this may not be sufficient in itself to draw the opposite conclusion, *i.e.*, that the relevant committees would in fact have approved funding for the project, the Tribunal recalls that Claimant’s owners were contemplating to contribute 60% equity to the project. Dr. Howden confirmed at the Hearing on Quantum that this was “a significant percentage.”¹⁷⁸¹ He also confirmed that the amount of equity they are putting in would be relevant to the lenders’ assessment but noted that “it’s a function of how much the project can withstand.” He explained that “[i]f somebody is putting in more equity [than in a typical project], it is either a function of the fact that the Project can’t support the 60 percent of the debt or they are prepared to provide more equity to make it more amenable to the banks.”¹⁷⁸²

1406. While Dr. Howden’s testimony indicates that he considered the contribution of 60% equity by the owners ambiguous in that it could also mean that the project would not be economic if it had to take more than 40% debt, the Tribunal is not convinced that any such indication would outweigh the obvious positive factors associated with this level of commitment by the project sponsors. Mr. Pingle emphasized at the Hearing on Quantum that, in his opinion, “the most important single issue in a project is the Sponsors, their

¹⁷⁷⁹ Pingle, ¶ 216.

¹⁷⁸⁰ Transcript Hearing on Quantum (Day 2), p. 495 lines 8-13.

¹⁷⁸¹ Transcript Hearing on Quantum (Day 7), p. 2213 lines 18-19.

¹⁷⁸² Transcript Hearing on Quantum (Day 8), p. 2251 line 2 to p. 2252 line 10.

capability, their experience, and the amount of money they are committing.” Referring to a usual range of 35% to 45% equity, Mr. Pingle considered that the commitment to contribute 60% “demonstrates a high level of confidence in the Project.”¹⁷⁸³

1407. In his report, Mr. Pingle already stated that “[o]ver my entire 40+ year career, I have never witnessed a project in which a sponsor was committing 60% of project costs as equity, in excess of US\$2.0 billion in cash, that failed to secure financing for technical reasons or because the lenders' engineer took issue with the project's technical work.”¹⁷⁸⁴

1408. Mr. Pingle further explained what he considered to be important factors in limited recourse project financing: (i) “[t]he identity of the project sponsors and their managerial, technical and financial capability and experience with similar projects in comparable locations”; (ii) “[t]he commitment of the project sponsors and their equity contribution,” with mining projects typically requiring, in his experience, between 35% to 45% equity; (iii) “[a] Feasibility Study that objectively and comprehensively confirms the Resource quality, quantity, and ease of mining. Lenders will consider the quality of the development program and the extensive analysis and confirmation work completed by internationally recognized consulting firms that established the existence of the mineral deposit to be mined”; and (iv) “[a] Financial Model that establishes that production can be produced and sold under reasonable price scenarios likely to be encountered and that cash flows are robust in the Base Case scenario.”¹⁷⁸⁵

1409. As pointed out by Mr. Pingle, Antofagasta was one of the ten largest copper miners in the world as of the valuation date, operating four copper mines in the Atacama Desert in Chile as well as managing a transportation network, a water purification and distribution company and Antofagasta port. Barrick was the world's largest gold producer as of the valuation date, operating 26 mines in nine countries on five continents, including a mine located in the Peruvian Andes and a mine in the Enga Province of Papua New Guinea.¹⁷⁸⁶ Teams from both companies had been involved in the exploration work and the preparation of the Feasibility Study and Expansion Pre-Feasibility Study, which had cost an amount of more than USD 240 million and were carried out with the assistance of numerous independent and internationally recognized consultants. Antofagasta and Barrick were further committed to contribute 60% of the total project costs, *i.e.*, an amount of over USD 2.3 billion, and would be seeking funding for the remaining 40%.

1410. In their second report, Mr. Henry and Dr. Howden dismissed the argument that Claimant had the full support of its sponsors by arguing that “[h]istorical sunk expenditure on exploration and feasibility work is irrelevant, with future sponsor commitment being more

¹⁷⁸³ Transcript Hearing on Quantum (Day 7), p. 2113 lines 4-18.

¹⁷⁸⁴ Pingle, ¶ 33.

¹⁷⁸⁵ Pingle, ¶ 39.

¹⁷⁸⁶ *Cf.* Pingle, ¶¶ 42-51.

of a concern for debt providers.” Specifically with regard to the contemplated commitment of 60% equity, they considered that “[t]his point has no merit and goes against the core discipline of limited recourse project finance which is standalone assessment of the project to repay the debt, including mitigation of any risks to production or sale of the commodity (i.e. technical risks, water risks and security).” Mr. Henry and Dr. Howden then reiterated their arguments regarding the absence of a firm commitment of the sponsors or an indication that the project was “next in line for development,”¹⁷⁸⁷ which have already been addressed above.

1411. The Tribunal is not convinced by Mr. Henry’s and Dr. Howden’s opinion. First, the Tribunal does not accept the argument that the amounts invested by Antofagasta and Barrick on the exploration work and preparation of the Studies would be considered irrelevant in determining whether they were committed to the development of the project. Sunk costs may be irrelevant to a DCF valuation, but they are evidence of the commitment of the owners. In addition, and while agreeing with Respondent’s experts to the extent that the future commitment of the sponsors may indeed be the more relevant aspect to consider, it is not plausible that a commitment to contribute 60% equity would be considered irrelevant by potential lenders due to the limited recourse nature of the contemplated financing.

1412. As a preliminary matter, the Tribunal notes that the Feasibility Study explicitly contemplated that Antofagasta and Barrick would have to “provide guarantees until the project starts operations and reaches completion” and that it would then be “a long term financing based upon the projected cash flows of the project during the operation phase and after reaching completion, rather than upon the balance sheets of the sponsors.”¹⁷⁸⁸ In any event, the Tribunal also does not accept the suggestion that a commitment to contribute 60% equity to a project would be irrelevant even to limited recourse financing. Even if the sponsors do not provide guarantees or other types of direct collateral to the lenders, the fact that they are willing to commit more than USD 2 billion of their own funds to the project and are thus very much interested in making this project a success, will surely increase the level of confidence that a lender would have in the project.

1413. In these circumstances, the Tribunal sees no reason to deviate from its initial conclusion that it is improbable that Antofagasta and Barrick would not have been able to obtain third-party financing. Based on the evidence now in the record, the Tribunal is further convinced that if the Mining Lease Application had been granted, Claimant and its owners would have been able to obtain the contemplated project financing.

¹⁷⁸⁷ Henry/Howden II, pp. 8, 18.

¹⁷⁸⁸ Exhibit RE-576-29, p. 29-5.

1414. In the Tribunal's view, it is not necessary to make a finding as to the precise identity of the lenders, including the question whether ECAs would have provided direct funding or would have insured commercial loans as well as whether certain DFIs would also have been part of the lender group. It is undisputed that the initial conversations with potential lenders did not progress to a stage where specific lending terms were discussed.
1415. Specifically with regard to the Asian Development Bank, Mr. Luksic testified that they *"were discussing just the principal ideas and their appetite and the possibility of them joining us in this Project. And my recollection is that they were very positive about it."*¹⁷⁸⁹ Mr. Sepúlveda also testified that while there were *"recurrent conversations"* with banks with whom they had relationships, such as *"with Japanese banks, with French banks, ... with China Development Bank, ... with Citibank, Standard Charter, American banks also,"* *"the main conclusion was, first, obtain the Mining Lease, and then go and get financing."*¹⁷⁹⁰ He further confirmed that *"[w]e didn't talk about the rates. What we discussed was about who would be the lenders, and what would be the strategy to approach the lenders."*¹⁷⁹¹
1416. On that basis, the Tribunal considers it undisputed that as of the valuation date, it was not yet clear from which lenders and at which cost Claimant would obtain financing for the 40% debt portion. As confirmed by Mr. Luksic, the loan terms underlying the financial analysis in the Feasibility Study were an estimate of what they considered to be reasonable terms of financing at the time.
1417. The question for the Tribunal to address is therefore whether the remaining uncertainty as to the actual costs of debt financing were adequately accounted for by Prof. Davis in his valuation model. As noted above, Prof. Davis explained in his first report that due to the uncertainties regarding external debt financing, his valuation assumed all equity financing. In his opinion, this assumption was conservative as external borrowing would have resulted in interest tax deductions and thereby increased the project's value.¹⁷⁹²
1418. Neither Respondent nor its experts disputed the statement that assuming all equity financing resulted in higher costs than assuming 40% debt financing. In particular, there has been no allegation that the cost of obtaining debt financing from ECAs and/or DFIs and/or commercial banks insured by ECAs would have been higher than the cost of equity applied by Prof. Davis. To the contrary, Respondent asked Mr. Sepúlveda to confirm at the Hearing on Quantum that *"as a matter of corporate finance, the Cost of Equity is*

¹⁷⁸⁹ Transcript Hearing on Quantum (Day 5), p. 1299 line 14 to p. 1300 line 1.

¹⁷⁹⁰ Transcript Hearing on Quantum (Day 2), p. 496 lines 4-13.

¹⁷⁹¹ Transcript Hearing on Quantum (Day 2), p. 497 line 22 to p. 498 line 2.

¹⁷⁹² Davis I, ¶ 191.

higher than the Cost of Financing” to which Mr. Sepúlveda responded that “[i]t usually is, yes” and confirmed that he did not think that this case would be an exception.¹⁷⁹³

1419. In the absence of any dispute that the costs for all equity financing as assumed by Prof. Davis were higher than the costs for the contemplated combined equity and external debt financing, it is also apparent that any external debt financing obtained by Claimant and its owners would only have served to decrease but not to increase the costs assumed by Prof. Davis in his model. In these circumstances, the Tribunal does not consider it necessary to make a finding as to the likely actual costs of the debt financing because the remaining uncertainty regarding these costs has been sufficiently accounted for by Prof. Davis’ assumption of all equity financing.

1420. Consequently, the Tribunal concludes that Claimant has established that it could have obtained the necessary financing for the project and that Prof. Davis has adequately accounted for the associated with financing, including the uncertainty as to the precise identity of the lenders and the terms at which they would provide funding to the project.

10. Conclusion

1421. For the reasons set out in detail above and based on its review and evaluation of the evidentiary record, the Tribunal considers it established that Claimant would have concluded a Mineral Agreement with the Federal and Provincial Governments, and further that Claimant has established the feasibility and financeability of the project. In particular, the Tribunal made the following findings:

- 1) *Mineral Agreement and fiscal terms*: Claimant would most likely have reached agreement with the Governments on the terms of the Mineral Agreement, but these terms would have differed to a certain extent from the terms assumed by Prof. Davis in his main valuation. Specifically, the terms would most likely have included: (i) a sliding scale of royalties increasing from 2.5% to 4% over the life of the mine, thereby reducing Claimant’s damages by USD 287 million; and (ii) a provision regarding the renewal of the Mining Lease; however, a buyer would have factored in the risk that the Mining Lease might not be renewed or might not be renewed on the same terms, thereby reducing Claimant’s damages by a further USD 744.5 million.
- 2) *Estimation and classification of resources*: Claimant has established that the estimation and classification of the resources reported in the Feasibility Study, which formed the basis for Prof. Davis’ valuation of Claimant’s damage, is in accordance with industry practice and corresponded to an exercise of “good judgment” by the relevant Competent Persons within Barrick and Antofagasta

¹⁷⁹³ Transcript Hearing on Quantum (Day 2), p. 499 lines 4-10.

who adopted and implemented the method, which Mr. Rossi had proposed upon his review of the methods previously applied by Claimant's two owners in March 2009.

- 3) *Metallurgical sampling and testing*: Claimant has established that the metallurgical sampling was adequate and in line with industry standards. The Tribunal further has no reason to believe that the metallurgical testing conducted by AMMTEC was inadequate or that such tests showed variability that would have affected the value attributed by a willing buyer to Claimant's investment.
- 4) *Project execution*: The Tribunal has no reason to believe that Claimant's plans for executing the project and the capital cost estimate, as adjusted by Prof. Davis, would have been considered inadequate by a buyer in November 2011.
- 5) *Water supply*: Claimant has established that none of the issues raised by Respondent would have affected the feasibility of Claimant's plan for the supply of water to the project. While it appears to the Tribunal that Claimant has not accounted for the potential extra costs associated with having to implement an aquifer injection system to mitigate possible drawdown effects into Afghanistan, the Tribunal does not consider that this would have affected the value of the Reko Diq project from the perspective of a buyer in November 2011.
- 6) *Security risks*: Claimant has established that its security plans for the project would have been considered adequate for a project at the development stage of Reko Diq and that, if particularly the risks affecting the pipeline turned out to be higher than anticipated, Claimant would have been able to adapt its security plan and react to the new level of threat. However, the Tribunal concluded that in order to adequately capture the residual risk caused by political violence, a buyer would have applied a higher annual probability of permanent shutdown than assumed by Prof. Davis in his valuation model, thereby reducing Claimant's damages by USD 711.5 million.
- 7) *Environmental and social impacts*: Claimant has established that it adequately addressed the environmental and social impacts of the project. The Tribunal is not convinced that any of the alleged non-conformities of the ESIA with the relevant environmental standards and regulatory requirements would have caused significant additional work and/or costs for which Claimant should have accounted in the cost estimate of the Feasibility Study. The Tribunal also has no basis to assume that a lender would have considered the cost that Claimant contemplated to spend on the community programs it had described insufficient. However, Claimant itself based its submission regarding the amounts it intended to spend for community programs on a revised offer of 4 October 2010 which included certain additional community initiatives beyond the costs reflected in the

Feasibility Study and Prof. Davis' model, which reduces Claimant's damages by USD 100 million.

- 8) *Permits and land rights*: Claimant has established that the delays modeled by Prof. Davis in his valuation to account for potential difficulties in obtaining relevant permits and/or land rights would have been considered sufficient by a buyer as of the valuation date.
- 9) *Financing*: Claimant has established that it could have obtained the necessary financing for the project. The Tribunal has no reason to doubt that Claimant's owners would have been willing and able to contribute the contemplated amount of equity funding to the project and that, if the Mining Lease Application had been granted, Claimant and its owners would have been able to obtain the contemplated project financing for the remaining portion of the project costs. While it was not yet certain which lenders would provide funding and at what terms, Prof. Davis has adequately accounted for this uncertainty by assuming the higher costs of all equity financing.

1422. On that basis, the Tribunal concludes that in order to account for the risks and concerns addressed in detail above, Claimant's damages must be reduced by an amount of USD 1,843 million.

D. Value of Claimant's Investment

1423. Having assessed the risks and issues raised by Respondent regarding the feasibility and profitability of the project, the Tribunal will now assess whether Prof. Davis has appropriately accounted for all relevant systematic and asymmetric risks of the project.

1424. Certain asymmetric risks, such as the risk of an early shut-down of the mine or delays in commencing construction and operations of the mine, have already been addressed in detail above. However, the Tribunal still has to assess whether Prof. Davis has appropriately addressed the systematic risk arising from, in particular, the fluctuation of prices for gold, copper and oil. More generally, the Tribunal will also address the question whether Claimant has established that Prof. Davis has accounted for all relevant systematic and asymmetric risks in his projection of future cash flows, including country risk, thereby justifying a risk-free discount rate which only accounts for the time value of money, or whether certain additional adjustments are warranted to fully capture the risks of the project as of November 2011.

1. Summary of Claimant's Position

1425. Claimant submits that Prof. Davis appropriately discounted the project's future cash flows for both systematic and asymmetric risks as well as for the time value of money. As for systematic risk, Claimant explains that Prof. Davis applied risk-adjusted cash flows

derived from futures and forward prices; it argues that “[b]ecause buyers in the forward market are exposed to systematic risk, the prices in futures contracts are already discounted for systematic risk.”¹⁷⁹⁴

1426. Claimant rejects Respondent’s allegation that the cash flows in Prof. Davis’ model are the same as the cash flows in the DCF model of the Expansion Pre-Feasibility Study. Claimant refers to Prof. Davis who testified that there are “*clear and large differences*” between the copper and gold revenues in the two models and demonstrated that the capital costs in his model are approximately 40% higher than in the Expansion Pre-Feasibility Study.¹⁷⁹⁵

1427. According to Claimant, Respondent’s experts, for the purposes of their comparison, “*arbitrarily reduced the EXP Pre-Feasibility Study prices by 20% below the base assumption,*” initially without providing any explanation. As for the explanation provided by Mr. Brailovsky and Prof. Wells in their second report that the change was “*a short cut to compensate for the fact that real output prices in the SNC-Lavalin [scenario] are indeed higher than those of Brattle and the former does not include the government equity take and risk adjustments,*” Claimant considers that it “*makes no sense*” as the government equity take could have been accounted for by taking 75% of each year’s cash flows. In addition, Claimant contends that their reference to higher “*real output prices*” in fact demonstrates that Prof. Davis indeed used risk-adjusted prices.¹⁷⁹⁶

1428. Claimant also rejects Mr. Brailovsky’s and Prof. Wells’ argument that they “*normalized*” the model in the Expansion Pre-Feasibility Study, noting that Mr. Brailovsky acknowledged at the Hearing on Quantum that there was initially an average difference of USD 3.8 billion in gross revenues, which he “*assumed away by setting the prices equal to each other.*” According to Claimant, Mr. Brailovsky and Prof. Wells thereby effectively assumed away the systematic risk discount applied by Prof. Davis; they also admitted that they were not trying to test with that exercise whether Prof. Davis’ figures were discounted for systematic risk.¹⁷⁹⁷

1429. In any event, Claimant considers that the “*normalized*” model still “*differs significantly*” from Prof. Davis’ model, as demonstrated by the table presented by Mr. Brailovsky and Prof. Wells in their second report. According to Claimant, the copper and gold revenues are “*radically different between the models, with the copper revenues nearly 40% higher*

¹⁷⁹⁴ Claimant’s Quantum Post-Hearing Brief, ¶¶ 320-321, 323; Claimant’s Quantum Reply, ¶ 205.

¹⁷⁹⁵ Claimant’s Quantum Post-Hearing Brief, ¶¶ 324-325, *quoting from Davis II*, ¶ 107 and referring to Figures 2, 3 and 4.

¹⁷⁹⁶ Claimant’s Quantum Post-Hearing Brief, ¶¶ 326-328, *referring to Brailovsky/Wells I*, ¶ 19 and note 24, *Brailovsky/Wells II*, ¶ 91 and Transcript Hearing on Quantum (Day 8), pp. 2615, 2618, 2628.

¹⁷⁹⁷ Claimant’s Quantum Post-Hearing Brief, ¶ 329, *referring to Brailovsky/Wells II*, Table 3 and Graph 5 and Transcript Hearing on Quantum (Day 8), pp. 2636-2637.

and the gold revenue more than 50% lower in the ‘normalized’ model.” Claimant also points to the expenditure estimates which “*vary widely, with around 10% higher Opex estimates and 27% lower Capex estimates in the ‘normalized’ model.*”¹⁷⁹⁸ In addition, Claimant notes that by contrast to Prof. Davis, Respondent’s experts did not update the Expansion Pre-Feasibility Study model, which dated from June 2010, to the valuation date even though Prof. Wells conceded that the prices and price expectations “*were quite materially different.*” They also did not contest that Prof. Davis’ approach to updating the model was appropriate, which shows an “*even greater*” difference in cash flows between the updated model and Prof. Davis’ risk-adjusted cash flows.¹⁷⁹⁹

1430. Claimant emphasizes that contrary to Mr. Brailovsky’s suggestion at the Hearing on Quantum, Prof. Davis did not apply in his update the spot prices on the valuation date but rather the (lower) average of the price projections used by mining companies in publicly available reports at the time.¹⁸⁰⁰

1431. Claimant further rejects the allegation that Prof. Davis’ model implies a 4.2% discount rate, which would be only 1.2 percentage points above the risk-free rate. According to Claimant, Respondent’s experts in their reverse engineering exercise fail to back out even some of the significant asymmetric risk adjustments made by Prof. Davis, such as the risks of cost overruns and ramp-up delay. Claimant contends that accurately backing out these risks would produce a higher a discount rate but argues that in any event, Respondent has not provided any basis for its claim that 4.2% is a low number for discount-rate equivalents of asymmetric risks in mining projects.¹⁸⁰¹

1432. More importantly, Claimant contends that Mr. Brailovsky’s and Prof. Wells’ exercise does not quantify the discount for systematic risk, which Prof. Davis discounted separately from asymmetric risk. Claimant refers to Prof. Davis’ explanation that backing out systematic risk would lead to a still higher discount rate but that it “*is not possible reliably to derive this missing figure*” due to the difficulties in attempting to “*estimate the actual spot prices for copper, gold, and oil that the project would be exposed to.*” Claimant further quotes from Prof. Davis’ explanation that this is “[o]ne of the reasons that this

¹⁷⁹⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 330, referring to Brailovsky/Wells II, Table 3.

¹⁷⁹⁹ Claimant’s Quantum Post-Hearing Brief, ¶¶ 332-335, referring to Transcript Hearing on Quantum (Day 8), pp. 2628-2619, 2381-2382, 2661, and Davis II, ¶¶ 301-302, Exhibits CE-1556, CE-1779 and CE-1779, Davis Presentation, p. 38.

¹⁸⁰⁰ Claimant’s Quantum Post-Hearing Brief, ¶¶ 337-338, quoting from Transcript Hearing on Quantum (Day 8), p. 2655 and referring to Davis I, Workpaper 18 and Davis II, Workpaper R-18.

¹⁸⁰¹ Claimant’s Quantum Post-Hearing Brief, ¶¶ 340-341, referring to Brailovsky/Wells II, Table 4, and Davis II, Workpaper R-1 and ¶¶ 85-86.

*modern approach has gained traction and is demanded by industry ... because it obviates the need to calculate that unknowable number.*¹⁸⁰²

1433. As a result, Claimant claims that Respondent's experts cannot calculate an implied discount rate for Prof. Davis' valuation. Claimant maintains, however, that the discount for systematic risk "*is likely to be significant*" as it encompasses the risks regarding price fluctuations, with a "*massive*" range of variability around the prices for copper, gold and oil.¹⁸⁰³

1434. Claimant further submits that Prof. Davis' approach of using risk-adjusted prices from the futures and forward markets is appropriate and fully accounts for the systematic risk of the project arising from its exposure to price uncertainty. Claimant emphasizes that Prof. Davis has not modeled what *actual* future prices are likely to be but rather what future prices are likely to be *on a risk-adjusted basis* and adds that forward market prices "*are the market's actual risk-adjusted expectations of what future prices will be.*" It argues that "[t]he market prices combine the market's average price expectation with the market's pricing of the associated uncertainty, creating a reliable and market-based way to account for systematic risk." Claimant refers to Prof. Davis' explanation that the use of risk-adjusted prices is "[o]ne of the core advantages of the modern DCF method" as it eliminates the need to forecast spot commodity prices and enables him to use prices that are "*directly observable in the futures market for shorter maturities and can be estimated using accepted models for longer maturities.*"¹⁸⁰⁴

1435. According to Claimant, the fact that futures prices incorporate systemic risk is supported by the academic literature and was also accepted by Prof. Wells, at least for oil, at the Hearing on Quantum. Claimant contends that using forward prices is also an accepted practice for valuation in the mining industry and refers to a report from CIMVal in 2012 that "*in appropriate circumstances a commodity price forecast may be derived from its forward price curve*" as the "*forward price is considered a risk-adjusted expected price.*"¹⁸⁰⁵

1436. Claimant submits that Prof. Davis' approach is consistent with industry practice and explains that for gold, he used futures prices and quotes on forward markets for the first ten years and then extended the prices out by using formulas derived from the market data together with statistical computations to simulate "*the wide range of potential future price*

¹⁸⁰² Claimant's Quantum Post-Hearing Brief, ¶¶ 342-344, referring to Davis Presentation, pp. 41, 43 and quoting from Transcript Hearing on Quantum (Day 8), pp. 2511-2512.

¹⁸⁰³ Claimant's Quantum Post-Hearing Brief, ¶¶ 345-346.

¹⁸⁰⁴ Claimant's Quantum Post-Hearing Brief, ¶¶ 347-348, quoting from Davis II, ¶¶ 117-118; Claimant's Quantum Reply, ¶¶ 223-224, 227, referring to Davis II, ¶¶ 120, 59.

¹⁸⁰⁵ Claimant's Quantum Post-Hearing Brief, ¶¶ 349-350, referring to **Exhibit CE-1764**, p. 793 (admitted *de bene esse*), Transcript Hearing on Quantum (Day 8), p. 2697 and quoting from **Exhibit CE-1483**, p. 10.

scenarios.”¹⁸⁰⁶ Claimant emphasizes that Prof. Davis did not model a fixed or “static” projected price at each point in the future but rather took a probabilistic approach, modelling a range of prices that might occur at each future point in time. Claimant notes that Respondent’s experts agreed with taking a probabilistic approach and raised only very narrow criticisms, focusing on Prof. Davis’ modeling of risk-adjusted gold prices.¹⁸⁰⁷

1437. As for the argument raised in Mr. Brailovsky’s and Prof. Wells’ first report that it was inappropriate to rely on forward market prices because Claimant could not have sold its entire expected production into the market, Claimant emphasizes that such an assumption does not form part of Prof. Davis’ model which rather simulates sales of the mine’s output in the future over the life of the mine “*under a wide range of potential scenarios for what the prices in those future years might be.*” Claimant explains that the risk-adjustment in Prof. Davis’ prices is not derived from prices being locked in through actual forward market transactions but rather from the fact that they “*reflect[] both the market’s forecasted price of copper and the market’s risk preferences over the uncertainty in that forecast,*” revealing “*the net result of these two items, the risk-adjusted forecasted price.*”¹⁸⁰⁸

1438. Claimant further rejects the argument raised by Respondent’s experts that Prof. Davis should have used analysts’ predictions for the gold price (but not the copper price), emphasizing that analysts do not forecast risk-adjusted prices or the average or expected value at particular future times and maintaining that “*market prices are the best, and indeed only options for risk-adjusted prices.*”¹⁸⁰⁹ In addition, Claimant claims that analyst forecasts are “*materially inaccurate*” and refers to Prof. Davis’ illustration of the fact that the Consensus Economics forecast relied on by Respondent’s experts consistently under-predicted actual future gold prices when the market was rising; they also over-predicted prices when the market was falling. Claimant also refers to Prof. Davis’ testimony that analyst prices “*are not even traded prices. ... They are just projections of something, and we are not sure what they are*” and that he was not sure who relied on them and for what purpose. According to Claimant, Mr. Brailovsky and Prof. Wells also offered contradicting testimony on which prices the forecasts actually predict.¹⁸¹⁰ It therefore maintains that “[t]he pricing of actual forward transactions by market participants with

¹⁸⁰⁶ Claimant’s Quantum Post-Hearing Brief, ¶ 351.

¹⁸⁰⁷ Claimant’s Quantum Reply, ¶¶ 206-207, 213-214, referring to Davis I, Appendix C and Brailovsky/Wells I, ¶¶ 143, 83.

¹⁸⁰⁸ Claimant’s Quantum Reply, ¶¶ 217-220, referring to Davis I, ¶¶ 96-101, 218-222 and quoting from ¶ 90, note 97.

¹⁸⁰⁹ Claimant’s Quantum Post-Hearing Brief, ¶¶ 352-354, referring to Transcript Hearing on Quantum (Day 8), p. 2347; Claimant’s Quantum Reply, ¶¶ 206-208, referring to Davis I, ¶ 90, note 97; Claimant’s Quantum Reply, ¶¶ 2227-227.

¹⁸¹⁰ Claimant’s Quantum Post-Hearing Brief, ¶¶ 355-359, referring to Davis II, Figure 6 and quoting from Transcript Hearing on Quantum (Day 8), pp. 2347, 2526-2527, 2671, 2674.

billions of dollars at stake provides a much more reliable indication of market participants' actual risk-adjusted expectations of future prices than analysts' predictions."¹⁸¹¹

1439. Claimant also rejects the criticisms regarding Prof. Davis' use of forward curves to extend the price forecasts into the future, arguing that "*forward prices are the most accurate indication of risk-adjusted future price expectations*" as they "*show the market's actual consensus risk-adjusted price expectations of what future prices will be.*" In Claimant's view, the existence of gold arbitrage also does not render it inappropriate to use gold forward prices given that Respondent's experts acknowledged that "*gold behaves like a currency in the forward markets*" and investors therefore expect it to at least hold its value in real terms, resulting in a rise in nominal terms. Claimant notes that CIMVal also reports about "*concerns about liquidity, incomplete forward curves, or the observation that a forward price is a mathematical calculation*" but adds that "*these reasons do not prevent the use of forward curves in generating a price forecast.*"¹⁸¹²

1440. Claimant further considers that Prof. Wells backed away from his previous concern whether there was sufficient liquidity for futures markets to show market expectations, testifying that "*there always is*" liquidity four years out in the gold futures market and acknowledging that on the valuation date, the gold future price four years out was supported by USD 1.5 billion in the market.¹⁸¹³

1441. Claimant contends that Prof. Davis' method of extending out the forward curve by applying an algorithm to the forward prices, which are based on market activity up to ten years out, followed recognized practices in the mining industry. It quotes from CIMVal's conclusion that "[m]etal price forecasts based on the forward curve may be extended beyond the publicly quoted prices based on the characteristics of the metal (base metal or precious metal) and the market characteristics of the forward curve."¹⁸¹⁴

1442. Specifically with regard to the projection of the gold price, Claimant emphasizes that Mr. Brailovsky and Prof. Wells recognize that "*gold behaves like a currency in the forward markets*" and adds that the gold price does not rise or fall with industry demand or expectations of global growth but that gold is rather used as a hedge against inflation and expected to hold its value in real terms. Claimant then refers to Prof. Davis' illustration that in real terms, his price projects are nearly flat, and notes that the nominal annual

¹⁸¹¹ Claimant's Quantum Reply, ¶ 229, referring to Davis II, ¶ 131.

¹⁸¹² Claimant's Quantum Post-Hearing Brief, ¶¶ 361-364, referring to Davis II, ¶ 59, 65, and quoting from **Exhibit CE-1483**, p. 10.

¹⁸¹³ Claimant's Quantum Post-Hearing Brief, ¶ 365, quoting from Transcript Hearing on Quantum (Day 9), p. 2692 and referring to p. 2694.

¹⁸¹⁴ Claimant's Quantum Post-Hearing Brief, ¶¶ 366-367, quoting from **Exhibit CE-1483**, p. 10.

compound growth rate of 3% assumed by Prof. Davis is “*far lower than the 8% historical annual compound growth from 1970 through the valuation date.*”¹⁸¹⁵

1443. Claimant notes that Respondent’s experts explicitly acknowledged in their first report that the gold price is not mean-reverting but rather “*varies as a random walk process with a drift*”; in their second report, however, they came up with a statistical test to confirm the opposite. Claimant requests that this test be disregarded as untimely because it prevented Prof. Davis from being able to properly respond; in any event, it should be given no weight due to its underdevelopment and substantive flaws. Claimant contends that Respondent’s experts first relied on the wrong statistical test, *i.e.*, a “*standard t-test,*” even though the very textbook they rely on notes that “*one cannot use a standard t-test to determine whether the estimate of N is significantly different from zero.*”¹⁸¹⁶ Claimant notes that Mr. Brailovsky and Prof. Wells appear to acknowledge that error by performing the correct unit root test recommended by their own source in an excel sheet introduced at the Hearing on Quantum and claims that the test, albeit not effective with only 30 to 40 years of data, yields the opposite conclusion from the one stated in their second report, namely that it cannot be rejected statistically that gold prices are not mean-reverting.¹⁸¹⁷

1444. Claimant further considers it “*common sense*” that gold prices are not mean-reverting and refers to Mr. Brailovsky’s and Prof. Wells’ illustration of their alleged mean-reverting price against the upward slope of the historical gold spot price. In Claimant’s view, there is not “*a shred of evidence*” to support Respondent’s allegation that gold will start to behave “*fundamentally different in the future than it has for generations.*”¹⁸¹⁸

1445. As for Prof. Davis’ modelling of risk-adjusted copper prices, Claimant notes that he projects them to “*drop[] steadily over the life of the mine*” to a price “*far below the lowest inflation-adjusted price of copper in the past 60 years.*” In Claimant’s view, “[t]his is consistent with copper forward prices showing the combined effects of the market’s expectations for what prices will be, on average, at future times and the market’s pricing of systematic risk.” Claimant adds that this downward trend is also consistent with copper being a commodity rather than an investment asset like gold. It emphasizes that Reko Diq contains far more copper than gold and argues that Prof. Davis’ copper price projection confirms that he did not use inflated price projections to create an artificially high value.¹⁸¹⁹

¹⁸¹⁵ Claimant’s Quantum Post-Hearing Brief, ¶¶ 368-371, quoting from Brailovsky/Wells II, ¶ 65 and referring to Transcript Hearing on Quantum (Day 8), pp. 2343-2345, and Davis Presentation, p. 22.

¹⁸¹⁶ Claimant’s Quantum Post-Hearing Brief, ¶¶ 372-377, referring to Brailovsky/Wells I, ¶ 143, Brailovsky/Wells II, ¶ 61 and **Exhibit CE-1766**, p. 77 (admitted *de bene esse*). See also Claimant’s Quantum Reply, ¶ 212.

¹⁸¹⁷ Claimant’s Quantum Post-Hearing Brief, ¶¶ 378-379, referring to **Exhibits CE-1782A and CE-1766**, p. 77 (both admitted *de bene esse*).

¹⁸¹⁸ Claimant’s Quantum Post-Hearing Brief, ¶¶ 380-382, referring to **Exhibit BW-82.08**.

¹⁸¹⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 387.

1446. Claimant also rejects the argument that it was inconsistent for Prof. Davis not to rely on forward market prices to also model the costs of the project. Claimant argues that reliable forward market prices exist only for fuel but not for other cost items such as equipment and labor as well as other capital and operating expenditures. According to Claimant, Prof. Davis therefore relied on “*the same uncontroversial techniques that are regularly used in traditional DCF analyses*” when there is no appropriate forward market data. He used Claimant’s “*detailed mine plans*” as a starting point but then adjusted the costs upwards to account for inflation, cost escalation and asymmetric risk.¹⁸²⁰
1447. Claimant agrees with Mr. Brailovsky and Prof. Wells that together with the increase of metals prices between the Feasibility Study and the valuation date, costs also increased and submits that Prof. Davis therefore adjusted costs upward by 18% based on an updated capital costs schedule prepared by Barrick. Claimant notes that together with the adjustments for cost escalation, inflation and asymmetric risk, Prof. Davis increased costs by a total of 58% and thus by more than the “*up to 50%*” that Mr. Brailovsky and Prof. Wells referred to in their first report.¹⁸²¹
1448. With regard to the volatility of capital costs, Claimant submits that Prof. Davis initially did not include variability of capital costs into his model “[t]o avoid needless complexity” as he did not expect such an adjustment to have a significant effect; however, following the criticism of Respondent’s experts, he did perform such a test and concluded that incorporating cost variability has a “*negligible effect.*”¹⁸²² Specifically, Prof. Davis concluded that randomizing capital costs would change his valuation estimate by approximately 1.5%.¹⁸²³
1449. Claimant also notes that the capital costs modeled by Prof. Davis were 58% higher in nominal terms and 33% higher in real terms than the capital costs in Claimant’s feasibility studies. In Claimant’s view, there is therefore no basis for Mr. Brailovsky’s and Prof. Wells’ argument that Prof. Davis should have used a higher probability distribution mean in order to account for average cost overruns of 25%, which would result in double-counting the risk already included in Prof. Davis’ modeling of the capital costs themselves.¹⁸²⁴

¹⁸²⁰ Claimant’s Reply on Quantum, ¶¶ 231-236, referring to Davis II, ¶¶ 203, 45 and Davis I, ¶¶ 155-199.

¹⁸²¹ Claimant’s Reply on Quantum, ¶¶ 240-244, referring to Davis I, ¶¶ 156, 159, Brailovsky/Wells I, ¶ 39, **Exhibit BW-17**, and Davis II, ¶¶ 155-163.

¹⁸²² Claimant’s Quantum Post-Hearing Brief, ¶ 436, quoting from Davis II, ¶¶ 188-190.

¹⁸²³ Claimant’s Reply on Quantum, ¶ 238, referring to Davis II, ¶¶ 188-190.

¹⁸²⁴ Claimant’s Quantum Post-Hearing Brief, ¶¶ 437-439, referring to Davis Presentation, p. 30 and Brailovsky/Wells II, Table 3 and ¶ 145.

1450. Claimant further submits that Prof. Davis has also fully accounted for asymmetric risks, including the country risk affecting the project because of its location in Pakistan and in particular Balochistan.¹⁸²⁵
1451. Claimant notes that on Respondent's own case, the most prominent risks associated with the project's location are political violence and security risks. It refers to Prof. Davis' explanation that the proper way to account for these and other asymmetric risks is "*to directly adjust the cash flow components affected by these risks.*"¹⁸²⁶
1452. Claimant contends that Respondent and its experts have not identified any security risks or potential security costs that Prof. Davis failed to account for in his model, rejecting in particular the argument that he did not account for the risks identified in Claimant's risk register.¹⁸²⁷ According to Claimant, Prof. Davis modeled and quantified several country-related risks identified by Claimant in its risk register, such as "[c]riminal extortion & kidnap caused by criminal groups," "[t]heft of explosives & blasting accessories," "[s]abotage of [e]quipment & [s]tructures," and "[m]ilitary operations against the Taliban in Afghanistan Helmand province spilling over."¹⁸²⁸
1453. Claimant argues that Prof. Davis took these security risks into account in three ways: (i) he incorporated an annual 0.5% probability of a complete and permanent project shutdown which reduced the value of Claimant's investment by USD 1.4 billion and, in Claimant's view, is "*an extremely conservative assumption*";¹⁸²⁹ (ii) he included "*substantial premiums for insurance that would protect against the effects of political violence, terrorist attacks, and other security threats,*" covering business interruptions of more than 30 days and totaling nearly USD 9 million per year;¹⁸³⁰ and (iii) he adjusted various costs and production quantities to reflect the residual risk of various security threats, which in total reduced the projected cash flows by USD 13.9 million per year for the first five years and USD 5.7 million per year thereafter.¹⁸³¹
1454. Claimant rejects the argument that the annual probability of an early shutdown is too low and notes that Mr. Brailovsky and Prof. Wells do not provide any analysis or suggestion how the security risks should have been modeled instead.¹⁸³² Claimant also maintains that

¹⁸²⁵ Claimant's Quantum Post-Hearing Brief, ¶¶ 389-390; Claimant's Quantum Reply, ¶ 246.

¹⁸²⁶ Claimant's Quantum Post-Hearing Brief, ¶¶ 390-391, *quoting from* Davis II, ¶ 42.

¹⁸²⁷ Claimant's Quantum Reply, ¶ 245.

¹⁸²⁸ Claimant's Quantum Post-Hearing Brief, ¶ 392, *quoting from* Davis Presentation, p. 34.

¹⁸²⁹ Claimant's Quantum Post-Hearing Brief, ¶¶ 393-394, *referring to* Davis II, ¶ 178 *and* Transcript Hearing on Quantum (Day 8), pp. 2352-2354; Claimant's Quantum Reply, ¶ 248, *referring to* Davis II, ¶¶ 176-178 *and* Davis I, ¶ 189.

¹⁸³⁰ Claimant's Quantum Reply, ¶ 249, *referring to* Davis I, ¶ 189, **Exhibits RE-577-24**, pp. 24-28 to 24-29 *and* **RE-577-29**, p. 29-18.

¹⁸³¹ Claimant's Quantum Reply, ¶ 250, *referring to* Davis I, Workpaper 26.

¹⁸³² Claimant's Quantum Reply, ¶ 251

Dr. Burrows' suggestion that it should use a discount rate based on Pakistan's sovereign yield spread is "*invalid and does not provide any basis to question Prof. Davis's treatment of country risk*"; the same applies to his belated reliance on a regression analysis performed by Dr. Bekaert, which does not work for Pakistan.¹⁸³³

1455. Finally, Claimant maintains that the additional security costs proposed by Respondent's expert Mr. Davies would not have been necessary but notes that, in any event, factoring them in would reduce the project's value only by USD 370 million. As Prof. Davis did not reduce the premature shutdown risk in this sensitivity calculation, he concluded that the potential effect on value of the security threats identified by Respondent's experts have already been taken into account in his model.¹⁸³⁴

1456. In addition to country risk, Claimant asserts that Prof. Davis also accounted for further asymmetric risk by incorporating the potential effects of project delays. Specifically, Claimant argues that he included a delay of at least six months before start of construction in each of his simulations and assumed that construction would, on average, start 2.3 years after Claimant had anticipated, which reduced the value of Claimant's investment by USD 1.3 billion.¹⁸³⁵

2. Summary of Respondent's Position

1457. Respondent takes the position that Prof. Davis has not adequately accounted for the systematic risks in his valuation model because he has used "*inordinately speculative*" projections of futures prices.¹⁸³⁶

1458. Respondent notes that Claimant's expert purported to apply prices for the futures markets and even called his projections "*certainty-equivalent*". To the contrary, however, Respondent refers to its experts who explained that "*futures' markets are not the best predictors of prices, and the valuation best practices would have been to rely on the price forecasts by the community of experts and entities active in the field, which are blended into consensus forecasts.*" Respondent claims that these forecasts "*are followed by the industry in their estimations of future prices*" and would "*without doubt have been the basis on which the hypothetical buyer and seller would have based their price forecasts,*" as Claimant and its shareholders did in the Expansion Pre-Feasibility Study and their annual reports.¹⁸³⁷

¹⁸³³ Claimant's Quantum Post-Hearing Brief, ¶¶ 405-432.

¹⁸³⁴ Claimant's Quantum Reply, ¶¶ 252-253, referring to Davis II, ¶¶ 185, 187.

¹⁸³⁵ Claimant's Quantum Reply, ¶ 255, referring to Davis II, ¶ 85.

¹⁸³⁶ Respondent's Rejoinder on Quantum, ¶ 433.

¹⁸³⁷ Respondent's Post-Hearing Brief on Quantum, ¶ 333, referring to Brailovsky/Wells II, ¶ 50, Exhibits BW-45 and CE-1023, p. 15.

1459. Respondent emphasizes that the time horizon of transactions in the futures markets is much shorter than the mining activities under valuation and claims that the prices applied by Claimant's expert are in fact admittedly "*projections created ad-hoc by those same TCC experts,*" including "*a bizarre gold price projection, which literally spikes off the graph, and ends up being 12 times the consensus price.*"¹⁸³⁸ Respondent refers to its experts who state that "*the futures prices used by Brattle are neither market determined nor the best forecasts of prices in the future, let alone certainty-equivalent*" and add that, in their opinion, "*no one can take Brattle's reports seriously when its author believes that the 'certainty-equivalent' cash flows that he calculates for Reko Diq are as safe as the cash flows from a U.S. Treasury bond of equal duration, and that therefore both have to be discounted at the risk-free rate.*"¹⁸³⁹
1460. Respondent further relies on Mr. Brailovsky's and Prof. Wells' statement that "*Claimant's damages vanish when one uses Consensus Economics price projections instead of futures-based prices, with no other changes in the Brattle model. Brattle relies on futures prices that are neither market determined nor the best source available for price forecasts.*"¹⁸⁴⁰ Respondent submits that if the prices crafted by Prof. Davis are replaced with the more reliable expert consensus forecasts for gold, copper and oil, the average net present value of Claimant's investment would be negative, *i.e.*, USD -1.23 billion, and the project would generate a negative rate of return and thus no profits.¹⁸⁴¹ Respondent argues that the fact that Prof. Davis prices which "*presumably contain all sorts of risks*" are higher than the prices predicted by forecasts further confirms the irrationality of his analysis.¹⁸⁴²
1461. Respondent also contends that Prof. Davis' modeling of the costs of the project contained "*myriad, unresolved and fatal errors*" which were revealed at the Hearing on Quantum when Claimant introduced a new set of spreadsheets which included expenditures that had increased by approximately USD 1 billion.¹⁸⁴³ In addition, Respondent notes that by

¹⁸³⁸ Respondent's Post-Hearing Brief on Quantum, ¶ 334, referring to Brailovsky/Wells II, ¶¶ 52, 133-135 and note 219, and Transcript Hearing on Quantum (Day 8), pp. 2343-2346.

¹⁸³⁹ Respondent's Post-Hearing Brief on Quantum, ¶ 334, quoting from Brailovsky/Wells II, ¶ 25; Respondent's Rejoinder on Quantum, ¶ 434.

¹⁸⁴⁰ Respondent's Post-Hearing Brief on Quantum, ¶ 335, quoting from Brailovsky/Wells II, ¶ 153; Respondent's Rejoinder on Quantum, ¶ 434, referring to Brailovsky/Wells II, ¶ 46.

¹⁸⁴¹ Respondent's Post-Hearing Brief on Quantum, ¶ 336, referring to Brailovsky/Wells Presentation, p. 6 and Brailovsky/Wells II, Table 2; Respondent's Rejoinder on Quantum, ¶ 434, referring to Brailovsky/Wells II, ¶¶ 57-58.

¹⁸⁴² Respondent's Rejoinder on Quantum, ¶ 434, referring to Brailovsky/Wells II, ¶ 60.

¹⁸⁴³ Respondent's Post-Hearing Brief on Quantum, ¶ 328, referring to Exhibits CE-1556A, CE-1778A and CE-1779A, Respondent's Closing Presentation, p. 81.

assuming all equity financing, Prof. Davis failed to account for the amortization or interest of financing in the project costs.¹⁸⁴⁴

1462. In Respondent's view, Prof. Davis' valuation is based on the proposition that its "*modern*" cash flows contain the same amount of risk as cash flows derived from a US Treasury bond both of which should then be discounted at the risk-free rate of return. Respondent considers it "*simply untenable*" that a buyer would be convinced by Prof. Davis' explanation of "*certainty-equivalent*" cash flows and accept the "*ridiculously low rate return*" in order to invest in a non-diversified, non-operational mining project in Balochistan instead of purchasing the same amount in US Treasury bonds.¹⁸⁴⁵

1463. In any event, Respondent contends that Prof. Davis admitted at the Hearing on Quantum that he had not fully de-risked the cash flows in his model when stating that "*very clearly ... when the Buyer buys this for \$8.5 billion, they do not get a bond. They get the cash flows up at the top right that are highly uncertain and highly risky.*" Respondent considers that this admission precludes the reliance on the "*de-risked*" approach yield a certainty-equivalent fair market value of USD 8.5 billion.¹⁸⁴⁶

1464. Respondent contends that "[w]hen properly analyzed," Prof. Davis' valuation is equivalent to applying a discount rate of merely 1.2% above the risk-free rate; "*a preposterous proposition,*" taking into account that market expectations for Pakistan were at least 9 times higher than that and the risks in Balochistan were even higher. According to Respondent, Claimant has thereby ignored over 90% of the risk impact perceived by financial markets and institutions.¹⁸⁴⁷ Respondent also refers to the discount rate of 23% calculated by Dr. Burrows as well as the discount rates of 10% to 12% used by SNC Lavalin in the Expansion Pre-Feasibility Study, which led to a value of the project near zero.¹⁸⁴⁸

1465. Respondent further argues that the implied discount rate is only "*about half of what would be appropriate for this type of project if it was located in an advanced economy*" but reveals that the risk adjustments made by Prof. Davis "*were not even close to being appropriate for valuing a project of this type in Balochistan, much less a project that had no track record.*" Specifically, Respondent refers to: (i) the "*speculative*" purchase of Reko Diq by Claimant's shareholders in 2006; (ii) Prof. Davis' "*scattered and piecemeal*

¹⁸⁴⁴ Respondent's Post-Hearing Brief on Quantum, ¶ 330, referring to Transcript Hearing on Quantum (Day 8), p. 2478 lines 3-9.

¹⁸⁴⁵ Respondent's Rejoinder on Quantum, ¶¶ 420, 424, referring to Brailovsky/Wells II, ¶ 136.

¹⁸⁴⁶ Respondent's Post-Hearing Brief on Quantum, ¶¶ 338-340, quoting from Transcript Hearing on Quantum (Day 8), p. 2484 lines 14-18.

¹⁸⁴⁷ Respondent's Post-Hearing Brief on Quantum, ¶¶ 343-344, referring to **Exhibit RE-782**, p. v and Burrows II, ¶ 74.

¹⁸⁴⁸ Respondent's Rejoinder on Quantum, ¶¶ 423-424, referring to Burrows I, Appendix 2, Panel B and Brailovsky/Wells I, Figure 1.

enumeration of the value assigned to the few risks actually incorporated into the cash flows,” which Respondent claims to be incorrect as “[w]hen analyzed systematically,” the amount of adjustments is “*much smaller than claimed by Claimant’s valuers*”; (iii) the “*risk component*” captured in Prof. Davis’ cash flows which adds only about 1.4% to the risk-free discount rate, which Respondent considers “*extremely, unexplainably low*” and a sign of Prof. Davis’ omission of country risk; (iv) the underestimation of the impact of early termination due to “*extreme political violence or government action*”; and (v) the fact that the results of applying the same discount rate to the cash flows in the Expansion Pre-Feasibility Study and Prof. Davis’ model are “*practically indistinguishable from each other*” which confirms in its view that Prof. Davis has failed to account “*in any meaningful way for the risks in the cash flows.*”¹⁸⁴⁹

1466. Specifically with regard to the discount rate before Prof. Davis’ risk adjustments, Respondent maintains that any buyer of Reko Diq would have considered to apply this rate because, as explained by Mr. Brailovsky and Prof. Wells, “[i]n real life investors want to know the discount rate used to evaluate the actual cash flows; telling them that it is the risk-free rate, which of course they can consult directly, is not of much use.” They further opined that “*the equivalence would reveal the IRR before Brattle’s risk adjustments, which is the overall profitability expected from the project, again a crucial variable that any investor in the real world would want to know before embarking in it.*” Respondent notes that Prof. Davis has not provided this information.¹⁸⁵⁰

1467. In addition, Respondent contends that it is a “*methodological charade*” to suggest that Prof. Davis has accounted for all risks at source given that Mr. Brailovsky and Prof. Wells revealed that the “*traditional*” DCF calculation in the Expansion Pre-Feasibility Study, “*once adjusted to describe the same universe of facts,*” yields a similar pattern of results, which makes it impossible to argue that one has been “*de-risked*” and the other has not. Respondent quotes from its experts that “[t]he most plausible explanation is that the two models are in reality neither independent nor conceptually different from each other, and since the SNC-Lavalin model—which never pretended to be a ‘modern’ DCF with ‘certainty equivalent’ prices—precedes Brattle’s, it is the latter that seems to be a close replica of the former.”¹⁸⁵¹ Respondent further refers to their opinion that Claimant “*applies a risk-free interest rate to those practically unadjusted cash flows to arrive at*

¹⁸⁴⁹ Respondent’s Rejoinder on Quantum, ¶ 418, referring to Brailovsky/Wells II, ¶¶ 4(ix), 19-20, 23, 17.

¹⁸⁵⁰ Respondent’s Rejoinder on Quantum, ¶ 419, quoting from Brailovsky/Wells II, ¶ 108.

¹⁸⁵¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 341, referring to Brailovsky/Wells II, ¶¶ 80 *et seq.* and quoting from ¶ 88; Respondent’s Rejoinder on Quantum, ¶¶ 437-439.

*\$8.5 billion, when practically the same cash flows yield no value in the SNC-Lavalin [EXP-PFS].”*¹⁸⁵²

1468. Respondent argues that, as confirmed by the IFRS, the traditional DCF calculation should produce the exact same result as the “*certainty-equivalent*” DCF method; Prof. Davis also acknowledged that both methods “*produce an estimate of this FMV, they just come to that FMV via different approaches to discounting for systematic risk.*”¹⁸⁵³ Respondent refers to its experts who explain that in order to obtain the certainty-equivalent cash flows, they must be discounted by “*the risk adjustment rate, which is the difference between the discount rate and the risk-free rate*” and that it should thereby be possible to derive a strict equivalent to the traditional DCF calculation. Respondent notes that Prof. Davis has not provided such a calculation.¹⁸⁵⁴

1469. Respondent concludes that given the similarity between the revenues and costs projected in both models, it is apparent that Prof. Davis made “*only minor adjustments to the cash flows*” which, “*when aggregated, are a very small part of the overall revenues and expenditures,*” and that these cash flows are therefore no more “*certainty-equivalent*” than those of SNC Lavalin. As a result, Respondent claims that there can be no justification for the application of risk-free discount rate to the cash flows in Prof. Davis’ model.¹⁸⁵⁵

1470. Specifically, with regard to country risk, Respondent submits that Claimant failed to properly account for this type of risk which, according to Mr. Brailovsky and Prof. Wells, is “*one of the most significant factors underlying the low risk implicit in Brattle’s calculation.*” In their opinion, “[i]t defies credulity that 1.2%—the risk premium implicitly contemplated in Brattle’s report—is enough to account for the enormous risks facing a mining project in Balochistan.”¹⁸⁵⁶ Therefore, Respondent also rejects the argument that its experts would double count the value impact of country risk, quoting from Mr. Brailovsky’s and Prof. Wells’ statement that “[o]ne cannot double count risks when almost none are accounted for in the first place.”¹⁸⁵⁷

1471. Respondent submits that country risk can cause significant uncertainty regarding an investment’s returns, due to macroeconomic, political and environmental factors and considers it “*indisputable that the country risk must be considered independently of the*

¹⁸⁵² Respondent’s Post-Hearing Brief on Quantum, ¶ 342, quoting from Brailovsky/Wells Presentation, p. 21; Respondent’s Rejoinder on Quantum, ¶ 420.

¹⁸⁵³ Respondent’s Rejoinder on Quantum, ¶ 422, referring to **Exhibit CE-1425**, ¶¶ B23-B30 and quoting from Davis II, ¶ 53.

¹⁸⁵⁴ Respondent’s Rejoinder on Quantum, ¶ 423, quoting from Brailovsky/Wells II, ¶ 108.

¹⁸⁵⁵ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 438-439, referring to Brailovsky/Wells II, Table 2 and ¶ 87.

¹⁸⁵⁶ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 345-346, quoting from Brailovsky/Wells II, ¶¶ 22, 119.

¹⁸⁵⁷ Respondent’s Rejoinder on Quantum, ¶ 425, quoting from Brailovsky/Wells II, ¶ 52.

*proposed valuation approach.*¹⁸⁵⁸ Respondent argues that investment treaty tribunals “*have consistently and uncontroversially recognized the necessity to apply country risk*” and quotes from a scholarly commentary stating that “[i]rrespective of the approach, in assessing value the expert must account for the relevant risks attached to the asset in question, including relevant country risk.”¹⁸⁵⁹

1472. Respondent notes that Mr. Luksic testified at the Hearing on Quantum that a discount rate of 12% would be considered conservative: in its view, the same applies to the country risk rate of 12.1% based on Pakistan’s sovereign yield spread in 2011.¹⁸⁶⁰ In Respondent’s view, it therefore defies reason to assume that the implied discount rate of 4.2% in Prof. Davis’ model would be an adequate expression of all the risks to which the project’s cash flows would have been exposed. Respondent refers to various recent decisions in which the tribunals determined damages based on forward-looking projections of income and found that country risk premiums between 10% and 20% should be included in the discount rate. Respondent notes that applying any of those discount rates would render the net present value of the cash flows estimated by Claimant negative. As stated by Mr. Brailovsky and Prof. Wells, “*any discount rate that includes country risk is far above the rates that make the NPV zero or less in all these calculations.*”¹⁸⁶¹

1473. According to Respondent, Prof. Davis’ application of a risk-free discount rate is directly contradicted by the reasoning of the tribunal in *OI European v. Venezuela* as to why an investment in Venezuela justified a higher premium than if the same investment had been made in Italy.¹⁸⁶²

1474. Respondent emphasizes that, in its view, there is no economic or legal reason not to apply a discount rate incorporating country risk, as a buyer would have done when making its decision whether to invest in Reko Diq. According to Respondent, Prof. Davis failed to contemplate possible changes in the fiscal regime, which would be “*perfectly legal for a sovereign State to do.*” Respondent also refers to political unrest and terrorism affecting

¹⁸⁵⁸ Respondent’s Rejoinder on Quantum, ¶¶ 426-427, referring to Steve Harris, Ben Johnson, and Emre Aydin, Valuation in International Arbitration: Measuring Country Risk In The Middle East (2017) [RLA-422], p. 33.

¹⁸⁵⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 348, referring to *Venezuela Holdings B.V. and others (formerly Mobil Corporation and others) v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/07/27, Award of 9 October 2014 [RLA-365], ¶ 365 and *Saint-Gobain Performance Plastics Europe v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/12/13, Decision on Liability and the Principles of Quantum of 30 December 2016 [RLA-330], ¶ 723, and quoting from Steve Harris, Ben Johnson, and Emre Aydin, Valuation in International Arbitration: Measuring Country Risk In The Middle East (2017) [RLA-422], p. 33. See also Respondent’s Rejoinder on Quantum, ¶¶ 428-429.

¹⁸⁶⁰ Respondent’s Post-Hearing Brief on Quantum, ¶ 349, referring to Transcript Hearing on Quantum (Day 5), p. 1333 lines 18-20; Respondent’s Rejoinder on Quantum, ¶ 430, referring to Burrows I, Appendix 5, Panel B.

¹⁸⁶¹ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 349-351, quoting from Brailovsky/Wells II, ¶ 120; Respondent’s Closing Presentation, p. 91.

¹⁸⁶² Respondent’s Rejoinder on Quantum, ¶ 431, quoting from *OI European Group v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/11/25, Award of 10 March 2015 [RLA-336], ¶¶ 776-782.

mining operations and transportation which increased between 2006 and 2011 and was “a grave concern as of the valuation date” as well as external reasons which can also impact country risk.¹⁸⁶³

3. Tribunal’s Analysis

1475. At the outset of its analysis of whether Claimant’s expert Prof. Davis has appropriately accounted for all systematic and asymmetric risks affecting the project, the Tribunal recalls that it has found above that it is appropriate to value Claimant’s investment based on the modern DCF method applied by Prof. Davis and, in that context, has already made certain findings which will again be relevant in the present analysis.

1476. Based on its review of the evidentiary record regarding the modern DCF method, the Tribunal found that it makes sense in the present valuation of Claimant’s investment to distinguish between different types of risk in the valuation and to adjust each cash flow component directly for the risks that affect this particular cash flow. In particular taking into account the information provided by CIMVal in 2012 about valuation practices in the mining industry, the Tribunal noted that uncertainties associated with the modern DCF approach, *e.g.*, regarding the projection of future metals prices, do not justify rejecting this method or the use of risk-adjusted prices; they are controllable by making reasonable, and perhaps conservative, assumptions. The Tribunal agreed with Claimant that in the present case, this approach is preferable to applying a traditional DCF method with a discount rate that results in almost no net present value for cash flows that would be generated in the second half of the mine’s life.

1477. The Tribunal has not yet assessed whether Prof. Davis has used reasonable inputs to account for systematic risks, in particular with regard to the uncertain development of copper and gold as well as oil prices. It noted, however, that CIMVal generally supports the use of forward curves, including their extension beyond publicly quoted prices, and that the Tribunal would therefore not follow Respondent’s general rejection of using forward curves as a basis for projecting risk-adjusted prices. The question whether the risk adjustment made by Prof. Davis is sufficient to account for the fluctuation of prices over the 56-year life of the mine will form part of the present analysis, which will also take into account the comparison drawn by Respondent’s experts to the “*traditional*” DCF calculation in the Feasibility Study and Expansion Pre-Feasibility Study.

1478. With regard to Respondent’s argument that it was incorrect for Prof. Davis to use a risk-free rate to discount the cash flows because these cash flows are not, or at least not fully, adjusted for risk, the Tribunal has already taken note of CIMVal’s explanation in the context of selecting discount rates for valuing reserves and resources that the certainty-

¹⁸⁶³ Respondent’s Rejoinder on Quantum, ¶ 432

equivalent DCF approach “does not make use of an aggregate discount rate though an implied aggregate discount rate can be derived” but instead “uses targeted risk-adjustments for select cash flow components. These adjustments are done within the CAPM framework. Market related uncertainties such as metal and energy prices are risk-adjusted with the CAPM while project-specific uncertainties may be modelled directly with no risk-adjustment.”¹⁸⁶⁴ At the same time, CIMVal stated:

“A residual risk adjustment may be necessary to adjust previously risk-adjusted cash flows for risk not explicitly recognized in the model before a final adjustment for the time value of money. The residual risk adjustment is similar in nature to a Credit Valuation Adjustment applied in derivative valuation for counter-party risk.”¹⁸⁶⁵

1479. As confirmed by CIMVal, the Tribunal therefore agreed with Prof. Davis that it is, in principle, consistent to use a risk-free rate which discounts cash flows only for the time value of money, if these cash flows have already been fully adjusted for risk. However, in line with the explanation provided by CIMVal, the Tribunal will now also assess whether it may be necessary to apply a residual risk adjustment to account for any risks that were not explicitly recognized in Prof. Davis’ model. In the Tribunal’s view, this also applies to risks that were recognized as such but for which the risk adjustments made are, in the Tribunal’s opinion, insufficient to fully capture the relevant risk; such risks might warrant additional or increased risk adjustments as well.

1480. In line with the distinction drawn by Prof. Davis between systematic risks, such as in particular the fluctuation of gold, copper and oil prices but also the risk of cost increases, and asymmetric risks, such as the risk of political violence and other, mostly country-related risks, the Tribunal will assess whether Prof. Davis has appropriately accounted for each type of risk in turn.

a. Whether Prof. Davis Has Appropriately Accounted for the Systematic Risk of Fluctuations in the Prices for Copper, Gold and Oil

1481. Prof. Davis explained in his first report that the approach of the modern DCF method to addressing systematic risk is as follows:

“The advantage of the modern DCF approach is that reasonable market signals about the market’s systematic risk preferences over individual cash flow components is often available in futures or forward markets, whereas market signals about risk preferences over the systematic risks in the overall, combined net cash flows of the entire project, which are required to calculate the appropriate discount rate in the traditional DCF method, are not.

¹⁸⁶⁴ Exhibit CE-1483, pp. 10-11.

¹⁸⁶⁵ Exhibit CE-1483, p. 11.

In the case of Reko Diq, commodity prices are major drivers of both revenues (copper and gold prices) and costs (oil prices, which drive fuel costs), and are also major sources of project uncertainties. Futures prices are available to capture the market risk of each. The modern DCF's approach of first adjusting the cash flows for asymmetric risk and then adjusting the results for market-based, systematic risk via the discounting adjustments inherent in the futures prices replaces the relatively ad hoc approach to discounting asymmetric and systematic risks inherent in the traditional DCF approach. In that approach the discount rate is increased by some amount to try to account for the value impact of both types of risk.”¹⁸⁶⁶

1482. Prof. Davis explained that the modern DCF approach eliminates the need to estimate an expected future price and a risk-adjusted discount rate because “[t]he impact of risk is already captured by using futures prices which reflect a discount from the expected spot price in the future in exchange for a guaranteed price set today. All that remains to be done is discount the risk-adjusted copper revenues at the risk-free rate to account for the price of time.”¹⁸⁶⁷ He further explained in detail his approach to forecasting and simulating commodity prices in Appendix C to his first report.¹⁸⁶⁸

1483. Respondent's experts Mr. Brailovsky and Prof. Wells distinguished in their first report between four steps in Prof. Davis' approach: (i) determining the volatility of prices based on historical data up to the valuation date; (ii) obtaining futures prices for each commodity as of the valuation date for the period covered by the futures quotations; (iii) projecting prices for a time period of 56 years based on the futures market data; and (iv) applying a random variable for each price and year and running a total of 1.2 million simulations covering six scenarios. As for the first step, Mr. Brailovsky and Prof. Wells noted that they would have accounted for standard deviations “with an appropriate parameter” but added that “it is unlikely that the results would have changed significantly.” They further stated that they did “not object to the way that stochastic projections are carried out,” i.e., the fourth step identified above. However, in their opinion, “the second and third steps [are] completely inappropriate, i.e. the use and characterization of futures prices and the way the projections parameters were obtained.”¹⁸⁶⁹

1484. Specifically, Mr. Brailovsky and Prof. Wells criticized Prof. Davis for basing his projections on “data for the futures market alone, with no recourse at all to the historical data before the valuation date.”¹⁸⁷⁰ In their opinion, Prof. Davis' approach assumes that Claimant would sell all of its expected gold and copper production as well as acquire all

¹⁸⁶⁶ Davis I, ¶¶ 87-88.

¹⁸⁶⁷ Davis I, ¶ 90.

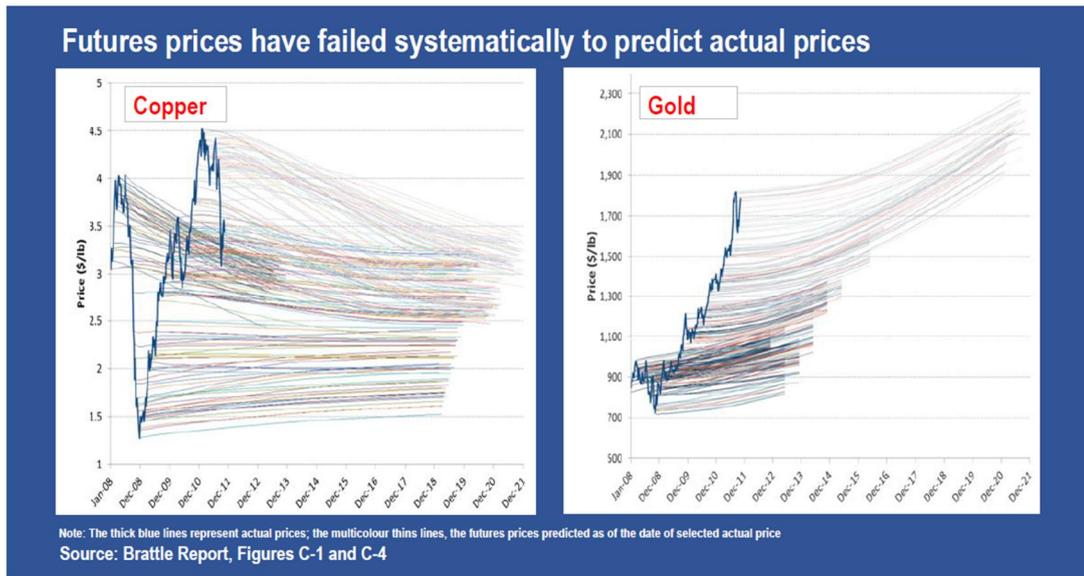
¹⁸⁶⁸ Davis I, Appendix C.

¹⁸⁶⁹ Brailovsky/Wells I, ¶¶ 129-130.

¹⁸⁷⁰ Brailovsky/Wells I, ¶ 129.

required quantities of oil at the valuation date at the prices in the futures or forward markets. Noting that production quantities would have exceeded open interest for copper and gold by far, Mr. Brailovsky and Prof. Wells considered it incorrect to call the prices from futures markets risk-adjusted.¹⁸⁷¹

1485. In their opinion, futures prices for both copper and gold further have “*extremely poor predictive power ..., especially at turning points,*” which they illustrated with the following graph:¹⁸⁷²



1486. Mr. Brailovsky and Prof. Wells further noted that for gold, Prof. Davis relied on data from the forward market, and argued that the forward market price for gold is “*simply the spot price of the day plus an interest charge,*” reflecting an underlying financial transaction rather than a price prediction.¹⁸⁷³

Instead of relying on futures and forward markets, Mr. Brailovsky and Prof. Wells considered that Prof. Davis should have averaged the results of a group of forecasts such as Consensus Economic forecasts, “*which include the contributions of around twenty financial and commercial research institutions and academics.*”¹⁸⁷⁴ They added:

“[W]e are under no illusion that any long-term, or indeed short-term, forecast of commodity prices can be accurate. This is a major stumbling block in any DCF analysis, one that is more of an impediment to conducting a serious DCF analysis in this case because capital costs are also a variable quantity. Probabilistic approaches to the problem are therefore a good instrument to measure the size of the uncertainty. However, these must be constructed in a

¹⁸⁷¹ Brailovsky/Wells I, ¶¶ 132-134.

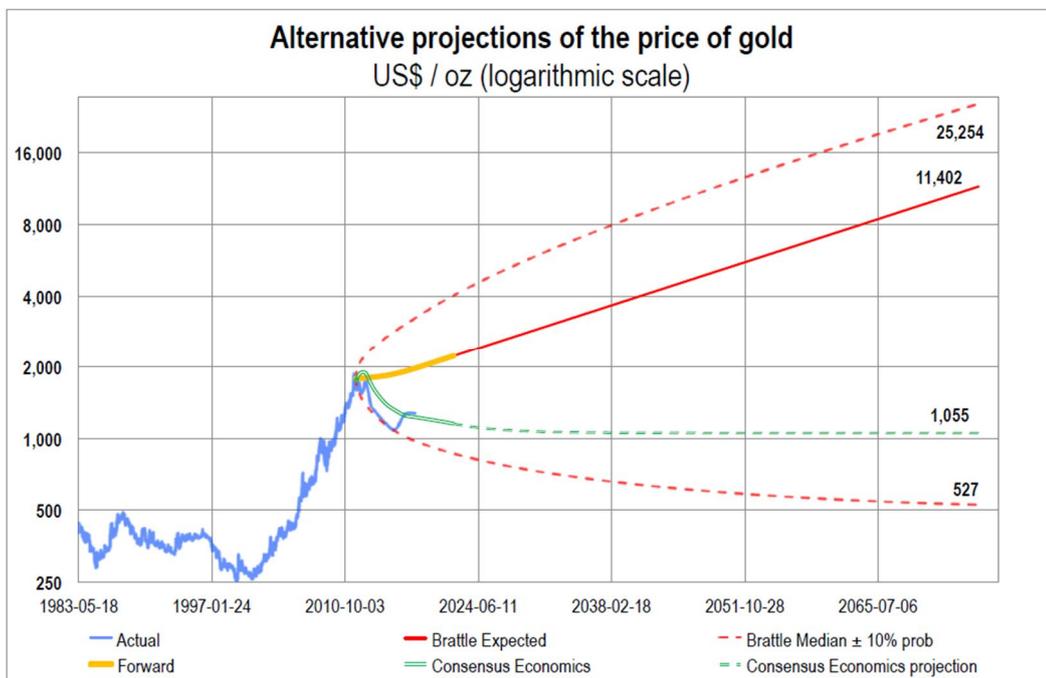
¹⁸⁷² Brailovsky/Wells I, ¶ 136 and Figure 10.

¹⁸⁷³ Brailovsky/Wells I, ¶¶ 137-138.

¹⁸⁷⁴ Brailovsky/Wells I, ¶¶ 140-141.

reasonable way. As mentioned, the Brattle Report ignores completely the history of prices to construct the deterministic part of the analysis of prices. For this purpose, it relies exclusively on the futures markets, which, as we have shown, are extremely thin and shallow after a few years ahead, as well as being driven by interest rates. We would agree with the Brattle Report that copper and oil tend to follow a mean-reverting behavior and that gold varies as a random walk process with a drift. The fatal flaw in Brattle’s method — and as we shall see later, this flaw accounts for 4/5 of the claim — lies in the starting point of the projection and in the drift parameter that the Brattle Report uses.”¹⁸⁷⁵

1487. Mr. Brailovsky and Prof. Wells illustrated the alleged deviation in Prof. Davis’ approach from historical data as follows:¹⁸⁷⁶

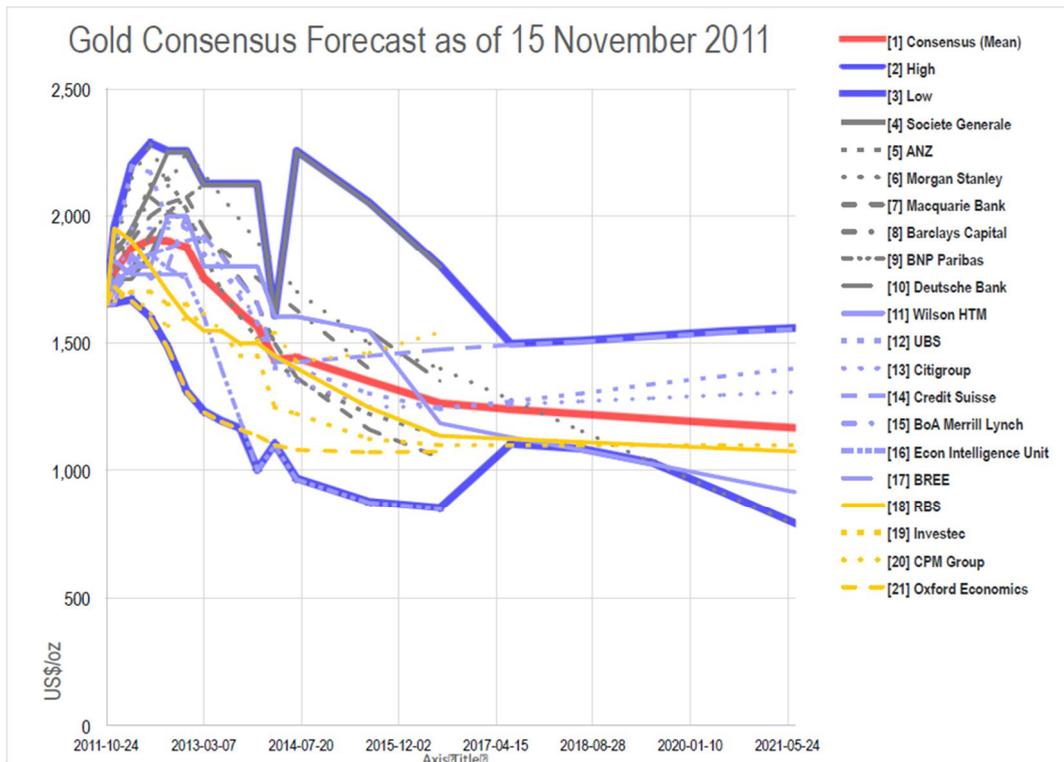


1488. They emphasized that by contrast to the forward market, all 21 Consensus Forecasts contributors forecast a decline in the price after a brief period of additional growth:¹⁸⁷⁷

¹⁸⁷⁵ Brailovsky/Wells I, ¶ 143.

¹⁸⁷⁶ Brailovsky/Wells I, Figure 12.

¹⁸⁷⁷ Brailovsky/Wells I, Figure 13.



1489. In response to Mr. Brailovsky's and Prof. Wells' criticisms, Prof. Davis reiterated in his second report that "[o]ne of the core advantages of the modern DCF method is that it eschews the need to forecast spot commodity prices and relies instead on risk-adjusted prices, which reflect both market expectations of future prices and the market's pricing of the associated systematic risk. These risk-adjusted prices are directly observable in the futures market for shorter maturities and can be estimated using accepted models for longer maturities." He emphasized that "[e]ither way, these risk-adjusted prices are not forecasts of the spot price" and therefore considered it an "apples-to-oranges comparison" to compare his assumptions regarding risk-adjusted prices with analyst forecasts of the non-risk-adjusted spot price.¹⁸⁷⁸

1490. Prof. Davis further denied that consensus forecasts were superior to forward prices when it comes to commodity prices, considering that such a conclusion was not supported by any of the literature relied on by Mr. Brailovsky and Prof. Wells, which was in any event mostly based on a discussion taken from the Consensus Economics website.¹⁸⁷⁹

1491. In support of his argument that forward prices can reliably project risk-adjusted prices over the life of the asset, Prof. Davis distinguished between three time horizons: (i) the first five years for which futures contracts are actually traded and for which the forward prices on which he relied are "virtually identical"; (ii) the following five years for which

¹⁸⁷⁸ Davis II, ¶¶ 118-120.

¹⁸⁷⁹ Davis II, ¶¶ 121-124.

forward prices had been published as of the valuation date and, given the agreement of Respondent's experts that there is "*ample liquidity*" for the gold market, there was no reason to suspect that these forward prices were not representative of the market participants' expectations; and (iii) the subsequent time horizon up to the end of the mine life.¹⁸⁸⁰

1492. Prof. Davis specifically agreed with Mr. Brailovsky and Prof. Wells that forward prices are not a forecast of future prices but rather reflect the characteristics of an underlying financial transaction. He then explained why, in his opinion, this does not render them inappropriate for valuation purposes:

*"Futures purchases and sales are financial transactions, and the pricing of those transactions has a specific relationship to spot prices as shown in the above equation. That does not make them inadequate indicators of future risk-adjusted prices – on the contrary, they reflect the view of market participants who have substantial amounts of money at stake and every incentive to make accurate predictions. Of course, they are not predictions of spot prices, and I do not use them as such."*¹⁸⁸¹

1493. For the extension of the forward curves beyond ten years and, thus, the long-term horizon, Prof. Davis noted that Mr. Brailovsky and Prof. Wells had not criticized the mean-reverting model he had used for copper prices; for the model used to predict gold prices, he had assumed that the rate of drift in the forward curve would remain equal to the drift derived within the 10-year forward price. In his opinion, this was a conservative assumption given that bond yields increase in maturity.¹⁸⁸² He then expressed the following opinion:

"Ultimately, the magnitude of the gap between my long-run projections and those developed by Mr. Brailovsky and Professor Wells stems almost entirely from their incorrect view that the appropriate data to use in a modern DCF analysis is the un-risked expected spot prices as reflected in the average of analyst forecasts. The differences are that 1) their ten-year price forecast is incorrectly based on analyst forecasts, whereas mine is based on forward prices, as required by the valuation model; 2) their long-run projection assumes that the price would continue to fall, extrapolating the ten-year price curve developed from analyst forecasts, which is not a projection of risk-adjusted prices, while mine is correctly based on the forward curve; and 3) even though both I and they agree that gold prices follow a geometric Brownian motion with drift, their projection of spot gold prices in the long run is inconsistent with a geometric Brownian motion with drift, while my

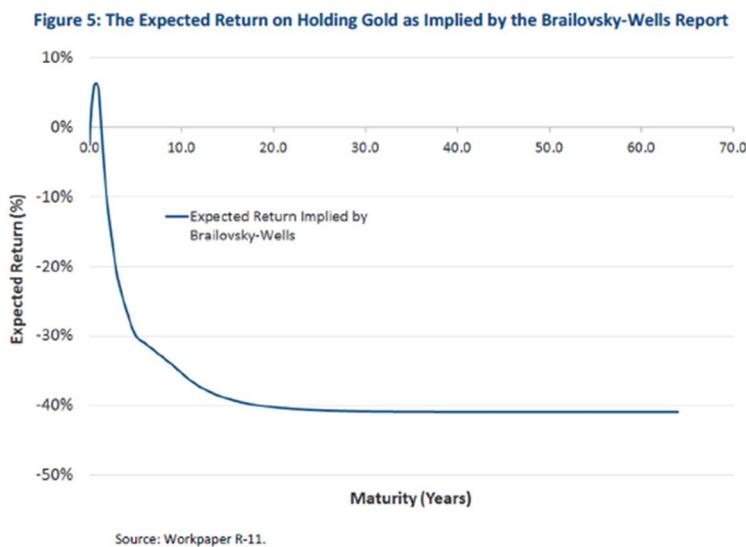
¹⁸⁸⁰ Davis II, ¶¶ 129-133.

¹⁸⁸¹ Davis II, ¶ 136.

¹⁸⁸² Davis II, ¶ 138; Davis I, Appendix C, ¶ 22.

*projection of forward prices in the long run is exactly a Geometric Brownian motion.*¹⁸⁸³

1494. Prof. Davis emphasized that “*there is no choice as to whether to use the forward prices or a forecast of spot prices in a modern DCF*” because “*analysts do not forecast the forward curve. What analysts claim to forecast is the spot price, which is not needed in the modern DCF method.*” In his opinion, the forecasts relied on by Mr. Brailovsky and Prof. Wells also cannot be treated as estimates of expected spot prices because they imply an expected loss of about 3% per year (35% over the next ten years), which runs contrary to investors’ expectations that they will receive positive returns from investing in gold, due to an expected price appreciation. Prof. Davis illustrated the expected negative return based on the Consensus Economics forecast as follows:¹⁸⁸⁴



1495. Prof. Davis noted that “*[i]f the Consensus Economics forecasts reflected investors’ views of the expected spot price of gold, then no one would be willing to buy gold at the spot prices prevailing in October 2011, when the analyst forecasts were published, and those who were holding gold at the time would sell, anticipating the price fall. But if that were the case, the spot price would have fallen as well because supply of gold would exceed demand. In other words, interpreting the Consensus Economics forecast as a measure of expected spot prices is inconsistent with the observed spot price of gold.*” Prof. Davis further considered that, based on historical data, analyst forecasts “*are consistently biased downward and increasingly inaccurate as the forecast horizon grows,*” noting that long-term forecasts are up to 50% below the realized spot price and adding that if such bias were removed, “*there is little discrepancy left between the consensus forecast and the forward curve.*”¹⁸⁸⁵

¹⁸⁸³ Davis II, ¶ 139.

¹⁸⁸⁴ Davis II, ¶¶ 143-145 and Figure 5.

¹⁸⁸⁵ Davis II, ¶¶ 144, 146-147 and Figures 6 and 7.

1496. In their second report, Mr. Brailovsky and Prof. Wells noted that Claimant's damages claim is very sensitive to price forecasts, in particular to that of the gold price, and calculated that the damage would disappear when using the "*reasonable price projections*" of Consensus Economics. Specifically, they calculated that when using those forecasts for gold, the average net present value of Claimant's investment, all else being equal, would drop to USD 0.89 billion, *i.e.*, by almost 90%; when also using the forecasts for copper, it would drop to USD -0.72 billion; and when also using the forecasts for oil, it would drop to USD -1.23 billion.¹⁸⁸⁶
1497. Respondent's experts reiterated that they "*explicitly reject* [Prof. Davis'] *central assumptions that futures prices should be used as forecasts in DCF analyses*" and clarified that they also opposed Prof. Davis' projection of the copper price based on futures prices. In response to Prof. Davis' methodological argument that the modern DCF method requires the use of risk-adjusted prices rather than forecasts of spot prices, Mr. Brailovsky and Prof. Wells considered it "*paradoxical*" that Prof. Davis' allegedly risk-adjusted prices produce considerably more revenues than those forecast by the consensus experts even though the latter "*presumably contain all sorts of risks.*"¹⁸⁸⁷
1498. Mr. Brailovsky and Prof. Wells then stated that "*prices of minerals—in particular the all-important gold price—are 'mean reverting.'* *This is in marked contrast to the assumption in the Brattle reports that they are ever climbing.*" Specifically with regard to gold, they relied on an econometric method called the Ornstein-Uhlenbeck process and claimed that this method, while resulting in "*somewhat higher*" price projections than Consensus Economics forecast, confirmed that the price of gold was also mean-reverting and not a "*random walk with time-dependent drift.*"¹⁸⁸⁸
1499. In the opinion of Respondent's experts, the futures prices relied on by Prof. Davis "*are neither market determined nor the best source available for price forecasts.*" They noted that the project would have begun to sell its production only seven years after the valuation date, making the period for which futures prices exist, and also a large part of the period for which forward curves exist, irrelevant for the valuation of the project's cash flows. In their opinion, the fact that futures prices are higher than those forecast by Consensus Economics indicates that the former are in fact riskier than the latter, which contradicts Prof. Davis' statement that his price assumptions are risk-adjusted.¹⁸⁸⁹ With regard to Prof. Davis' criticisms of the consensus forecasts, they argued:

¹⁸⁸⁶ Brailovsky/Wells II, Section III and Table 2.

¹⁸⁸⁷ Brailovsky/Wells II, ¶¶ 55-56, 59.

¹⁸⁸⁸ Brailovsky/Wells II, ¶¶ 61-64 and Graph 3.

¹⁸⁸⁹ Brailovsky/Wells II, ¶¶ 153-156.

*“We are under no illusion that commodities prices can be accurately predicted, as we have said; the future is unknown and unknowable. Neither the futures prices nor consensus forecasts have a really good predictive record. That is why Brattle’s effort to show how poorly the mean Consensus Economics forecasts have predicted actual prices, without comparison to other methods, is not useful. But the available empirical studies clearly favour the Consensus Economics forecasts.”*¹⁸⁹⁰

1500. Relying on statements made by economists regarding a lack of accuracy of predictions made by futures prices, Mr. Brailovsky and Prof. Wells rejected the argument that forward market prices are the market’s actual risk-adjusted expectations of what futures prices will be. In particular quoting from economists at the Federal Reserve Board of San Francisco, who stated with regard to oil futures prices that *“taking into account the relationship between current spot prices and futures prices instead of considering only the raw futures price can significantly improve forecasting accuracy,”* Respondent’s experts also denied that, by considering forecasts for spot prices, they were making an *“apples-to-oranges comparison.”*¹⁸⁹¹ They also rejected Prof. Davis’ suggestion that it is not necessary to know the non-risk-adjusted price, arguing that *“[t]o be able to say that futures prices are risk-adjusted, one has to know the amount of such risk adjustment. That information is not provided in the Brattle reports. Just saying that futures prices are risk-adjusted is not enough.”*¹⁸⁹²

1501. Mr. Brailovsky and Prof. Wells further rejected the argument that Consensus Economics forecasts cannot be used to predict spot prices, arguing that *“at any point in time, economic agents have divergent expectations,”* that *“the markets do not adjust instantaneously to expectations,”* and further that *“the decline in gold prices in the forecasts is consistent with the comparatively small response of share prices of gold producers shown in the Burrow’s reports.”*¹⁸⁹³ They also denied that analyst forecasts are biased downwards, arguing that just like the futures market, forecasts of commodity prices tend to underestimate prices when they are rising, as they were in the time period from 1998 to 2011 examined by Prof. Davis, but to overestimate them when they are falling, as they did after the valuation date.¹⁸⁹⁴

1502. The Tribunal notes that, as becomes apparent through Mr. Brailovsky’s and Prof. Wells’ calculation of the impact on the value of Claimant’s investment if the price projections made by Prof. Davis were to be replaced by the Consensus Economics forecasts, the question which assumptions a buyer would have made as of November 2011 with regard to gold, copper and oil prices has a very significant impact on the purchase price it would

¹⁸⁹⁰ Brailovsky/Wells II, ¶ 157.

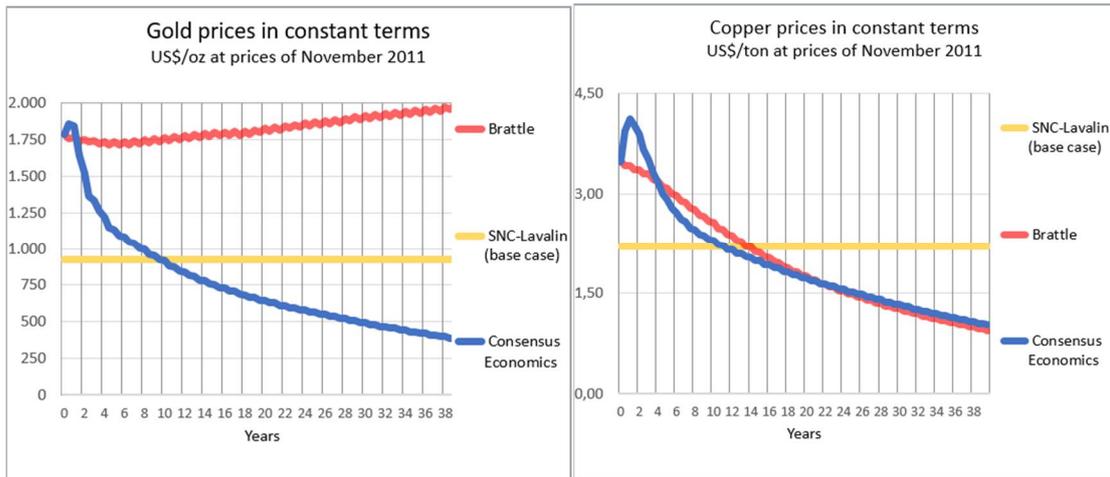
¹⁸⁹¹ Brailovsky/Wells II, ¶¶ 159-162; **Exhibit BW-71**.

¹⁸⁹² Brailovsky/Wells II, ¶ 164.

¹⁸⁹³ Brailovsky/Wells II, ¶ 165.

¹⁸⁹⁴ Brailovsky/Wells II, ¶¶ 166-168.

have been willing to pay for the Reko Diq project. In particular, and despite the fact that Reko Diq was intended to produce far larger quantities of copper than of gold, the deviating gold price predictions based on the Consensus Economics forecast would have had the largest impact, reducing the value of Claimant's investment from USD 8.5 billion to USD 0.89 billion, all else being equal. That the deviation between the sources relied on by the Parties' experts is by far larger larger for gold than for copper was illustrated by Mr. Brailovsky and Prof. Wells by the following graphs:¹⁸⁹⁵



1503. Claimant did not dispute the accuracy of Mr. Brailovsky's and Prof. Wells' calculation and thus the impact it would have on the value of its investment if a buyer were to base its price projections on the Consensus Economics forecast instead of futures and forward market data. The significance of the projections for gold, copper and oil prices appears to be undisputed and was confirmed by Mr. Livesey already at the Hearing on Jurisdiction and Liability when he testified that "[t]he fuel price and the metals price primarily are the things that are driving the returns on this project."¹⁸⁹⁶

1504. Bearing this significance in mind, the Tribunal has carefully considered the opinions provided by the experts from both sides and maintains its initial conclusion that Prof. Davis' approach to use futures and/or forward market prices for the purposes of projecting risk-adjusted prices for his valuation model is generally plausible and supported by the 2012 CIMVal report of valuation practices in the mining industry. However, the Tribunal has also taken note of the arguments raised by Respondent's experts, in particular the fact that the prices for gold that Prof. Davis derived from the futures and forward markets are considerably higher than the prices derived from analyst forecasts.

1505. As a preliminary point, the Tribunal is not convinced by the argument made by Mr. Brailovsky and Prof. Wells in their first report that using futures and forward prices would

¹⁸⁹⁵ Exhibit BW-82.07.

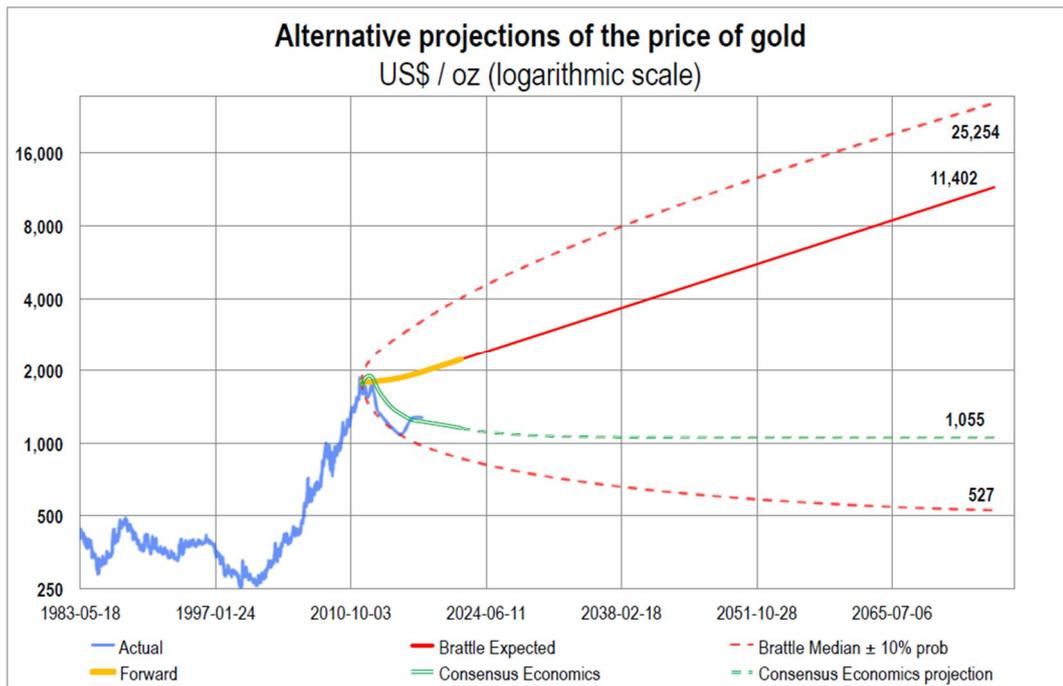
¹⁸⁹⁶ Transcript Hearing on Jurisdiction and Liability (Day 5), p. 1398 lines 13-15.

require making the assumption that the entire production quantities would be sold, and the entire quantities of required oil would be acquired, as of the valuation date, thereby exceeding by far the available demand for copper and gold. The Tribunal does not understand the assumption to be that Claimant would have entered into actual transactions at the prices assumed by Prof. Davis but rather that, as he explained in his second report, the futures and forward prices as of the valuation date reflect the market expectations of future prices at the time as well as the market's pricing of the systematic risk associated with these expectations.¹⁸⁹⁷ In his opinion, these prices therefore directly lead to the input required for the modern DCF method, *i.e.*, the price whose application results in a cash flow which has already been adjusted for the systematic risk associated with price fluctuations, and thereby also does away with the need to predict a spot price as well as a separate risk adjustment.

1506. The Tribunal considers it undisputed that the Consensus Economics forecasts relied on by Respondent's experts attempt to predict spot prices rather than the risk-adjusted prices Prof. Davis is seeking as an input for his modern DCF model. In the Tribunal's view, it is therefore apparent that the two sets of price predictions used by the Parties' experts cannot be directly compared. At the same time, the Tribunal agrees with Mr. Brailovsky and Prof. Wells that a buyer might have been concerned with the fact that the prices for gold from the futures and forward markets, which incorporate the market's pricing of the risk associated with price predictions over a certain time period, were considerably higher than the analysts' forecasts of prices which do not incorporate such risks. These concerns would then have been intensified by the different trends predicted by the forward curve and the consensus forecast, respectively, over a 10-year period, which are then extrapolated over the remainder of the predicted mine life, assuming that the initially predicted trend will continue over the entire production period. As illustrated by Respondent's experts, this leads to a continuously widening gap between the risk-adjusted prices projected by Prof. Davis (solid red line) and the non-risk-adjusted prices projected by Mr. Brailovsky and Prof. Wells (green line):¹⁸⁹⁸

¹⁸⁹⁷ *Cf.* Davis II, ¶ 118.

¹⁸⁹⁸ Brailovsky/Wells I, Figure 12.



1507. Prof. Davis addressed this discrepancy and the criticisms raised by Respondent's experts regarding the use of futures and forward prices and provided various arguments supporting his reliance on these prices both for short-term and long-term predictions. Prof. Davis also presented arguments as to why the forecasts relied on by Respondent's experts should not be used as a basis for making projections, noting in particular that they do not even attempt to predict risk-adjusted prices and are, in his opinion, inconsistent with accepted models of how the commodity markets and specifically the gold price are expected to develop over the long term.

1508. The Tribunal considers that Prof. Davis' methodological argument, *i.e.*, that it would be inaccurate to refer to analyst forecasts to determine risk-adjusted prices sought as input for the modern DCF model and that forward market prices are the best and in fact only indication of how the market prices that risk, is generally plausible. However, taking into account the large gap between particularly the gold price predictions, the Tribunal considers that the plausibility of the price assumptions made by Prof. Davis cannot be assessed without also addressing the question whether there is a plausible reason for the gap to the forecasts of spot prices made by analysts at the same time.

1509. In this regard, the Tribunal also notes that the suggestion implied in Claimant's and Prof. Davis' argument that forecasts of spot prices are irrelevant to determining the risk-adjusted prices sought for the modern DCF model is not confirmed by the academic literature in the record and also does not correspond to the 2012 CIMVal report. In the Tribunal's view, an article dated 30 December 2005 authored by an economist from the Federal Reserve Bank of San Francisco, assessing whether oil futures prices help predict future oil prices, is particularly instructive. The author first confirmed that "[o]il futures

prices reflect the price that both the buyer and the seller agree will be the price of oil upon delivery. Therefore, these prices provide direct information about investor's expectations about the future price of oil." He added, however, that oil futures prices include risk premiums to reflect the possibility of higher or lower prices and that those risk premiums are "quite large and volatile over time," which suggested that "oil futures prices are not necessarily the best predictor of future oil prices."¹⁸⁹⁹ The author then stated that "[t]he current, or spot, oil price may also help predict future oil price movements" and, based on an assessment of four models based on oil futures prices and the spot oil price, reached the following conclusion:

*"Raw futures prices are found to be unbiased predictors of future oil prices; that is, for the past two decades, the raw oil futures prices are as likely to overpredict as to underpredict future oil prices. However, while the average of forecasting errors based on raw futures prices may be close to zero, such errors are quite large over time. Indeed, raw oil futures prices provide relatively less accurate forecasts than models using both the futures prices and spot price (the 'futures-spot spread' model). Therefore, incorporating information on the relationship between current futures prices and spot price improves the forecast."*¹⁹⁰⁰

1510. The author also noted that futures prices were more accurate in predicting near-term oil price movements than longer-term movements and provided the following explanation:

*"The observation that futures prices are more useful in forecasting near-term oil price movements may reflect the fact that the near-term oil futures markets are much more liquid than longer-term futures markets. For instance, the average daily trading volume of the 'light, sweet crude oil' futures contracts on the New York Mercantile Exchange over the past two years is about 72,600 contracts for a horizon of one month, 22,000 units for two months, 4,800 for four months, and only 1,000 units for the one-year horizon (one unit represents 1,000 barrels). As the futures market becomes less liquid at longer horizons, the quoted futures prices may become a less accurate measure of expected oil prices, because they are more vulnerable to shocks that may not be related to the expected oil price movements in the future."*¹⁹⁰¹

1511. He then concluded with the section quoted by Respondent's experts in their second report:

*"Oil futures prices contain important information about future oil price movements, especially for the near term. In particular, taking into account the relationship between current spot and futures prices instead of considering only the raw futures price can significantly improve forecasting accuracy. Prediction errors, however, are still substantial, and accurately predicting the future price of oil seems as elusive as ever."*¹⁹⁰²

¹⁸⁹⁹ Exhibit BW-71, p. 1.

¹⁹⁰⁰ Exhibit BW-71, p. 2.

¹⁹⁰¹ Exhibit BW-71, pp. 2-3.

¹⁹⁰² Exhibit BW-71, p. 3.

1512. While the Tribunal is aware that this paper was limited to discussing the usefulness of futures prices to predicting future oil prices and did not extend its conclusions to predictions of gold or copper prices, the Tribunal does consider it instructive that, at least for oil, there are indications that futures prices may not be, in isolation, the best indicator of future prices but that forecasts of spot prices and different models describing the relationship between futures and spot prices may also be considered useful to obtain a more accurate prediction of future prices. The Tribunal appreciates the fact that Prof. Davis did not attempt to predict actual future prices but rather prices which have already been adjusted for the risk associated with price uncertainty. However, the Tribunal cannot accept that forecasts of the spot price would therefore be considered irrelevant. More specifically, the Tribunal is not convinced that a buyer would base its price assumptions exclusively on forward markets and not take into account at all forecasts of spot prices, in particular when taking into account the undisputed volatility of prices and difficulty in predicting them, the large impact of this volatility on the value of the project as well as the long life of the mine over which the predictions made by the forward markets have to be extrapolated, thus creating considerable additional uncertainty.

1513. In the Tribunal's view, the reasonableness of taking into account more than one source for a price assumption is also confirmed by CIMVal, which reports in response to the question how future prices are estimated that they "*generally use a combination of sources to estimate forecast future metal prices, including management forecasts, spot prices, consensus forecasts from investment banks and forecasts derived from forward curves as the circumstances dictate.*" CIMVal then explains in detail as to why it considers that "*in appropriate circumstances a commodity price forecast may be derived from its forward price curve*" and that "*[m]etal price forecasts based on the forward curve may be extended beyond the publicly quoted prices based on the characteristics of the metal ... and the market characteristics of the forward curve.*" CIMVal explicitly confirms that "*[t]he forward price is considered a risk—adjusted expected price since a party choosing to buy or sell a commodity in the future would first need to estimate what the spot price might be and then adjust this estimated price for variance around the forecast (i.e., applying a risk adjustment).*"¹⁹⁰³

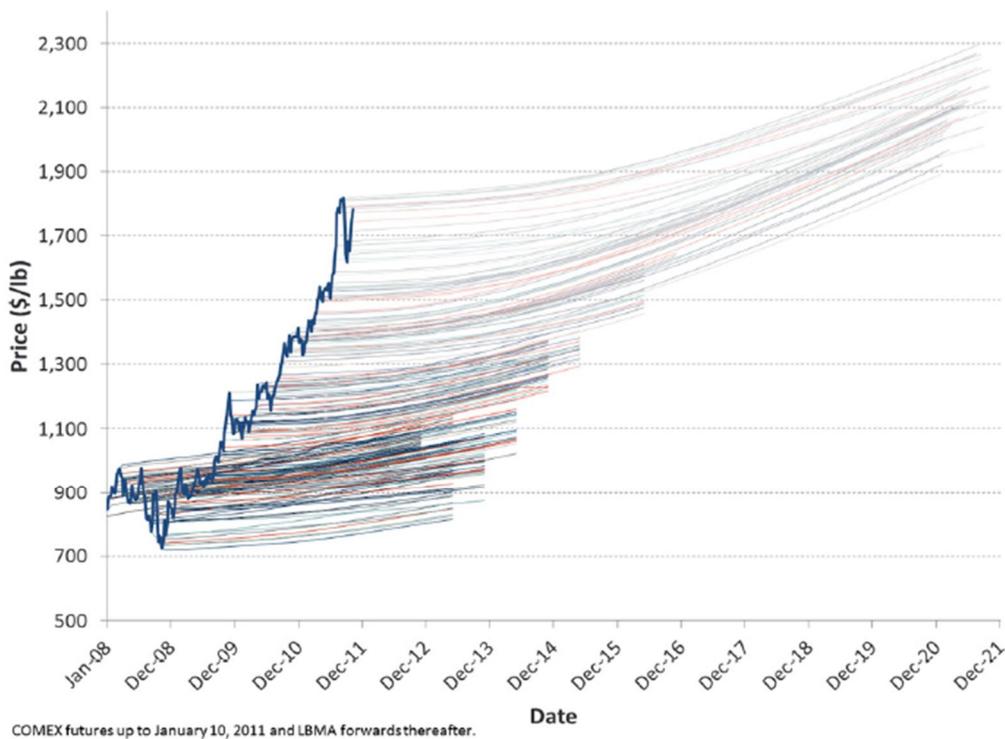
1514. In the Tribunal's view, this is a strong indication for the soundness of Prof. Davis' approach to rely on market data from the forward markets and to extrapolate the forward market curve to obtain data for the period of 10+x years after the valuation date. However, the Tribunal cannot deduce from CIMVal's explanation that it would be inaccurate to cross-check the results obtained with this approach by looking, *inter alia*, at spot prices and consensus forecasts. For the reasons set out above, the Tribunal considers it likely

¹⁹⁰³ Exhibit CE-1483, p. 10.

that a buyer would also take into account more than one source for the prediction of future prices and at least consider whether there is a plausible explanation for the discrepancy between the prices forecast by analysts and the prices quoted in the futures and forward markets.

1515. In this regard, Claimant and Prof. Davis argued that the Consensus Economics forecast relied on by Respondent's experts is unreliable and has historically been biased downwards. Specifically, Prof. Davis noted that analysts have continuously under-predicted gold prices, on average, since they started to publish long-term forecasts in 1998 and further argued that the forecasts are contrary to investors' expectations that an investment in gold yields a positive return. Mr. Brailovsky and Prof. Wells, on the other hand, noted that the under-prediction occurred only in times of increasing prices and that, by contrast, analysts over-predicted prices when they started to fall. While Claimant argues that this shows the general unreliability of the forecast, Mr. Brailovsky and Prof. Wells pointed out that a similar correlation of under-prediction of rising prices and over-prediction of falling prices also occurs in the futures market for gold and copper prices. That this is in fact the case is confirmed by Prof. Davis' illustration of the gold forward curves between January 2008 and September 2011:¹⁹⁰⁴

Figure C-4. Gold: COMEX and LBMA Forward Curves, 01/01/2008 - 11/09/2011



¹⁹⁰⁴ Davis I, Appendix C, Figure C-4.

1516. In these circumstances, the Tribunal is not convinced that an average under-prediction of prices while they were rising would suffice to demonstrate a general “*downward bias*” of consensus forecasts or to fully explain the discrepancy between the consensus forecasts and the forward curve. In fact, recalling the statement made by Respondent’s experts that “[n]either the futures prices nor consensus forecasts have a really good predictive record,”¹⁹⁰⁵ the Tribunal considers its conclusion reinforced that while it is reasonable to rely on data from the forward markets, a buyer would likely also cross-check the plausibility of the assumptions made on the basis of such forward market data by looking at other indicators of future prices, such as those listed by CIMVal, which specifically include spot prices and consensus forecasts.

1517. In the opinion of Prof. Davis, the unreliability of the Economic Consensus forecast for the gold price is further demonstrated by the fact that it contradicts expectations of investors to receive a positive return when investing in gold as well as the actual development of the spot price as of the valuation date. The Tribunal notes that there is agreement between the Parties’ experts to the extent that gold can be characterized as an investment asset but that they disagree as to the expected long-term development of the gold price. While Mr. Brailovsky and Prof. Wells initially agreed with Prof. Davis “*that copper and oil tend to follow a mean-reverting behavior, and that gold varies as a random walk process with a drift*,”¹⁹⁰⁶ they claimed to have found in their second report that “*the price of gold is also mean reverting, as are prices of copper and oil. It is not the ‘random walk with time-dependent drift’ that Brattle assumes to obtain its ever-rising pattern for gold*.”¹⁹⁰⁷ As Mr. Brailovsky and Prof. Wells introduced this finding and the method on which it was based only in their second report, Prof. Davis did not have the opportunity to respond to it in writing. At the Hearing on Quantum, he testified that “[t]he test [suggested by Prof. Wells and Mr. Brailovsky] was not conducted using appropriate statistical procedure” and that their calculation reflected “*an error in a key statistic*.”¹⁹⁰⁸ In support of his opinion, he referred to an appendix of his presentation.¹⁹⁰⁹ Claimant further introduced an additional excerpt from the textbook on which Mr. Brailovsky and Prof. Wells had relied in carrying out their test, which confirmed in its view that the test could not be used for the purposes of verifying whether or not the gold price is mean-reverting.¹⁹¹⁰ According to Claimant, additional data produced by Respondent revealed that Respondent’s experts also performed the correct test which yielded the opposite conclusion, *i.e.*, that it cannot be rejected statistically that the gold price is not mean-

¹⁹⁰⁵ Brailovsky/Wells II, ¶ 157.

¹⁹⁰⁶ Brailovsky/Wells I, ¶ 143.

¹⁹⁰⁷ Brailovsky/Wells II, ¶ 63.

¹⁹⁰⁸ Transcript Hearing on Quantum (Day 8), p. 2346 lines 16-21.

¹⁹⁰⁹ **Exhibit CE-1782**; Davis Presentation, pp. 23, 54.

¹⁹¹⁰ **Exhibit CE-1766**, p. 77. *See also* **Exhibit BW-82.08**.

reverting.¹⁹¹¹ All of these exhibits were admitted *de bene esse* and are now admitted into the record.

1518. In the Tribunal's view, it is not necessary to make a conclusive finding as to the accuracy or reliability of either of the statistical tests applied by the Parties' experts to assess whether or not the gold price follows a mean-reverting pattern like copper or oil. In any event, the Tribunal is not convinced that a consensus forecast predicting considerably lower prices and, perhaps even more importantly, a different price trend than the forward market would not have been taken into account at all by a buyer valuing the project as of the valuation date. More specifically, the Tribunal does not consider it established that a buyer would have based its price assumption exclusively on the forward market curve, extrapolating it to predict a constant increase of the gold price for 56 years into the future, without accounting for the possibility that gold prices might develop differently, despite the considerable deviation between the predictions derived from forward markets and from the Consensus Economics forecasts, respectively.

1519. As noted above, the Tribunal is convinced that Prof. Davis' approach to use the forward market curve as a basis to determine risk-adjusted prices is methodologically sound and therefore considers it likely that a buyer would also have used this approach as a basis for its price predictions. The Tribunal is not convinced, however, that this approach fully captures the risk associated with the fluctuation of prices over a time period of 56 years. In the Tribunal's view, this applies not only to the gold price for which the discrepancy between the forward curve and consensus forecasts is particularly large, but also to the prices for copper and oil. Claimant itself noted that "[t]he range of variability in projecting [price fluctuations] years into the future is massive."¹⁹¹² While Claimant argues that the discount made by Prof. Davis for systematic risk is "likely to be significant" and claims that "[t]here is no reason to assume ... that the corresponding discount is a small number,"¹⁹¹³ the Tribunal notes that Claimant bears the burden of proving that Prof. Davis fully captured the impact of systematic risk on the value of its investment.

1520. The Tribunal is aware that Prof. Davis has applied a probabilistic approach, which means that, only on average, he assumed that prices would have developed along the forward curve and its extrapolation, while in a certain number of his simulations, prices would also have turned out to be significantly lower (or, in the case of oil, higher) than this average. In the Tribunal's view, this shows that he did recognize a certain risk of prices developing differently and it would therefore not be appropriate to make a finding that the price prediction made by a buyer would have been, *e.g.*, in the middle between the

¹⁹¹¹ Exhibit CE-1782A.

¹⁹¹² Claimant's Quantum Post-Hearing Brief, ¶ 346.

¹⁹¹³ Claimant's Quantum Post-Hearing Brief, ¶ 346.

forward curve and the analyst forecasts. The Tribunal also notes that it has not been provided with sensitivity analyses using different price predictions; however, it has been provided with the average value based on forward curve price predictions (USD 8.5 billion) and the average value based on Consensus Economics forecasts (USD -1.23 billion when using them for gold, copper and oil).

1521. The Tribunal will therefore proceed to make what it considers to be the most reasonable assumption in the circumstances of the case. Based on the considerations set out above and the difference of almost USD 10 billion between the calculations made by the Parties' experts, the Tribunal considers it reasonable to conclude that a buyer would have factored in the possibility that not all of the systematic risk associated with the development of prices over the 56-year life of the mine is fully captured in the available market data and quotations going up to ten years into the future and the extrapolation of such data over the remainder of the mine's life. It is undisputed that there is no market pricing of the systematic risk extending over a 56-year mine life and Prof. Davis specifically agreed at the Hearing on Quantum that the cash flows acquired by the buyer would remain "*highly uncertain and highly risky.*"¹⁹¹⁴ The Tribunal therefore concludes that it is likely that a buyer would have assigned a price to assuming this long-term risk by reducing its expectation of the cash flows that the Reko Diq project would generate over the life of the mine by 25%. This results in a reduction of the value of Claimant's investment by USD 2,430 million.

b. Whether Prof. Davis Has Appropriately Accounted for the Risk of Increases in Capital and Operating Expenditures (Other than Oil)

1522. In addition to the risk associated with the projection of prices for gold, copper and oil, there is common ground that the project also faced uncertainty regarding the expected costs or, more precisely, costs other than oil which has already been addressed above. In this regard, Prof. Davis explained that he had referred to futures markets where available, such as for oil, but could not do so where there is no futures markets pricing the expected costs. He added that "*[i]f there are no market signals to determine the at-source risk adjustments for the risks of some cost elements and the traditional projections are used instead (as would be available from engineering studies for example), then the net present value of costs will be overstated and project value understated, since costs are a subtraction from revenues and the necessary adjustment for systematic risk, whether done at-source or through the discount rate, would lower their value.*"¹⁹¹⁵

1523. With regard to capital costs, Prof. Davis explained that he had made certain adjustments to the cost estimates contained in the Feasibility Study and Expansion Pre-Feasibility

¹⁹¹⁴ Transcript Hearing on Quantum (Day 8), p. 2484 line 15-18.

¹⁹¹⁵ Davis I, ¶ 94.

Study, accounting for inflation until the valuation date, cost escalation based on forecasts for capital cost escalation rates as well as general inflation based on inflation swaps reflecting market expectation of inflation and its correlation to the overall market. Prof. Davis stated that these adjustments increased the cumulative capital costs in the Feasibility Study and Expansion Pre-Feasibility Study by 136% and 99%, respectively.¹⁹¹⁶ He explained that, in addition to the adjustments for systematic risk, cost projections also had to be adjusted to reflect the impact of asymmetric risk, which he had done separately. Finally, Prof. Davis noted that he had refrained from making adjustments for the systematic risk of variation around the mean correlated with overall market movements because he considered this risk difficult to quantify in a reliable manner and “*excluding the adjustment possibly overstates the present value of costs and understates project value.*”¹⁹¹⁷

1524. As for operating costs, Prof. Davis stated that he had used the project operating cost schedules which had been updated by Barrick in 2011 based on updated fuel prices and other cost information obtained through its global supply chain organization. Noting that fuel made up 38% of operating costs in the Initial Mine Development scenario and 40% in the Expansion Scenario and that these costs were “*highly correlated with crude oil prices,*” Prof. Davis estimated fuel operating costs based on oil market price signals.¹⁹¹⁸ As for non-fuel operating costs, he modeled increases in real operating costs based on escalation rates forecasts, amounting to 11% over the four years following the valuation date. He then converted these costs into nominal terms by using the forecast of CPI inflation which also reflects systematic risk in price inflation. According to Prof. Davis, this resulted in a cumulative increase of the non-fuel operating costs included in the Feasibility Study and Expansion Pre-Feasibility Study by 225% and 141%, respectively.¹⁹¹⁹ Prof. Davis further referred to additional adjustments made to account for asymmetric risks identified in Claimant’s risk register.¹⁹²⁰

1525. In their first report, Mr. Brailovsky and Prof. Wells criticized Prof. Davis for failing to account for potential cost overruns in his model. In their opinion, the adjustments he had made to the capital cost estimates of the Feasibility Study and the Expansion Pre-Feasibility Study “*result from normal inflation rates accumulated over a period of 65 years, not from any consideration of cost overruns.*” They noted that Prof. Davis had made “*some adjustment*” for “*residual risk*” concerning capital expenditures which represented 1.7% of the value of the investment program and, in their opinion, “*does not*

¹⁹¹⁶ Davis I, ¶¶ 156-159.

¹⁹¹⁷ Davis I, ¶¶ 160-161.

¹⁹¹⁸ Davis I, ¶¶ 163-171.

¹⁹¹⁹ Davis I, ¶¶ 172-173.

¹⁹²⁰ Davis I, ¶ 174.

seem at all commensurate with the experience of cost overruns.” For operating costs, Respondent’s experts considered that *“a similarly minor adjustment for risk is included, equivalent to 2.4% of [operating] costs.”*¹⁹²¹ Specifically, Mr. Brailovsky and Prof. Wells referred to studies comparing capital cost estimates in feasibility studies and capital costs actually incurred, resulting in an average cost overrun of 22%; they further quoted from the former Director of Project Evaluations at Barrick, who suggested in an article that *“up to 50%”* should be added to costs and schedule when looking at feasibility studies prepared for a remote area in a third-world country.¹⁹²² They also noted that, by contrast to the price of oil, Prof. Davis had not modeled variability for other costs or production quantities; in their opinion, the software Prof. Davis had used would have enabled him *“to make a reasonable assumption of the type of probability distribution that best fits capital expenditures in the mining industry, as well as its dispersion.”* They concluded that accounting for capital cost overruns *“would greatly reduce the value of the claim.”*¹⁹²³

1526. Prof. Davis responded to these criticisms in his second report by pointing out that the adjustments he had made accounted for cost overruns that can result from general inflation associated with delays, *“real”* cost increases and growth in the quantity estimates, *“resulting in total escalation well above the benchmarks that Mr. Brailovsky and Professor Wells cite.”* Specifically, Prof. Davis explained that the expected initial mine development costs in his model were 58% higher than the estimate in the Feasibility Study. He rejected the argument that his adjustment accounted only for inflation and noted that it was difficult to understand *“how inflation over 65 years is at all relevant, when most capital expenditures are incurred upfront, when the mine is built.”* He also emphasized that the effects of inflation have to be included when cost overruns are reported and therefore also form part of his adjustments.¹⁹²⁴

1527. Prof. Davis explained that he had made the following adjustments to the Feasibility Study’s capital cost estimate: (i) increase by 18% to account for inflation up to the valuation date; (ii) increase by 21.4% to account for *“real”* cost escalation (in excess of inflation) over the five-year period following the valuation date; (iii) increase by expected rate of CPI inflation over the same period; and (iv) further increases to account for asymmetric risks identified by Claimant in its residual risk register that would result in cost overruns, the effects of which are *“typically small for large projects.”*¹⁹²⁵

1528. Prof. Davis emphasized that his adjustments went beyond the contingency included in the Feasibility Study and built in *“a substantial increase in both capital and operating costs*

¹⁹²¹ Brailovsky/Wells I, ¶¶ 120-121.

¹⁹²² Brailovsky/Wells I, ¶¶ 38, 39; Exhibits BW-5 and BW-17.

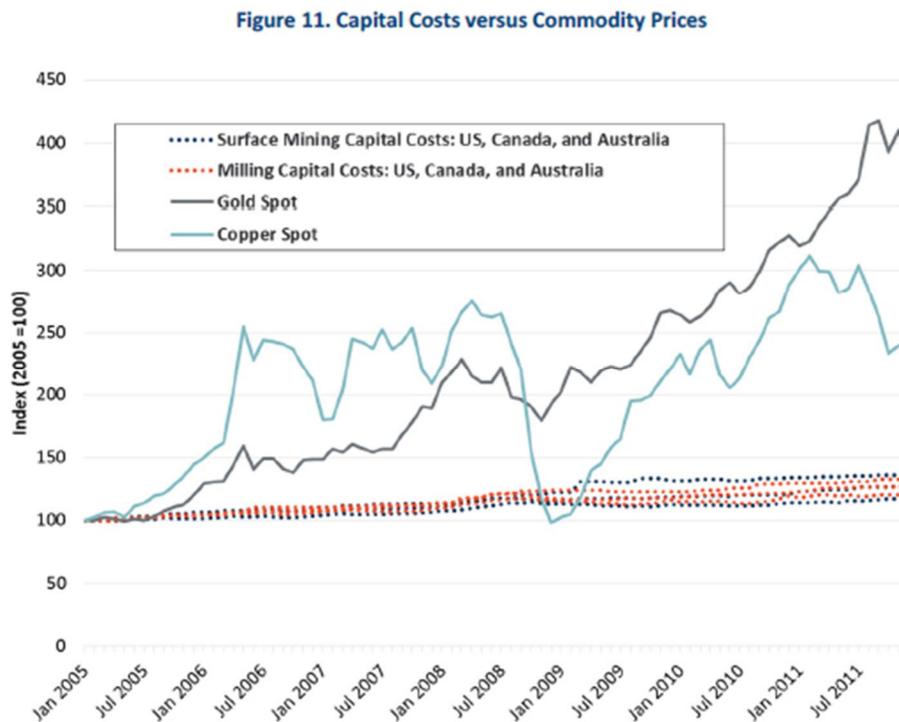
¹⁹²³ Brailovsky/Wells I, ¶¶ 122, 125.

¹⁹²⁴ Davis II, ¶¶ 154-156.

¹⁹²⁵ Davis II, ¶¶ 158-159.

in an environment with rising commodity prices.” Specifically, he noted that by updating the cost estimates from the Expansion Pre-Feasibility Study made as of October 2009, he increased Opex estimates by 10-11% and Capex estimates by 17-18%.¹⁹²⁶ He stated that by adjusting both capital and operating cost estimates as well as closure costs based on cost escalation forecasts, he had reduced the value of Claimant’s investment by more than USD 2 billion.¹⁹²⁷

1529. Prof. Davis emphasized that contrary to what Mr. Brailovsky and Prof. Wells appeared to suggest, “*neither capital nor operating costs rise proportionally with commodity prices,*” which he illustrated as follows:¹⁹²⁸



1530. Finally, Prof. Davis noted that he had not modeled capital cost variability around the projected average values in his first report as he did not expect that it would have a significant effect on his value estimate but had now performed such a test, incorporating into the simulation the possibility that capital costs would vary above or below the projected values. Prof. Davis stated that the effect of this addition was a decrease in project value by 1.5% to USD 8.4 billion.¹⁹²⁹

¹⁹²⁶ Davis II, ¶¶ 160-165.

¹⁹²⁷ Davis II, ¶¶ 85-86.

¹⁹²⁸ Davis II, ¶ 166 and Figure 11.

¹⁹²⁹ Davis II, ¶¶ 188-190.

1531. As for operating costs, Prof. Davis explained that he had increased the cost estimate by 11.6% (initial mine development scenario) and 9.8% (expansion scenario) to account for cost increases up to the valuation date based on Barrick's updated cost schedule and, in addition, for real escalation of costs for future periods based on cost escalation forecasts for the mining industry. According to Prof. Davis, these adjustments also accounted for inflation in labor costs associated with rising commodities markets.¹⁹³⁰
1532. In their second report, Mr. Brailovsky and Prof. Wells argued that the expenditures modeled by Prof. Davis were "*only slightly higher than those of the SNC-Lavalin study, 2.7% in constant terms.*" They recognized that "*the capital expenditure is much higher, by US\$ 2.96 billion,*" maintaining that "*most of the increase*" was the result of inflation adjustments, but emphasized that operating costs were "*much lower, by US\$ 2.4 billion, largely offsetting each other,*" without any explanation from Prof. Davis on this point.¹⁹³¹
1533. Respondent's experts further considered that the effect of variability for capital costs calculated by Prof. Davis was inconsistent with his own writings in which he reported that "[c]ost overruns of 100% or more happen in roughly 1 out of 13 projects" and referred to an intentional and rational bias, "*driven by a scarcity of project financing and the need by project sponsors to inflate the project economics in a bid to secure financing.*"¹⁹³² Respondent's experts further considered that in making his test for variability, Prof. Davis had incorrectly applied a distribution mean of 1 even though his study indicated that the distribution mean should be 1.25, stating that it had established "*a bias in mining project capital cost estimates that results in as-built capital costs being 25% higher than the estimate in the feasibility study.*" Mr. Brailovsky and Prof. Wells added that using the correct distribution mean, the effect of modeling cost variability would have been to reduce the value by an additional USD 2 billion, *i.e.*, to USD 6.4 billion.¹⁹³³
1534. Respondent's experts further noted that Prof. Davis had not tested the effects of modeling variability of operating costs. In their opinion, incorporating variability for both capital and operating costs (using "*half the mean bias*" used for capital costs variability, *i.e.*, 1.125) would reduce the value to USD 5.2 billion.¹⁹³⁴
1535. At the Hearing on Quantum, Prof. Davis confirmed that the study he had worked on in 2008 concluded that "*the cash spent [on mining projects] tended to be 25 percent more than what was listed in the Feasibility Study.*" He also referred to the other sources relied on by Respondent's experts, suggesting an increase of 22% and up to 50%, respectively,

¹⁹³⁰ Davis II, ¶ 204.

¹⁹³¹ Brailovsky/Wells II, ¶ 84 and Table 3.

¹⁹³² Brailovsky/Wells II, ¶¶ 143-144; **Exhibit BW-13**, pp. 118-139.

¹⁹³³ Brailovsky/Wells II, ¶ 145; **Exhibit BW-13**, p. 130; **Exhibit BW-82.19**.

¹⁹³⁴ Brailovsky/Wells II, ¶ 148; **Exhibit BW-82.20**.

and reiterated that he had already “*added 58 percent to Feasibility Study costs to allow for cost overruns.*” Prof. Davis further noted that he had incorporated substantial project delay risks, estimating an average delay of 5.3 years between the completion of the Feasibility Study and start of construction, which he also described as “*de-risking because that then causes additional costs while you’re waiting and being delayed. It also causes extra Capital Cost Inflation, and it pushes your revenues more and causes them to be discounted more for time.*”¹⁹³⁵

1536. In the Tribunal’s view, it is undisputed that Prof. Davis made significant adjustments to the capital cost estimates included in the Feasibility Study and the Expansion Pre-Feasibility Study. Specifically, Mr. Brailovsky and Prof. Wells did not dispute that Prof. Davis increased the capital cost estimate by 58% in nominal terms (corresponding to a 33% increase in real terms) and they recognized in their comparison of Prof. Davis’ numbers to the Expansion Pre-Feasibility Study that Prof. Davis’ capital cost estimate was almost USD 3 billion higher than its equivalent in the Expansion Pre-Feasibility Study. While they maintained their opinion that this increase was largely due to inflation adjustments, they did not engage with Prof. Davis’ explanation that adjustments for inflation have to be included in this calculation because the cost overruns reported for other mining projects also include the effects of inflation. Mr. Brailovsky and Prof. Wells also did not respond to Prof. Davis’ explanation that the effects of inflation are in any event limited as most of the capital costs are incurred during the construction period and thus in the first few years after the feasibility study. In the absence of any further substantiated argument on this point, the Tribunal cannot follow the opinion of Respondent’s experts that Prof. Davis’ adjustments to capital costs did not actually account for the risk of cost overruns experienced by other mining projects.

1537. Mr. Brailovsky and Prof. Wells further argued that Prof. Davis had not adequately modeled variability of capital costs and thereby significantly understated the effect of incorporating this aspect of volatility into his model. While Prof. Davis did not specifically refer to Mr. Brailovsky’s and Prof. Wells’ criticism regarding his use of an allegedly incorrect distribution mean, Claimant pointed out in its Post-Hearing Brief that the distribution mean of 1.25 indicated in Prof. Davis’ research would have applied to feasibility study costs. Given that Prof. Davis already made adjustments of 58% in nominal terms (corresponding to 33% in real terms) to the cost estimates in the Feasibility Study, Claimant argued that “*Prof. Davis did not err by conservatively modeling capital cost volatility with a mean even higher than the 25% average cost overrun reported in his paper.*”¹⁹³⁶

¹⁹³⁵ Transcript Hearing on Quantum (Day 8), p. 2350 line 8 to p. 2352 line 14; Davis Presentation, pp. 30-32.

¹⁹³⁶ Claimant’s Quantum Post-Hearing Brief, ¶¶ 438-439.

1538. The Tribunal agrees with Claimant that it would appear incorrect to apply the distribution mean of 1.25, which reflects the assumption that costs will be 25% higher than estimated in the feasibility study, to a cost estimate which has already been adjusted (by more than 25%) to account for likely cost increases *vis-à-vis* the feasibility study estimate. Prof. Davis has shown that the adjustments he has made exceed the cost increases suggested by the sources relied on by Mr. Brailovsky and Prof. Wells, including the highest increase of “*up to 50%*” suggested for projects in remote, third-world countries.¹⁹³⁷
1539. In the absence of any substantiated argument as to why the cost adjustments made by Prof. Davis would not reflect the cost increases reported or suggested by the sources relied on by Respondent’s experts and in particular the 25% increase established in Prof. Davis’ research from 2008, the Tribunal sees no basis to conclude that Prof. Davis should have applied a distribution mean of >1 when modeling the variability of capital costs around his increased cost estimate. However, as Prof. Davis’ own analysis has yielded an impact on the value of the project, reducing the value of Claimant’s investment by 1.5% or USD 130 million,¹⁹³⁸ the Tribunal considers that this amount has to be deducted from the amount of compensation to which Claimant is entitled.
1540. As for operating costs, Prof. Wells maintained at the Hearing on Quantum that variance in operating costs was a significant factor for a non-operational project: “*If you have an ongoing project, the variance is usually prices. That’s where the great uncertainty lies. If you do not have an ongoing project there are large uncertainties in other elements of the cash flow and those, in effect, compound. Once looking in the cash flow at the difference between uncertain revenues, prices, and uncertain costs--well, capital investments and Operating Costs--then the variance becomes particularly large.*”¹⁹³⁹ Mr. Brailovsky confirmed that oil prices, which Prof. Davis had simulated in his valuation model based on futures and forward market data, accounted for about 40% of the operating expenses.¹⁹⁴⁰ He also confirmed that Prof. Davis’ assumption of operating expenses was different from the Expansion Pre-Feasibility Study but again questioned why Prof. Davis’ estimate was in fact lower (USD 23.6 billion as opposed to USD 26 billion) even though he, Mr. Brailovsky, would have expected the risk-adjusted price for oil to be higher than the non-adjusted price.¹⁹⁴¹
1541. Prof. Davis was not cross-examined on the question why his estimate of operating costs was lower than the estimate included in the Expansion Pre-Feasibility Study or why he decided to not also model variability of operating costs. However, Claimant’s position is

¹⁹³⁷ Cf. **Exhibit BW-17**, p. 14.

¹⁹³⁸ Davis II, Workpaper R-1, Scenario 10.

¹⁹³⁹ Transcript Hearing on Quantum (Day 9), p. 2591 line 16 to p. 2592 line 3.

¹⁹⁴⁰ Transcript Hearing on Quantum (Day 9), p. 2639 line 6 to p. 2640 line 5.

¹⁹⁴¹ Transcript Hearing on Quantum (Day 9), p. 2640 line 14 to p. 2641 line 14.

indicated in its questions to Mr. Brailovsky regarding the comparison drawn by Respondent's experts between Prof. Davis' model and the Expansion Pre-Feasibility Study, in particular the question whether he understood that "*the reason Professor Davis's aggregate number for Operating Expenses is lower than the one in the Expansion Feasibility Study is largely driven, not by a failure to account for risk, but by simulating and using risk-adjusted prices in the forecast for oil.*"¹⁹⁴² The Tribunal has already addressed the disagreement between the Parties and their experts regarding the determination of risk-adjusted prices based on futures and forward market data above and it has found that while Prof. Davis' approach was generally reasonable, a buyer would likely have cross-checked the plausibility of its price assumptions and made a deduction from the purchase price it would be willing to pay to account for the long-term risk of price uncertainty associated with the 56-year life of the mine and the corresponding need to extrapolate forward market data over a significant period of time. This deduction also covered the reduction in value that resulted from basing price predictions for crude oil (as an indicator for the price of different types of fuel that Claimant contemplated to use for the project) on consensus forecasts, which projected higher prices than Prof. Davis derived from the forward market.

1542. As for the non-fuel operating costs, Prof. Davis explained in his reports that he increased the cost estimate of the Expansion Pre-Feasibility Study for inflation up to the valuation date, real escalation as forecasted for the mining industry, and future inflation after the valuation date. Mr. Brailovsky and Prof. Wells did not raise any substantiated criticisms with regard to either of these adjustments but only referred to the overall estimate for operating expenses which showed in their opinion that no significant risk adjustments were made. Consequently, the Tribunal has no basis to conclude that Prof. Davis' adjustments to non-fuel operating costs were inadequate. It also sees no basis to question that the overall lower figure in Prof. Davis' estimate of operating expenses is indeed due to his adjustments regarding fuel operating costs, which undisputedly made up close to 40% of the total operating expenses.

1543. With regard to the variability of operating costs and the impact that such a calculation would have had on the value of Claimant's investment, the Tribunal notes that Respondent's experts again assumed in their calculation that the distribution mean would be >1 , *i.e.*, in this case 1.125. They did not provide any basis for this assumption, except that it was "*half the mean bias ... used for capital cost variability.*"¹⁹⁴³ The Tribunal also considers that similarly to the calculation for capital costs, it appears incorrect to apply the distribution mean to Prof. Davis' cost estimate which has already been adjusted to account for the same cost increases that are also reflected in the distribution mean.

¹⁹⁴² Transcript Hearing on Quantum (Day 9), p. 2641 lines 5-10.

¹⁹⁴³ Brailovsky/Wells II, note 210.

Consequently, the Tribunal cannot accept the calculation made by Respondent's experts with regard to the impact of modeling variability for operating costs.

1544. In conclusion, the Tribunal finds that with the exception of the reduction for variability of capital costs calculated by Prof. Davis in the amount of USD 130 million, no further reduction is warranted to account for potential increases in capital costs or operating costs of the project.

c. Whether Prof. Davis Has Appropriately Accounted for the Asymmetric Risks Affecting the Project, in Particular for Country-related Risks

1545. There is common ground between the Parties and their experts that the project also faced asymmetric risks, which Prof. Davis described as “*negative events that are specific to the asset rather than affecting the market at large.*”¹⁹⁴⁴ Prof. Davis explained that most of the risks identified in Claimant's residual risk register qualified as asymmetric risks and described the approach to account for them risks as follows:

*“The first step to risk adjustment is to adjust the affected cash flow components for these potential negative events such that the correct probability-weighted cash flow is used in the analysis. For example, if there is a risk that unforeseen accidents will lead to increased costs, this must be accounted for by increasing the expected operating costs or decreasing the expected operating revenues.”*¹⁹⁴⁵

1546. Prof. Davis stated that “[t]he potential negative events considered [in the risk register] include many country-specific risks during both the construction and operation phases of the project” and referred to “*corruption, armed conflict, delays due to inexperienced workforces and government authorities, logistics disruptions, community relations impacts, and changing regulations.*” He also noted that “[t]he analysis also contemplated the possibility of nationalization, which I exclude from my damages calculation by instruction.”¹⁹⁴⁶ Prof. Davis explained that Claimant had monetized the financial impact for those events that, if realized in their mitigated state, would have direct financial consequences for the operations, into either a capital cost or operating cost. In order to effect asymmetric risk adjustment, Prof. Davis added these estimated impacts to his valuation, with the exception of those events that would lead to a project delay before ramp-up which were modeled separately in his valuation, and made the same adjustments to these additional costs that he also made for the other capital and operating costs.¹⁹⁴⁷

1547. Prof. Davis further explained that he classified those risks for which Claimant had not quantified a financial impact in three categories and made separate adjustments for each

¹⁹⁴⁴ Davis I, ¶ 86.

¹⁹⁴⁵ Davis I, ¶ 86.

¹⁹⁴⁶ Davis I, ¶ 181.

¹⁹⁴⁷ Davis I, ¶¶ 184-186.

category: (i) events that could lead to early termination were addressed by assuming an annual 0.5% probability of early shut down; (ii) events that could cause project delays before construction were addressed by assuming that it would take, on average, 3.8 years from the valuation date (or 5.3 years from the completion of the Feasibility Study) until the start of construction; and (iii) risks that could cause temporary interruption of operations would have been addressed either by the planned activities in the risk register or the insurance policies taken out by Barrick and/or Claimant. Prof. Davis noted that the adjustments he had made for these asymmetric risks reduced the value of Claimant's investment by approximately USD 3.4 billion.¹⁹⁴⁸ Further explanations regarding the individual adjustments made for each category of asymmetric risks were provided in Appendix D to Prof. Davis' first report.

1548. The Tribunal notes that it has already addressed these adjustments as well as the arguments raised by Respondent and its experts in this regard. Specifically, the Tribunal has already addressed both the 0.5% annual probability of an early mine shut down and Prof. Davis' reference to business interruption insurance that Claimant was planning to purchase in the context of its discussion whether Prof. Davis had adequately quantified residual security-related risks. The Tribunal has also addressed the average delay modeled by Prof. Davis until the start of construction in the context of the question whether Claimant had a reasonable plan and schedule for obtaining the permits and approvals required to construct and operate the project.

1549. However, the Tribunal has not yet assessed the more general argument raised by Respondents and its experts that the risk adjustments made by Prof. Davis cannot be considered sufficient to account for the country risk affecting the project. In the opinion of Mr. Brailovsky and Prof. Wells, the country risk should be reflected in the discount rate applied to the cash flows of the project, which would lead to a fair market value of zero regardless of the precise discount rate being used, as the value would turn negative at any rate above 13.2%.¹⁹⁴⁹ They noted that “[a]lthough we believe that the discount rate that would actually be applied by a potential investor in 2011 would be above 30%, there is no need to choose an exact number to understand that the project would attract no investor even if one accepts the optimistic assumptions on which the SNC-Lavalin reports are based.” They also referred to Dr. Burrows' calculation of a discount rate of 23% for Pakistan and added that “[n]o doubt, given the higher risks facing an investor in Balochistan than in Pakistan in general, the actual discount rate, or hurdle rate, used by a potential buyer would be higher than that. Still, even if a potential buyer were to accept

¹⁹⁴⁸ Davis I, ¶¶ 187-198.

¹⁹⁴⁹ Brailovsky/Wells I, ¶¶ 162, 166, 17.

a rate considerably lower than 23%, the SNC-Lavalin report shows that the project is unattractive to a buyer."¹⁹⁵⁰

1550. Prof. Davis responded to this criticism in his second report by emphasizing that country risk is an example of asymmetric risk and maintaining that "[t]he appropriate way to take these risks into account is to directly adjust the cash flow components affected by these risks such that the cash flows reflect the statistically expected, or average outcome." In his opinion, Respondent's experts "instead arbitrarily increase the discount rate to try to account for the valuation effects of asymmetric risks."¹⁹⁵¹ Prof. Davis noted that they did not provide any quantification of the risks they had discussed in their first report "other than the impact of a single, catch-all country risk premium that would raise the traditional DCF risk-adjusted discount rate to above 30%." As he did not use the traditional DCF method, Prof. Davis considered that "the idea of using a 30% discount rate does not apply to [his] analysis" and added that this measure of country risk would in any event be "ad-hoc and excessive even within the traditional DCF model."¹⁹⁵²

1551. Prof. Davis quantified the adjustments he had made for asymmetric risks as follows: (i) higher expected capital expenditures, operating costs, and closure costs needed to mitigate the asymmetric risks identified by Claimant in its risk register, reducing the value of Claimant's investment by USD 0.5 billion; (ii) projected operational interruptions and consequent decreased annual production, including the additional adjustment for a 24-month ramp-up that he made in his second report based on the expert opinion of Mr. Cusworth, reducing the value of Claimant's investment by USD 0.6 billion; (iii) projected delays prior to or during construction causing additional costs, additional cost inflation and delays in the receipt of revenues, reducing the value of Claimant's investment by USD 1.3 billion; and (iv) a chance of a permanent shutdown of the project and subsequent loss of all cash flows except closure costs, reducing the value of Claimant's investment by USD 1.6 billion. As already addressed in the context of the adjustments made to capital and operating cost estimates, Prof. Davis also referred to an escalation of construction and operational costs based on forecasts for the mining industry, reducing the value of Claimant's investment by a further USD 2.1 billion. In total Prof. Davis specified that his adjustments for asymmetric risk reduced the value of Claimant's investment from USD 14.7 billion to USD 8.5 billion.¹⁹⁵³

1552. Prof. Davis further did not agree with Mr. Brailovsky and Prof. Wells that the value of the project turned negative when applying a discount rate above 13.2%, noting that they

¹⁹⁵⁰ Brailovsky/Wells I, ¶¶ 17, 72-73.

¹⁹⁵¹ Davis II, ¶ 42.

¹⁹⁵² Davis II, ¶¶ 82-83.

¹⁹⁵³ Davis II, ¶¶ 85-86.

had derived this figure from the calculation in the Expansion Pre-Feasibility Study which, besides being a calculation in a technical study rather than a valuation, had not been updated to the valuation date. Prof. Davis then presented such an update of the calculation reflecting conditions at the valuation date which yielded a net present value of USD 4.03 billion for the project and USD 3.02 billion for Claimant's 75% share, implying an internal rate of return of 18.5%.¹⁹⁵⁴ Prof. Davis further rejected the suggestion of a hurdle rate and/or discount rate of 30% as both unsupported and contradicted by Claimant's previous investment decisions and further explained why he considered that Dr. Burrows' method of determining country risk based on Pakistan's sovereign yield spread was not appropriate in the present case.¹⁹⁵⁵

1553. In their second report, Mr. Brailovsky and Prof. Wells maintained their opinion that Prof. Davis' model "*completely disregards the notion of country risk,*" arguing that "*the alleged risk adjustment in the cash flows [is] Brattle's 'fudge factor' and one that is ridiculously low.*" They rejected the argument that they were double-counting risk, noting that "*one cannot double count risks when none are accounted for in the first place.*"¹⁹⁵⁶ In their opinion, Prof. Davis' model implies a discount rate of only 4.2%, arguing that when all risk adjustments made by Prof. Davis are excluded, cash flows are only USD 3.3 billion higher (as opposed to USD 4.0 billion as claimed by Prof. Davis) than with his risk adjustments. Noting that this implied discount rate was only 1.2% above the risk-free rate applied by Prof. Davis, Respondent's experts considered this calculation as proof that Prof. Davis did not make more than "*negligible*" risk adjustments.¹⁹⁵⁷

1554. Mr. Brailovsky and Prof. Wells discussed several decisions involving Venezuela in which they had participated as economic experts for the respondent and in which arbitral tribunals had considered it appropriate to apply a country risk premium of 15.75% or a discount rate of 19.88% and 18%, respectively.¹⁹⁵⁸ In their opinion, Prof. Davis' model has not otherwise accounted for the risks incorporated in such country risk premiums:

¹⁹⁵⁴ At the Hearing on Quantum, Prof. Davis presented a revised calculation of this updated value based on the Expansion Pre-Feasibility Study in which he had corrected an error identified in his preparation for the Hearing. This correction was subject to an extended debate between the Parties at the Hearing on Quantum and will be addressed in more detail in the context of the Tribunal's verification of its conclusion on the value of Claimant's investment taking into account the updated calculation in the Expansion Pre-Feasibility Study presented by Prof. Davis.

¹⁹⁵⁵ Davis II, Section VI.

¹⁹⁵⁶ Brailovsky/Wells II, ¶ 117.

¹⁹⁵⁷ Brailovsky/Wells II, ¶¶ 101-109 and Table 4.

¹⁹⁵⁸ Brailovsky/Wells II, ¶¶ 118-125; *Tidewater Investments SRL and Tidewater Caribe, C.A., v. The Bolivarian Republic of Venezuela*, ICSID Case No. ARB/10/5, Award (13 March 2015), p. 62 (**Exhibit BW-65**); *Saint-Gobain Performance Plastics Europe v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/12/13, Decision on Liability and the Principles of Quantum (30 December 2016), ¶¶ 754, 758 (**Exhibit BW-66**); *Mobil Cerro Negro, Ltd., et. al., v. The Bolivarian Republic of Venezuela*, ICSID Case No. ARB/07/27, Award (9 October 2014), ¶ 365 (**Exhibit BW-67**); *Mobil Cerro Negro, Ltd., v. Petróleos de Venezuela, S.A., et. al.*, ICC Case No. 15416/JRF (**Exhibit BW-68**).

“Brattle’s model is little more than the traditional DCF with revenues valued at Brattle’s projections of futures prices, which it paradoxically labels as ‘certainty-equivalent’ notwithstanding their being higher than the Consensus Economics forecasts—which presumably incorporate risk—and an extremely low discount rate. That is not ‘modern’; it is manipulation of a methodology with an inaccurate description of what was actually done.

Going through the motions and saying that one ‘followed the valuation rules’ and has ‘treated risk at its source’ does not mean that there are rules which allow one to see clearly what is going to happen in the far future, allowing one to eliminate uncertainty, especially in a region such as Balochistan. As Keynes and Knight have stated, uncertainty is a concept that is not amenable to probability calculations. But the fact that uncertainty cannot be assigned probabilities does not mean that it does not exist. To repeat, ‘there are things we don’t know we don’t know.’ The ‘irreducible uncertain’ cannot be avoided. How can anyone, not just Brattle, measure the uncertainty involved in the ‘known unknowns’ and, even worse, the ‘unknown unknowns’?

In sum, there is no way that the equivalent of adding 1.2% to the risk-free discount rate in a conventional DCF calculation can possibly account for the risks and uncertainty facing this project in Balochistan. It would not even be sufficient for the risks in a similar project in Canada or Australia.”¹⁹⁵⁹

1555. As the above quoted paragraphs as well as other passages of Mr. Brailovsky's and Prof. Wells' opinion demonstrate, they generally call into question whether it is possible to determine “*certainty-equivalent*” cash flows, *i.e.*, to adjust cash flows for all relevant risks, including country risk, at source. Respondent even considers it accepted by Prof. Davis that the cash flows he determined in his model are not “*certainty-equivalent*” but instead “*highly uncertain and highly risky*” which, in Respondent’s view, “*makes any reliance on the ‘de-risked’ approach yielding the certainty-equivalent FMV of USD 8.5 million misguided.*”¹⁹⁶⁰ The Tribunal is not convinced by this argument. In particular, the Tribunal does not understand the concept of “*certainty-equivalent*” cash flows to mean that a buyer would expect that he would receive this specific amount of cash flows at no risk. Rather, the buyer would be assuming the undisputedly significant level of risk associated with constructing and operating the project at Reko Diq; in return, however, the buyer would also acquire the chance of receiving much higher cash flows than the “*certainty-equivalent*” amount calculated by Prof. Davis. As Prof. Davis has explained in detail and as the 2012 CIMVal report confirms, the concept of “*certainty equivalent*” cash flows is based on the notion that the risk affecting a particular cash flow is monetized and directly incorporated into the calculation of that cash flow instead of being reflected in an aggregate discount rate.

¹⁹⁵⁹ Brailovsky/Wells II, ¶¶ 126-128.

¹⁹⁶⁰ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 338-339.

1556. In fact, Prof. Davis explained already in his second report:

“There is no doubt that Reko Diq’s development plan was subject to asymmetric risks, systematic risks, and unsystematic risks. It may seem counterintuitive that the Project’s risky future cash flows could be made equivalent to cash flows that are certain, but it is no different than the notion of fair market value itself – the FMV is the certain, or fixed, amount that a buyer or seller is accepting now in exchange for the uncertain, or variable, stream of future cash flows that the asset will generate. The FMV is the ‘certainty-equivalent’ value of the asset itself. Both the traditional DCF and modern DCF produce an estimate of this FMV, they just come to that FMV via different approaches to discounting for systematic risk.”¹⁹⁶¹

1557. For the reasons set out in detail in its assessment of the modern DCF valuation method, the Tribunal is convinced that it is generally appropriate to value the Reko Diq project based on the concept of certainty-equivalent cash flows and neither of the arguments raised by Respondent and its experts cause it to reach a different conclusion. Pursuant to the concept presented by Prof. Davis, the asymmetric risks affecting the project, including country-related risks, should not be reflected in the discount rate as they would be in a traditional DCF calculation but rather in individual risk adjustments made to the cash flows themselves.

1558. However, the question remains whether the asymmetric risk and in particular those risks that would be reflected in a country risk premium applied to the discount rate in a traditional DCF calculation have been fully captured by Prof. Davis’ risk adjustments at source. At the Hearing on Quantum, Prof. Davis presented a list of the country-related risks that he accounted for in his model.¹⁹⁶² As became clear through this list as well as through Prof. Davis’ explanations, he did not identify any of those risks himself but rather relied on the risks identified in the residual risk register that Claimant had appended to the Feasibility Study and continued to update until the valuation date.¹⁹⁶³ The Tribunal notes that neither Respondent nor its experts identified any specific country-related risks which were not included in the risk register but which, in their opinion, should have been included and quantified by Prof. Davis in his model. With the exception of the risk of a “[d]irect violent attack incountry by any hostile force resulting in injuries, death, business disruption,” they also did not raise a substantiated challenge to the specific quantification of any particular risk that Prof. Davis presented in his reports. This applies both to the risks for which Claimant quantified a financial impact and to the risks for which Claimant

¹⁹⁶¹ Davis II, ¶ 53.

¹⁹⁶² Cf. Davis Presentation, p. 34.

¹⁹⁶³ See also Davis I, Appendix D, ¶ 1.

did not identify a financial impact and Prof. Davis modeled an impact based on his classification of these risks in the three categories referred to above.

1559. First, the category of risks that could cause early termination of the project included the risk of a “[d]irect violent attack incountry by any hostile force resulting in injuries, death, business disruption,” which has already been addressed in detail above, as well as the risk of “nationalization,”¹⁹⁶⁴ which Prof. Davis was instructed to exclude in his valuation. The Tribunal found above that the risk adjustment made by Prof. Davis for the security-related risk of a direct violent attack was not sufficient and should be increased based on his own reliance on OPIC insurance values for this purpose. The Tribunal further considers that it has not been provided with any basis to conclude that a further adjustment is warranted to account for other risks in this category and specifically the risk of “nationalization.”

1560. While there is disagreement between the Parties and their experts as to whether it was appropriate for Claimant to instruct Prof. Davis to exclude the risk of nationalization from his valuation, neither Respondent nor its experts have argued that the risk of nationalization would have been significant and, thus, that its inclusion would have had a measurable impact on the value of Claimant’s investment as of the valuation date. To the contrary, as pointed out by Claimant, the committee formed by Pakistan for the negotiation of the Mineral Agreement assured Claimant during a meeting held on 8-9 September 2008 “about stability, concept and continuity of the policy towards investment of the company in future as no untoward incident of expropriation had ever occurred in Pakistan.”¹⁹⁶⁵

1561. Claimant’s witness Ms. Boggs testified during the liability phase that while performing due diligence and country risk analysis for a possible acquisition of claimant in 2006, she “also considered the history of foreign investment in Pakistan and found no incidents in which foreign investors’ interests had been expropriated and nationalized.”¹⁹⁶⁶ Similarly, Mr. Luksic testified that he had been told at the time that “although there had been frequent changes between civilian and military Governments, and the political situation had often been volatile, foreign investments had not been expropriated and the different Governments had generally respected the law.”¹⁹⁶⁷

1562. Respondent’s expert Dr. Burrows expressed the opinion that “[t]he risk of expropriation is a business risk that a hypothetical buyer would take into account and is a risk that would have been knowingly undertaken by the owners of TCC.” He did not, however,

¹⁹⁶⁴ Davis I, Workpaper 27.

¹⁹⁶⁵ Exhibit RE-717, p. 3.

¹⁹⁶⁶ Boggs I, ¶¶ 10, 12.

¹⁹⁶⁷ Luksic I, ¶ 14.

quantify that risk but only stated that “[i]t is unlikely that unlawful actions by Respondent would account for much, if any, of the gap between Professor Davis’ 0.5% annual loss probability and my estimates of Pakistan PRS of 4.6-8.2%, nor that the risk of unlawful actions changed drastically from 2006 to 2011.”¹⁹⁶⁸ Similarly, Respondent and its experts Mr. Brailovsky and Prof. Wells argued that the risk of expropriation should be included in the determination of country risk, but did not provide any quantification of that risk.¹⁹⁶⁹ In particular, Mr. Brailovsky and Prof. Wells, while referring to the decisions of arbitral tribunals regarding the country risk of Venezuela, did not express any opinion as to the level of risk of uncompensated expropriation or other unlawful actions prevailing in Pakistan as of the valuation date.

1563. Consequently, the Tribunal does not have to make a finding on whether it was correct as a matter of law to exclude the general risk of unlawful actions from a valuation of Claimant’s investment because, in any event, it has not been established that a buyer would have considered this a significant risk from a factual point of view.

1564. Second, the category of risks that could cause project start-up delay includes the risks of “Delays in financing due to lenders review of ESIA results,” “petty corruption resulting in delays and expenses,” “Cross border consultation & mitigation in Afghanistan caused by the use of water sources resulting in schedule delay and/or community/government opposition or demands,” “Unfavourable perceptions/interests of our project by local stakeholders,” “Inability to negotiate Mineral Agreement,” “Delay in ESIA submittal due to changes in the project description, resulting in a delay of the project,” “Failure to secure all required permits in good time resulting in project delay,” and “Water usage by project causes drawdowns that have impacts in Iran resulting in diplomatic challenges.”¹⁹⁷⁰

1565. The Tribunal has already addressed most of these risks and the Parties’ arguments with regard to the issues reflected in those risk items above. Based on its findings with regard to water, security, environmental and social impacts, permitting and the negotiation of a Mineral Agreement, the Tribunal is convinced that these risks are adequately captured in the delay modeled by Prof. Davis. Based on a review of the 100 largest deposits as of 2011 and the average time period between completion of the feasibility study and the start of construction for these deposits, Prof. Davis modeled in his simulations that it would take, on average, 5.3 years from completion of the Feasibility Study in August 2010 to the start of construction. As the Tribunal has already stated in the context of its assessment on whether likely permitting delays were sufficiently accounted in Prof. Davis’ model,

¹⁹⁶⁸ Burrows II, ¶ 58.

¹⁹⁶⁹ Cf. Respondent’s Post-Hearing Brief on Quantum, ¶ 347; Respondent’s Rejoinder on Quantum, ¶¶ 426, 428-429; Brailovsky/Wells II, ¶¶ 121-125.

¹⁹⁷⁰ Davis I, Workpaper 27.

Respondent has not raised any substantiated challenge to Prof. Davis' modeling of these delays and the Tribunal therefore sees no basis to assume that they would not have been considered sufficient by a buyer to account for the risks identified above as of the valuation date.

1566. Third, the category of risks that could cause temporary interruption includes the risks of "*TCC Security staff Implicated in human rights abuses resulting in reputational damage,*" "*Criminal extortion & kidnap caused by criminal groups possibly resulting in personnel harm, reputational and financial loss,*" and "*Theft of explosives & blasting accessories - linked to CPL13 leading to restrictions on our ability to operate, disruptions and reputational and financial loss.*"¹⁹⁷¹

1567. The Tribunal has already addressed Prof. Davis' modeling of these three security-related risks above. Specifically, Prof. Davis explained that business interruptions lasting longer than 30 days would be covered by business interruption insurance that Claimant was planning to purchase (the premiums for which were included in his cost estimates) and that he had adjusted production quantities to account for shorter interruption, which would not be covered by insurance. Respondent and its experts did not challenge Prof. Davis' approach to these risks and the Tribunal therefore sees no basis to conclude that the adjustments made by Prof. Davis were not sufficient for the purposes of determining the impact of business interruptions.

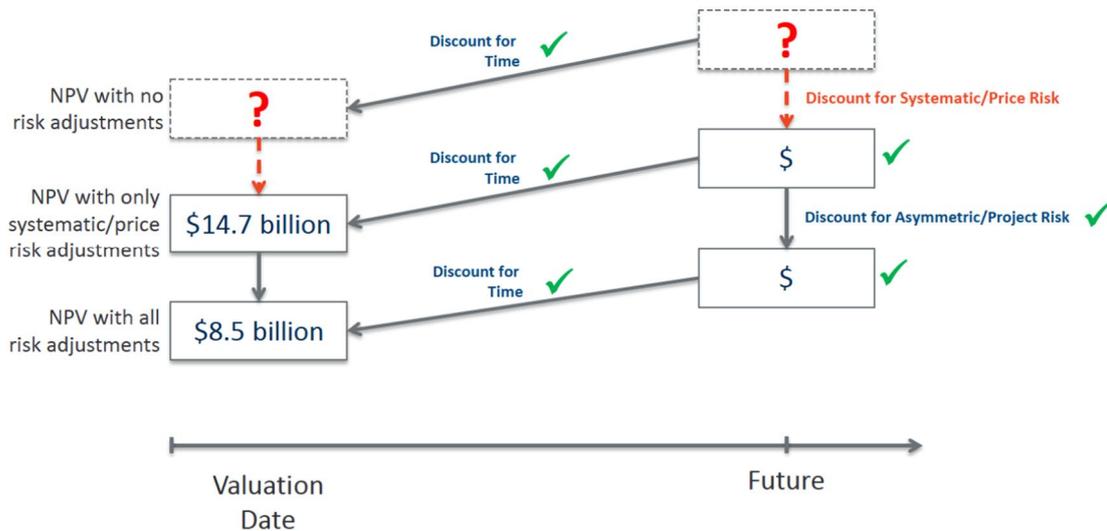
d. Whether a Different Conclusion Is Warranted by Mr. Brailovsky's and Prof. Wells' Argument That the Implied Discount Rate Is Too Low

1568. The Tribunal notes, however, that Mr. Brailovsky and Prof. Wells raised the more general argument that the risk adjustments made by Prof. Davis for asymmetric risk cannot be considered sufficient because they amount to only USD 3.3 billion and thereby imply a discount rate of 4.2%, *i.e.*, only 1.2% above the risk-free rate.

1569. At the Hearing on Quantum, Prof. Davis disagreed with the calculation of the implied discount rate made by Respondent's experts in their second report and referred to an illustration of the risk adjustments made in his presentation:¹⁹⁷²

¹⁹⁷¹ Davis I, Workpaper 27.

¹⁹⁷² Davis Presentation, p. 43.



1570. Prof. Davis went on to explain why, in his opinion, the calculation made by Mr. Brailovsky and Prof. Wells was incomplete:

“What Mr. Brailovsky and Professor Wells attempted to do is, on the right-hand side, starting at the bottom box, they attempted to unwind my discount for asymmetric and Project risk. So, they attempted to adjust my cash flows upwards to the middle box. And then I believe they thought they had taken all the risks out of the Project, including systematic risk, or all the valuations of the risks. I don't want to say they took the risks out. So, I think they believe they got all the way up to the top box, and then they said--what Discount Rate do I need to use to bring that top right box all the way down to the bottom left box? And they come up with 4.1 percent. If they use 4.1 percent, they get 8.5 billion. The problem is, they didn't get all the way to the top box because they didn't unwind the systematic risk-discounting, and, in fact, they didn't get all the way up to the middle box because they didn't unwind my ramp-up adjustment, which was about USD.6 billion. So, they unwound the cash flows for risk up to maybe the bottom of the middle box and then calculated what equivalent Discount Rate would be needed to bring it back to the bottom left, and they came up with 4.2 percent, something like that. That's my inference of what they did in that calculation.”¹⁹⁷³

1571. In response to the question what information would be required in order to calculate the discount rate implied in his calculation, Prof. Davis explained:

“Well, you could start by completely unwinding all the asymmetric Project risks, in particular, take the ramp-out up. That would get to you to a little bit of a higher cash flow, and that would require more than a 4.1 percent Discount Rate to bring it back. But then you would need to go further because you would need to go and estimate the actual spot prices for copper, gold, and oil that the Project would be exposed to. That's that red box at the top. You'd need to somehow estimate that, and then you're back to the parallel.”

¹⁹⁷³ Transcript Hearing on Quantum (Day 8), p. 2509 line 17 to p. 2510 line 20.

We talked about the parallel. I'm not sure which of the arbitrators asked, but we're back to the parallel where you have the complete risk cash flows that you would normally discount and what discount would bring it back. We know it's going to be higher than 4.1 percent. It's impossible to say what it would be without actually doing the exercise.

Q. And are you aware of any reliable information that exists to fill in that top right box?

A. No. One certainly can't use--as I've argued, one certainly can't use the analyst forecasts. One of the reasons that this modern approach has gained traction and is demanded by industry is because it obviates that need to calculate that unknowable number. We have models. Make no mistake, we have models about what that might be, but we've gotten to the point now in modern finance where we don't even talk about that top right box anymore because it's not of interest. We don't need it. And so that modeling effort is largely going by the wayside.”¹⁹⁷⁴

1572. The Tribunal notes that while Prof. Davis argued that the implied discount rate calculated by Respondent's experts did not take into account all of the risk adjustments he had made, he did not provide an alternative figure which would, in his opinion, correspond to the overall implied discount rate. The main reason for Prof. Davis' decision not to present such a figure apparently is that he did not make an assumption as to the non-risk-adjusted prices for copper, gold and oil and therefore did not quantify the systematic risk adjustment he had made through his direct assumption of risk-adjusted prices. He stated that *“to compute the correct Discount Rate to bring us back to 8.5, if we assume that's the number that we are trying to get, I would need to start with ... an estimate of the cash flows in that question mark red box in the top right. And I don't have that because that was not necessary for my analysis. I started with the certain equivalent cash flows.”* Prof. Davis added that while he *“could do the exercise,”* he had not done so because it was not necessary to estimate the non-risk-adjusted cash flows for his analysis and, therefore, neither he nor the Tribunal had the numerics to make a calculation of the implied discount rate.¹⁹⁷⁵

1573. However, Prof. Davis also argued that Respondent's experts did not even account for all of the asymmetric risk adjustments he had made and referred in particular to the adjustment made for the longer ramp-period he modeled in his second report. To the extent that asymmetric risk is concerned, Prof. Davis did not state that it would be impossible or even difficult to calculate the premium implied by the country-related risk adjustments he made in his model. However, apart from stating that it would be higher than the premium of 1.2% calculated by Mr. Brailovsky and Prof. Wells, he did not provide any quantification or indication of what would have been the risk premium

¹⁹⁷⁴ Transcript Hearing on Quantum (Day 8), p. 2511 line 7 to p. 2512 line 17.

¹⁹⁷⁵ Cf. Transcript Hearing on Quantum (Day 8), p. 2379 line 3 to p. 2380 line 9.

implied by his adjustments. Respondent's experts in turn did not engage in substance with Prof. Davis' criticism that their calculation did not back out all of the relevant asymmetric (and systematic) risks and did not present an alternative calculation that would also back out the ramp-up delays; they maintained their opinion that the implied discount rate was only 4.2%.¹⁹⁷⁶ Prof. Wells further testified at the Hearing on Quantum:

*"I note that Professor Davis disagrees somewhat with the number '4.2 percent.' We can defend the number, but let's say that we're wrong by 50 percent. That gives a Discount Rate or a profitability of a little more than 6 percent. Clearly, no investor is going to put up 8.5 billion to earn a little more than 6 percent in Balochistan."*¹⁹⁷⁷

1574. Mr. Brailovsky further expanded on why they considered their calculation of the implied discount rate to be correct:

"Scenario 6, which purports to show his model without any of the systematic, nonsystematic risks included. So, we just took his Scenario 6, which is where he reincorporates all the risks that he adopted. So, we will say that we have, with this scenario, a traditional DCF because the risks are not adopted in the cash flows. So, if we take that scenario and assume that the hypothetical Buyer is going to pay 8.5 billion, well, the Rate of Return would be 4.2 percent.

Now, I say 'traditional' because there is still the systematic risk. Now, we understand that--and if we look at one of the schematics in Professor Davis's presentation, where you have the first block, which is the unknown revenue including all the risks, and then you take that--you take those risks down to what you have, what you would have is an NPV without the systematic risks.

*Now, if we do that by using you know, the consensus economics, which presumably has all the risks in, the problem is that the consensus economics revenues would be below, not above us, as in that scheme, but below. And we know that, if they are below that, the NPV, even at the 3 percent risk-free rate would be zero. So, if we try to do a full traditional, we would have to deduct--to start with those prices, which are risk-inclusive, obviously risk inclusive, and come out with a zero NPV."*¹⁹⁷⁸

1575. As reiterated by Mr. Brailovsky in his oral testimony, the calculation of the implied discount rate made by Respondent's experts was based on a comparison of two scenarios in Prof. Davis' updated valuation model submitted together with his second report. Specifically, they compared Scenario 1, which is labelled "*NPI, Renewal, 2% Royalty, EPZ, Risk Adjustments,*" with Scenario 6, which is labelled "*No Asymmetric Risk Adjustments.*"¹⁹⁷⁹ As noted by Respondent's experts, damages to Claimant are calculated

¹⁹⁷⁶ Cf. Brailovsky/Wells Presentation, pp. 21, 32.

¹⁹⁷⁷ Transcript Hearing on Quantum (Day 9), p. 2560 lines 4-10.

¹⁹⁷⁸ Transcript Hearing on Quantum (Day 9), p. 2563 line 5 to p. 2564 line 10.

¹⁹⁷⁹ Brailovsky/Wells II, ¶ 101 and note 129; **Exhibit CE-1530**.

to amount to USD 8.49 billion in Scenario 1 and USD 11.79 billion in Scenario 6.¹⁹⁸⁰ On that basis, they concluded that the risk adjustments made by Prof. Davis in fact amounted only to USD 3.3 billion and not USD 6 billion as stated in his reports and at the Hearing on Quantum.

1576. The Tribunal agrees with Respondent's experts that, judging from the label of Scenario 6, *i.e.*, "*No Asymmetric Risk Adjustments*," it would appear that the difference between the amounts calculated in Scenarios 1 and 6, respectively, should indeed reflect the entirety of the asymmetric risk adjustments made by Prof. Davis. However, the Tribunal notes that Prof. Davis also included a Scenario 11, which is labelled "*No Political Violence Risk (0.5%)*," and a Scenario 12, which is labelled "*No Residual Risk*."¹⁹⁸¹ This indicates that Prof. Davis quantified the impact of his assumption regarding a 0.5% annual probability of early shutdown as well as residual cost risks quantified in Claimant's risk register separately. Comparing these Scenarios to Scenario 1, Prof. Davis made additional adjustments of USD 1,423 million and USD 505 million, respectively. This also corresponds to the description he provided of these risk adjustments in his second report.¹⁹⁸² Given that, in particular, the risk of political violence has also been characterized as an asymmetric and, more specifically, a country-related risk, this confirms that the implied discount rate calculated by Respondent's experts does not in fact reflect all relevant asymmetric risk adjustments made by Prof. Davis.

1577. As neither expert has provided the Tribunal with a number of what would be the risk premium reflecting all of the asymmetric risk adjustments made by Prof. Davis, the Tribunal has no basis to draw a comparison to the figures discussed by the Parties' experts with regard to what they would have considered an adequate country risk premium in a traditional DCF calculation. The same applies to the consideration of an overall implied discount rate which would undisputedly have required to remove the adjustments for systematic risk as well. While Mr. Brailovsky reiterated the opinion that no actual adjustment for systematic risk was made when considering that the non-risk-adjusted prices projected by Consensus Economics were lower than the risk-adjusted prices derived by Prof. Davis from the futures and forward markets, the Tribunal notes that it has already addressed this argument above and reached the conclusion that it was generally plausible for Prof. Davis to rely on futures and forward market data but that an additional adjustment accounting for the long-term risk and additional uncertainty created by the extrapolation of market data has to be made. Consequently, and in light of the Tribunal's acceptance of Prof. Davis' approach to the application of the DCF method, it is not necessary for the Tribunal to express an opinion as to the disagreement between the

¹⁹⁸⁰ Davis II, Workpaper R-1.

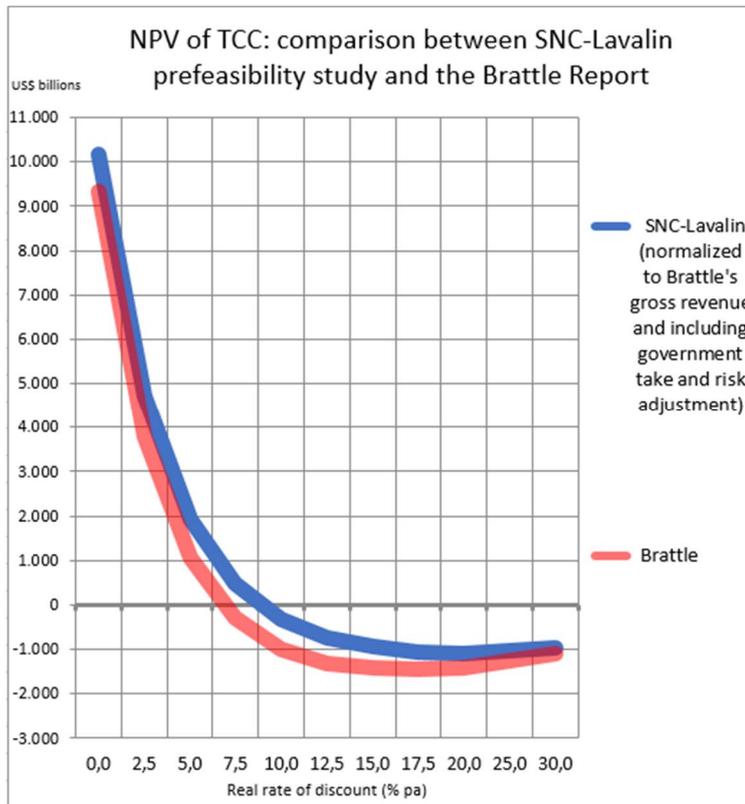
¹⁹⁸¹ Davis II, Workpaper R-1.

¹⁹⁸² Davis II, ¶ 85.

Parties' experts concerning an appropriate discount rate and/or country risk premium for a traditional DCF valuation of Claimant's investment.

e. Whether a Different Conclusion Is Warranted by the Comparison Drawn by Mr. Brailovsky and Prof. Wells to the Cash Flows Calculated in the Expansion Pre-Feasibility Study

1578. As an additional argument supporting their opinion that the risk adjustments made by Prof. Davis were insignificant and that his valuation resulted in a positive net present value of Claimant's investment only because he did not apply an appropriate discount rate, Mr. Brailovsky and Prof. Wells presented a comparison of the revenues and costs estimated by Prof. Davis in his model with the revenues and costs estimated in the Expansion Pre-Feasibility Study, which were undisputedly made for the purposes of a traditional DCF calculation. In their opinion, the comparison showed a "*striking and revealing*" similarity between the two calculations, which warranted the conclusion "*that both are in reality traditional and that the only decisive driver of differences in valuation is the discount rate.*"¹⁹⁸³ They illustrated this alleged similarity with the following graph:¹⁹⁸⁴



¹⁹⁸³ Brailovsky/Wells II, Table 3, Graph 5 and ¶¶ 89-90.

¹⁹⁸⁴ Exhibit BW-82.09(a).

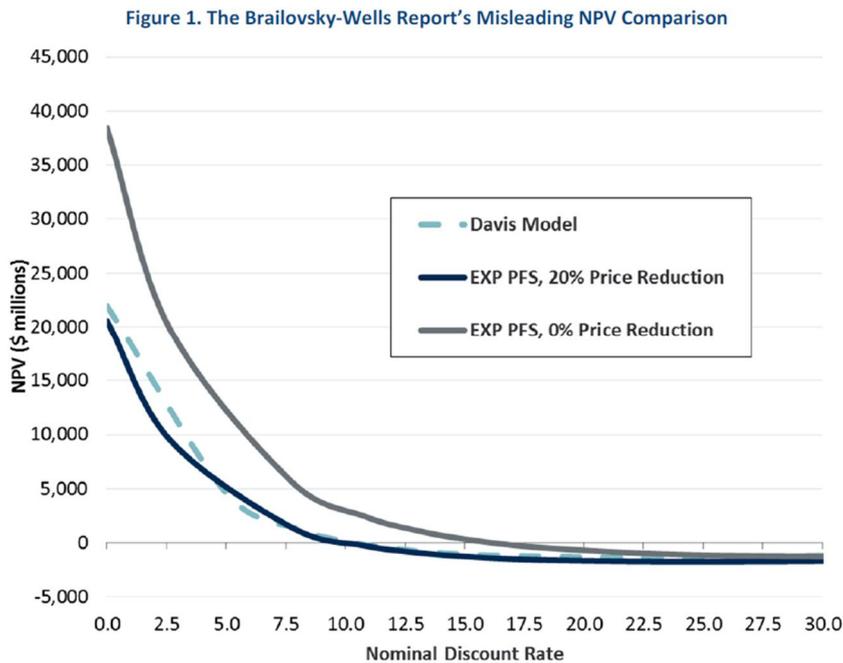
1579. As indicated in the legend to the graph, Mr. Brailovsky and Prof. Wells made certain adjustments or “normalizations” to the figures included in the Expansion Pre-Feasibility Study in their second report. They had already presented a similar comparison and graph in their first report to support their argument that the difference in value yielded by both calculations was “*almost entirely attributable to the different discount rates used in the two studies.*”¹⁹⁸⁵
1580. Prof. Davis responded to this comparison in his second report by emphasizing that the comparison had been made based on a reduction of the revenues in the Expansion Pre-Feasibility Study by 20%.¹⁹⁸⁶ In fact, Mr. Brailovsky and Prof. Wells had noted in the footnote to the graph in their Figure 2 that “[f]or the purpose of constructing the graph, the SNC-Lavalin real rates were converted into nominal discount rates in order to make them comparable to the results of the Brattle model. There are of course differences between the SNC-Lavalin pre-feasibility study model and the Brattle model, but it is nonetheless remarkable that these offset each other as shown in Figure 2. The offset is almost perfect if one assumes, as in the figure, the SNC-Lavalin scenario with metal prices about 20% below the base assumption.”¹⁹⁸⁷
1581. Prof. Davis argued in response that “as a conceptual matter, given any two numbers A and B, one can always find some factor by which to adjust A until it equals B. It is a tautology, not a proof that the numbers were the same to begin with, akin to saying that 100 and 80 are the same number because, after adjusting 100 down by 20%, it is the same as 80.” Prof. Davis further considered that “when the 20% adjustment is removed from their calculation, the two NPVs that they calculate are not particularly close,” which he illustrated as follows:¹⁹⁸⁸

¹⁹⁸⁵ Brailovsky/Wells I, ¶ 19 and Figure 2.

¹⁹⁸⁶ Davis II, ¶ 103.

¹⁹⁸⁷ Brailovsky/Wells I, note 24.

¹⁹⁸⁸ Davis II, ¶ 103 and Figure 1.



1582. Mr. Brailovsky and Prof. Wells responded to this argument and graph by noting that “[i]t is not surprising that the two models yield different results if one uses much higher prices than the other.” In their opinion, however, “[t]he real test is whether or not they perform approximately the same at the same prices,” which they had shown to be the case.” They further explained that “[t]he use in our first report of a SNC-Lavalin scenario with prices 20% below the central scenario was meant as a short cut to compensate for the fact that real output prices in the SNC-Lavalin are indeed higher than those of Brattle and that the former does not include the government equity take and risk adjustments” and added that “[i]n any case, Table 3 and Graph 5 above dispose of Brattle’s criticism as they come from a rigorous comparison of the two models. We are left with the corollary that Brattle’s approach is a traditional calculation disguised as ‘modern,’ a disguise that allegedly justifies the use of a riskfree discount rate.”¹⁹⁸⁹

1583. Respondent’s experts emphasized that in this revised, “strictly construed comparison of the two models,” they had now relied on the central price scenario of the Expansion Pre-Feasibility Study. With regard to the “normalized” scenario they had used as a basis for their comparison, they explained that “[i]n order to improve comparability, ... we adjust the gross revenue of the SNC-Lavalin study to be equal to that of the Brattle report, and add the government equity take and the risk adjustment for early termination. This results in an undiscounted net cash flow of US\$10.1 billion.” In their opinion, the remaining difference to Prof. Davis’ model likely resulted from the fact that the Expansion Pre-

¹⁹⁸⁹ Brailovsky/Wells II, ¶ 91.

Feasibility Study did not include “*Brattle’s allowance for risk with financial impact that was not quantified by TCC, which is of a similar magnitude.*”¹⁹⁹⁰

1584. At the Hearing on Quantum, Mr. Brailovsky confirmed his explanation that the comparison made in their first report had been a “*rough-and-ready calculation,*” using the lower prices scenario to account for the 25% equity share of the GOB as well as the fact that “*strangely enough, the prices in the SNC are higher than in the Brattle report.*” He pointed out that the prices in the original version of the central price scenario reported in the second column of the table presenting the revised comparison in their second report were indeed higher and that the government equity take was zero.¹⁹⁹¹

Table 3

Comparison of cash flows in real terms: Brattle Report and SNC-Lavalin Prefeasibility Study
Million undiscounted US\$ at prices of November 2011

	[1]	[2]	[3]	[4]	[5]
	Brattle Report (average result)	SNC- Lavalin Report		Difference SNC-Lavalin minus Brattle Report	
		Original (central price scenario)	Normalized to Brattle's gross revenue and including government take and risk adjustment	Original (central price scenario)	Normalized to Brattle's gross revenue and including government take and risk adjustment
Gross Revenue	64,953	68,791	64,953	-3,839	0
Copper	38,134	55,200	52,120	-17,066	-13,985
Gold	26,818	13,591	12,833	13,227	13,985
Transport costs	7,917	7,413	7,413	504	504
Expenditures	35,040	34,133	34,184	907	856
Opex	23,661	26,045	26,045	-2,385	-2,385
Capex	10,845	7,948	7,948	2,896	2,896
Other	534	139	190	395	344
Risk adjustments for early termination	1,439	0	1,639	1,439	-200
Net cash flow before government take	20,557	27,245	21,717	-6,688	-1,160
Royalties and taxes	6,984	7,262	6,200	-277	785
Equity government take	4,246	0	5,363	4,246	-1,117
Net cash flow after government take	9,326	19,984	10,154	-10,657	-827
<i>Memorandum:</i>					
<i>Payable volumes</i>					
Copper (million kg)	11,128	11,381	11,381	-253	-253
Gold (million ounces)	14,390	14,693	14,693	-303	-303
<i>Implicit prices</i>					
Copper (US\$/kg)	3.427	4.850	4.579	-1.423	-1.153
Gold (US\$/oz)	1.864	0.925	0.873	0.939	0.990

1585. Mr. Brailovsky further explained their approach to “*normalizing*” the central price scenario in column 3 of the same table:

“Now, obviously you can obtain very different results if your costs are, more or less, the same. And you can see here the expenditures in the Brattle. And

¹⁹⁹⁰ Brailovsky/Wells II, ¶¶ 81, 86.

¹⁹⁹¹ Transcript Hearing on Quantum (Day 9), p. 2621 line 3 to p. 2622 line 8; Brailovsky/Wells II, Table 3.

the expenditures in the SNC-Lavalin are different but not that much; whereas, the Capex is higher. The Opex is lower.

So, what happens if you have the same costs but different prices? Obviously, you get very different results. So, really, what is important is to normalize the SNC-Lavalin to the prices in the Brattle Report.

And this is exactly what we did. You can see that the gross revenue is 64,953, in the first column, and 64,953 in the second column--in the third column.

So, they are exactly the same. Now, I don't--I didn't move the costs. The costs are the same. I included an estimate of the 25 equity government take, and the result is NPV undiscounted of 10.2, a little bit higher than the Brattle Report.

So, actually, when you really do a strict comparison--and this is a strict comparison, and Professor Davis didn't contest this calculation--you will see that, on similar terms, actually, the SNC-Lavalin is a little bit higher than the Brattle Report.

And the curves in the Second Report, which are on Page 43, Graph 5, are obtained from Column 3, which is a normalized SNC, normalized to two things: The same income and introducing the Government equity.

...

Summarizing, costs are basically the same when expressing the same terms. So, whatever Professor Davis did with the costs only increased them by about 900 million undiscounted. Whatever his corrections, it's just a little bit higher than the original SNC calculation.

Now, the prices have to be the same, so you can calculate one thing or the other; otherwise, you can do whatever with the prices. But at the same prices, the two are very similar, and discounted at 3 percent one will give you about USD 9 billion. Discounted at 13 percent, both of will give you zero.”¹⁹⁹²

1586. Mr. Brailovsky confirmed that the revenues in the original central price scenario of the Expansion Pre-Feasibility Study were “*about 3.5 billion higher*” than in Prof. Davis’ model and that the normalization they had carried out “*set the revenues equal to each other.*” When asked whether he had thereby assumed away any systematic risk adjustment made by Prof. Davis in his prices, Mr. Brailovsky testified:

“That was not really--what you're interested in is the final output of the--final result of your analysis.

Q. So, you think you can just assume away one significant difference and then say the models come to the same thing, so they have to be the same?

A. (Mr. Brailovsky) As I said, it is very easy to play around with prices because nobody knows them; right?

Q. That's exactly what you did.

¹⁹⁹² Transcript Hearing on Quantum (Day 9), p. 2622 line 9 to p. 2624 line 14.

A. (Mr. Brailovsky) Nobody knows them. So, it's very easy to play around with those, especially when you're in the context of modeling real terms for 50 years. So, even though the Brattle Report seems to have prices much higher than the SNC, they don't because of the--once you put them in real terms, it just goes down. And that I show in the graphs in this section.

You have to normalize. You have to compare one thing with the other. Revenues are revenues, and you have to put them on the same basis.”¹⁹⁹³

1587. Mr. Brailovsky reiterated that when setting the prices equal to each other, it became clear that the costs were very similar in both models and “*the difference in valuation is basically the Discount Rate, however you want to characterize the modern or nonmodern.*” He emphasized that, contrary to Prof. Davis statement that he had included considerably higher costs, the comparison at equal prices show that the costs “*are almost the same.*”¹⁹⁹⁴ Mr. Brailovsky explicitly confirmed that his calculation had assumed away the difference of USD 3.8 billion in revenues between the original central price scenario and Prof. Davis’ model and that he “*wasn’t trying to test for [the] proposition*” made by Prof. Davis that his prices were adjusted for systematic risk.¹⁹⁹⁵

1588. With regard to the costs that he had described as “*almost the same*” in both models, Mr. Brailovsky clarified that this applied “[*i*n aggregate” given that, while Prof. Davis’ capital costs were indeed higher by 36% in real terms, his operating costs were in fact lower than the corresponding cost estimate of the Expansion Pre-Feasibility Study. As already addressed above, he accepted that oil prices accounted for about 40% of the operating expenses but questioned Claimant’s proposition that “*simulating and using risk-adjusted prices in the forecast for oil*” could lead to a lower cost estimate, as he “*would expect the price of oil in the risk-adjusted to be higher than the other one, no? Because if you include risk there, you should be above the other one.*”¹⁹⁹⁶

1589. Mr. Brailovsky further confirmed that when also taking into account additional “[*o*ther” expenses included by Prof. Davis as well as his adjustment for early termination, the difference between the two models before his normalization, including the government take, amounted to USD 6.7 billion. He did not agree with Claimant that the difference after adjustment for the government take still amounted to about USD 5.6 billion, arguing that the government take would in fact be higher and lead to a difference of only USD 4.6 billion between the two models. He agreed that “[*n*ondiscounted, yes,” this still amounted to a material difference but maintained that “*any reasonable Discount Rate will make this difference almost disappear.*”¹⁹⁹⁷

¹⁹⁹³ Transcript Hearing on Quantum (Day 9), p. 2630 line 7 to p. 2631 line 5.

¹⁹⁹⁴ Transcript Hearing on Quantum (Day 9), p. 2631 line 15 to p. 2633 line 18.

¹⁹⁹⁵ Transcript Hearing on Quantum (Day 9), p. 2636 line 8 to p. 2637 line 21.

¹⁹⁹⁶ Transcript Hearing on Quantum (Day 9), p. 2639 line 3 to p. 2642 line 16.

¹⁹⁹⁷ Transcript Hearing on Quantum (Day 9), p. 2642 line 21 to p. 2645 line 19.

1590. Based on Mr. Brailovsky's testimony at the Hearing on Quantum, it is clear to the Tribunal that the comparison drawn to the "*normalized*" calculation in the Expansion Pre-Feasibility Study cannot provide any verification as to whether or not Prof. Davis made adequate adjustments to account for systematic risk. Mr. Brailovsky readily stated that he had assumed away any difference in prices by setting the revenues equal to each other in both calculations. As pointed out by Claimant, however, the fact that there was a considerable difference in revenues between the original central price scenario and Prof. Davis' model indicates that Prof. Davis' prices indeed reflect a systematic risk adjustment. In this regard, the Tribunal also takes into account that the price assumptions in the Expansion Pre-Feasibility Study dated from 2010 and it is undisputed that price expectations rose during the time period until the valuation date in November 2011. Consequently, it is plausible to assume that if Mr. Brailovsky had updated the non-risk-adjusted price assumptions in the Expansion Pre-Feasibility Study, as Prof. Davis has done in his second report which will be addressed in more detail below, the difference in revenues would have been even larger than reflected in Mr. Brailovsky's Table 3. In these circumstances, the Tribunal considers that the comparison to the Expansion Pre-Feasibility Study cannot provide any justification for deviating from the Tribunal's conclusion above that Prof. Davis' approach to systematic risk was generally appropriate and that the result only has to be adjusted to account for the additional uncertainty associated with the 56-year life of the mine.

1591. Mr. Brailovsky's testimony clarified that what he had attempted to show with this comparison was that the aggregate costs estimated by Prof. Davis did not significantly differ from the cost estimate of the Expansion Pre-Feasibility Study. This concerns the asymmetric risk adjustments made by Prof. Davis. As the comparison makes clear, however, the capital costs estimated by Prof. Davis are in fact considerably higher (USD 10.845 billion as opposed to USD 7.948 billion in the Expansion Pre-Feasibility Study) and correspond to the 36% risk adjustment in real terms that he presented in his reports. As pointed out by Mr. Brailovsky, this cost increase was offset to a large extent by the lower operating cost estimate (USD 23.661 billion as opposed to USD 26.045 billion in the Expansion Pre-Feasibility Study). The Tribunal has already addressed this particular aspect of the comparison between the two calculations, which apparently resulted from the fact that Prof. Davis assumed a lower oil price than the Expansion Pre-Feasibility Study, and it concluded for the reasons set out in detail above that this did not warrant any further adjustment beyond the deduction it considers appropriate in the context of Prof. Davis' reliance on forward market data. The Tribunal again notes, however, that neither the price assumptions, including for oil, nor the other operating expenses estimated in the Expansion Pre-Feasibility Study were updated by Mr. Brailovsky to the valuation date. This serves as another reason why the Tribunal does not consider it justified to draw

any deviating conclusion from the comparison of operating expenses in the two calculations.

1592. Finally, the Tribunal notes that, as Mr. Brailovsky confirmed at the Hearing on Quantum, the comparison he had made showed that the cash flows modeled by Prof. Davis before accounting for the 25% stake of the GOB were almost USD 6.7 billion lower than those estimated in the Expansion Pre-Feasibility Study (even without updating the latter to the valuation date). While there was slight disagreement as to amount to be deducted for the 25% stake of the GOB in the case of the Expansion Pre-Feasibility Study, Mr. Brailovsky confirmed that the difference still amounted to at least USD 4.6 billion between the two calculations.

1593. The Tribunal notes that Mr. Brailovsky continued to argue that this difference would “*almost disappear*” when applying “*any reasonable Discount Rate*” to the cash flows accruing 20 years into the future. The Tribunal is not convinced by this argument, however. As has been addressed in detail above, the concept of the modern DCF model applied by Prof. Davis is based on making adjustments for risk affecting the individual cash flows at source rather than the application of a discount rate reflecting those risks. The Tribunal further recalls that the comparison was made by Mr. Brailovsky in order to show that the risk adjustments that Prof. Davis had made to the cash flows were not significant, thus did not fully capture the risks associated with the project and therefore did not justify discounting these cash flows at the risk-free rate. However, it would be circular to establish the absence of significant risk adjustments by arguing that any differences in value that might reflect such risk adjustments would disappear when applying a risk-adjusted discount rate. The Tribunal agrees with Claimant and Prof. Davis that this would amount to double-counting the same risks and be contrary to the modern DCF valuation approach as described by Prof. Davis and the 2012 CIMVal report.

1594. Consequently, the Tribunal concludes that the comparison to the traditional DCF calculation made in the Expansion Pre-Feasibility Study does not warrant the conclusion that Prof. Davis did not make significant risk adjustments to the cash flows in his model. To the contrary, the significant difference between the net cash flow resulting from the respective calculation convinces the Tribunal that Prof. Davis in fact did make significant risk adjustments and that it would therefore not be appropriate to apply a discount rate to these cash flows that would also reflect and thereby double-count the systematic and asymmetric risks already reflected in Prof. Davis’ cash flows.

f. Whether Prof. Davis Has Appropriately Discounted the Cash Flows at the Risk-Free Rate

1595. As a final point in determining whether Prof. Davis has appropriately discounted the cash flows in his model, the Tribunal recalls that the 2012 CIMVal indicates that a “*residual risk adjustment may be necessary to adjust previously risk—adjusted cash flows for risk*

*not explicitly recognized in the model before a final adjustment for the time value of money.*¹⁹⁹⁸ The Tribunal further noted that this would also apply to risks that were recognized as such but for which the risk adjustments made are, in the Tribunal's opinion, insufficient to fully capture the relevant risk.

1596. The Tribunal has found above that the adjustments made by Prof. Davis for the systematic risk of how the prices for copper, gold and oil would have developed over the 56-year life of the mine were not sufficient and therefore warrant a further deduction of USD 2,430 million from the value of Claimant's investment. The Tribunal further found that based on Prof. Davis' analysis, an amount of USD 130 million has to be deducted to account for capital cost variability.

1597. Apart from these adjustments, the Tribunal does not see any basis for applying a further residual risk adjustment for any risks not explicitly or not sufficiently recognized in Prof. Davis' model. Having reviewed all of the Parties' expert reports and taking into account the various adjustments to the value of Claimant's investment at which the Tribunal has already arrived, the Tribunal concludes that Respondent and its experts have not identified and substantiated any additional risks that Prof. Davis should have, but failed to, account for in his valuation model.

1598. Finally, as to the risk-free rate applied to account for the time value of money, Prof. Davis explained that he used "*the U.S. Treasury yield curve built from constant maturity rates published by the Federal Reserve, interpolating linearly for maturities for which a rate was unavailable.*"¹⁹⁹⁹ Mr. Brailovsky and Prof. Wells noted in their first report that the discount rate assumed by Prof. Davis amounted to approximately 3% and added that "[t]he Brattle Report uses nominal discount rates starting at almost zero at the beginning of the project and then rising to 3% in year 28, remaining fixed at that level thereafter. The simple average is 2.7%."²⁰⁰⁰ Prof. Davis did not specifically confirm this calculation but also referred to a nominal discount rate of 2.7% in the context of Mr. Brailovsky's and Prof. Wells' comparison of his model with the Expansion Pre-Feasibility Study.²⁰⁰¹ In their second report, Mr. Brailovsky and Prof. Wells again referred to a risk-free rate of 3% to which they also compared their calculation of an implied discount rate of 4.2%.²⁰⁰²

1599. In the absence of any challenge regarding the risk-free rate applied by Prof. Davis and also taking into account the statement made by Respondent's experts in the context of an example that assumed a risk-free rate of 5%, *i.e.*, that they considered "*3% is closer to*

¹⁹⁹⁸ Exhibit CE-1483, p. 11.

¹⁹⁹⁹ Davis I, ¶ 219.

²⁰⁰⁰ Brailovsky/Wells I, ¶¶ 69, 15 and note 19.

²⁰⁰¹ Cf. Davis II, ¶ 103.

²⁰⁰² Brailovsky/Wells II, ¶ 20.

*the risk-free rate today,*²⁰⁰³ the Tribunal considers it undisputed that the risk-free rate selected by Prof. Davis was appropriate to make the necessary adjustment for the time value of money.

E. Conclusion of the Value of Claimant's Investment Based on the Modern DCF Valuation Approach Applied by Prof. Davis

1600. In conclusion, the Tribunal finds that based on its review of the Parties' submissions and the evidence they submitted in support of their arguments, Claimant's damages, which Prof. Davis calculated at the amount of USD 8,490 million, must be reduced by an amount of USD 1,843 million to account for the impact of the risks and issues raised by Respondent regarding the feasibility of the project and/or the value of Claimant's investment. In addition, the Tribunal finds that further deductions in the amount of USD 2,560 million must be made to fully account for the systematic and asymmetric risks affecting the project.

1601. On that basis, the Tribunal concludes that, based on the modern DCF valuation model of Prof. Davis, the value of Claimant's investment amounts to USD 4,087 million.

F. Verification of the Tribunal's Conclusion on the Value of Claimant's Investment

1602. Having reached its conclusion on the value of Claimant's investment based on the valuation method relied on by Prof. Davis, the Tribunal will now verify whether this conclusion is reconcilable with the results yielded by other valuation or evaluation methods relied on by Respondent's experts in this arbitration or contemporaneously applied by TCCA.

1. Summary of Claimant's Position

1603. Claimant submits that Respondent has failed to present any credible valuation which could have been compared with Prof. Davis' modern DCF valuation but only submitted "*Dr. Burrows's odd and unconvincing 'prior transaction' approach*" which concluded that the project was worth even less than in 2006 because Pakistan allegedly became nearly five times riskier until 2011.²⁰⁰⁴

1604. Claimant argues that the Hearing on Quantum revealed that, contrary to what Dr. Burrows stated in his first report, he acted based on an undisclosed restrictive instruction which contradicted his own views on mining valuation. Specifically, he testified that he was instructed "*to determine the value based on the 2006 transaction*" and was "*not instructed*

²⁰⁰³ Brailovsky/Wells II, ¶ 111 and note 149.

²⁰⁰⁴ Claimant's Quantum Post-Hearing Brief, ¶ 468; Claimant's Quantum Reply, ¶ 273.

to look at other potential avenues for valuing.” Respondent also confirmed that Dr. Burrows was instructed *“to please pursue that and not other things.”*²⁰⁰⁵

1605. In Claimant’s view, it is *“fundamentally unacceptable”* that Dr. Burrows did not exercise his own independent and professional judgment as to the correct valuation method and, moreover, that he did not even disclose this instruction in his reports. Claimant adds that given Dr. Burrows’ further testimony that in his experience, every transaction in the mining industry he had seen had been based on a DCF valuation, his own *“independent judgment”* could only have led to the use of a DCF analysis rather than *“this single, outdated, incomparable transaction as the sole basis for valuation.”*²⁰⁰⁶

1606. Claimant contends that Dr. Burrows’ prior transaction analysis is *“irredeemably flawed”* because the 2006 transaction is *“simply not ‘comparable’”* to the 2011 project, as confirmed by the *“massive adjustments”* made by Dr. Burrows in his analysis. More importantly, Claimant argues that Dr. Burrows’ analysis contradicts the *“foundational principle”* of the value curve according to which *“project value increases exponentially as sponsors’ certainty about the underlying mineral resources and about the feasibility of the mine plan increases.”*²⁰⁰⁷

1607. Claimant refers to Mr. Luksic’s testimony that Antofagasta bought *“a promising exploration project”* in 2006 but *“much remained to be done to prove that the area’s resources could be profitably mined”* and that *“with a lot of hard work—and some good luck—this could be an outstanding project.”* Claimant submits that over the following years *“TCC and its Owners did what was needed to prove the resource and to develop a plan to mine it economically, transforming it from a mineral-resource-stage project to a development-stage project.”*²⁰⁰⁸

1608. By contrast, Claimant emphasizes that Dr. Burrows’s analysis assumes that the work carried out by Claimant and *“all the capital and skill TCC poured into the project”* added no value beyond the amounts invested. It quotes from Dr. Burrows’ testimony at the Hearing on Quantum that even when investing in real estate, *“you would get back pretty much what you spent.”*²⁰⁰⁹ In Claimant’s view, this testimony is contradicted by *“millions”* or real estate investors who expect to receive *“a healthy return”* on their investment and *“even less credible in the mining context where the business model itself—*

²⁰⁰⁵ Claimant’s Quantum Post-Hearing Brief, ¶¶ 469-471, quoting from Burrows I, ¶ 3 and Transcript Hearing on Quantum (Day 9), pp. 2772-2773 and 2793-2794.

²⁰⁰⁶ Claimant’s Quantum Post-Hearing Brief, ¶¶ 472.

²⁰⁰⁷ Claimant’s Quantum Post-Hearing Brief, ¶¶ 477-478, referring to Davis II, ¶¶ 244-245 and Transcript Hearing on Quantum (Day 9), pp. 2783-2784.

²⁰⁰⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 479, quoting from Luksic II, ¶ 2.

²⁰⁰⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 480, quoting from Transcript Hearing on Quantum (Day 9), p. 2775, Claimant’s Quantum Reply, ¶ 276.

as Pakistan's own experts have acknowledged—is based on a risk-reward principle whereby value increases exponentially as risk diminishes."²⁰¹⁰

1609. Claimant emphasizes that in any event the comparison of the project in 2006 with the project in 2011 shows that it had “*doubled the size of the deposit and transformed all of the resource that had been determined in 2006 into reserves (but for the issuance of the mining lease) through extensive additional drilling, testing, planning, and verification work.*” In Claimant’s view, this renders the assets “*vastly different*” and thus not eligible for a “*comparables*” approach.²⁰¹¹

1610. Claimant argues that the difference between resources and reserves is substantial and refers to Mr. Brailovsky’s and Prof. Wells’ assertion that reserves are worth five times as much as measured and indicated resources and nearly eight times as much as inferred resources. Emphasizing that it does not endorse these specific figures, Claimant agrees with Respondent’s experts that “*the technical and economic demonstration of a reserve adds great value compared to unproven resources.*”²⁰¹² It claims that while Antofagasta and Barrick acquired a “*risky and unproven exploration project*” in 2006, the capital-intensive exploration program transformed the project from an “*exploration gamble into an actual mine,*” allowing the team to “*vastly improve the accuracy of the resource estimate and to develop detailed plans to locate, extract, process, and finally transport the copper and gold.*”²⁰¹³

1611. Specifically, Claimant argues that it: (i) increased the quantity of the drilling and the quality of the information gained from the drilling by using more sophisticated equipment; (ii) expanded the types of drilling to metallurgical drilling, condemnation drilling, environmental drilling, hydrological drilling, engineering drilling, and geotechnical drilling; (iii) used the so acquired information to create “*a detailed blueprint for the mine using known technologies and the largest readily available machinery in the world*” and to prepare detailed analyses of the required equipment as well as the feasibility study for the slurry pipeline conducted by 2009; and (iv) engaged high-quality third-party consultants and peer reviewers to “*demonstrate the technical and economic viability of the business opportunity*” presented in the Feasibility Study and Expansion Pre-Feasibility Study.²⁰¹⁴

1612. Claimant emphasizes that Dr. Burrows failed to make any adjustments for the value created by Claimant after 2006. In addition, with regard to the expenditures made by Claimant on the project during that time, Claimant rejects the argument that many of these

²⁰¹⁰ Claimant’s Quantum Post-Hearing Brief, ¶ 481, referring to Dagdelen-Owen I, ¶ 64.

²⁰¹¹ Claimant’s Quantum Reply, ¶¶ 277-281.

²⁰¹² Claimant’s Quantum Reply, ¶ 282, referring to Brailovsky/Wells I, ¶¶ 21, 110.

²⁰¹³ Claimant’s Quantum Reply, ¶¶ 284-285, 299.

²⁰¹⁴ Claimant’s Quantum Reply, ¶¶ 286-298, quoting from Cusworth, ¶ 38.

were not productive or inefficient or unrelated to the development of the project. It further argues that in any event, even if certain expenditures were not efficient, this would not justify ignoring their result of doubling the size of the resource and proving the feasibility of mining 2.52 billion tonnes of ore. According to Claimant, a buyer would not care about how much it spent but about the potential for future revenues that Claimant had demonstrated at Reko Diq.²⁰¹⁵

1613. Claimant further rejects Dr. Burrows' argument that the expected metals production did not increase between 2006 and 2011. Claimant submits that the 2006 spreadsheet on which Dr. Burrows relied in support of the alleged comparability of the two assets was not created by Antofagasta or its advisors but rather by an equity analyst at UBS who had no involvement with or first-hand knowledge of the transaction. According to Claimant, the spreadsheet therefore reflects no more than "*that analyst's own blue-sky projects based on resource data disclosure by TCCA's previous owner, Mincor.*" Claimant also rejects Dr. Burrows' description of the spreadsheet as "*detailed*" projections and claims that it is rather "*crude back-of-the-envelope guesses about metallurgical recovery rates, throughput, and production costs, information that no one—not Mincor, not Antofagasta, not Barrick, and certainly not UBS—knew in 2006.*"²⁰¹⁶ In addition, Claimant emphasizes that neither the 2006 press release nor the 2006 spreadsheet support Dr. Burrows' suggestion that Antofagasta in 2006 treated the deposit as though it were a proven reserve ready to be mined or that Antofagasta "*expected*" with the degree of certainty attached to a proven reserve that the metals production would be equal to the resource estimate.²⁰¹⁷

1614. As for the adjustments that Dr. Burrows has made, Claimant claims that these are "*meaningless, subjective, and erroneous.*" Claimant submits that the mining indices on which he relied to account for the change of prices and costs contains companies which "*vary widely in size, composition, and focus on exploration versus operating projects, and even metals mined.*" Claimant further considers that Dr. Burrows used a "*fundamentally incorrect*" approach to account for the alleged change in country risk because the sovereign yield spread includes a number of risks which do not impact the value of a mine at Reko Diq. More generally, Claimant argues that the "*massive size*" of the adjustments made confirms the incomparability of the project in 2006 to the project in 2011.²⁰¹⁸

²⁰¹⁵ Claimant's Quantum Reply, ¶¶ 301-305, 310-311.

²⁰¹⁶ Claimant's Quantum Post-Hearing Brief, ¶ 482, *comparing Exhibit CRA-11 with Exhibit CRA-1273 and quoting from* Transcript Hearing on Quantum (Day 9), p. 2806.

²⁰¹⁷ Claimant's Quantum Reply, ¶¶ 306-307, *referring to Exhibits CRA-10 and CRA-11.*

²⁰¹⁸ Claimant's Quantum Reply, ¶¶ 316-321.

1615. Finally, Claimant contends that Dr. Burrows should have done a reasonableness check of his valuation taking into account the broader market context, which would have demonstrated that copper-gold deposits smaller than Reko Diq were valued at “*tens of billions of dollars*” in 2011 by mining companies such as Rio Tinto and Barrick. In Claimant’s view, Dr. Burrows’ valuation therefore “*cannot be squared with the actual market realities on the Valuation Date.*”²⁰¹⁹
1616. Claimant further emphasizes that contrary to what Dr. Burrows was led to believe, Mr. Brailovsky and Prof. Wells did not make any attempt to perform a DCF valuation of the project but only stated that the project either had no value, a negative value or the value estimated by Dr. Burrows, without proving actual calculations or supporting evidence for their assertions.²⁰²⁰ As an example, Claimant refers to their opinion that the IRR is “*far below any reasonable hurdle rate for a mining firm investing in a mining project in Balochistan*” and notes that Respondent’s experts did not specify what they considered to be a “*reasonable hurdle rate*” but only suggest that such a rate would be above 30%, without offering any evidentiary support and only based on “*hearsay statements purportedly made—during negotiations---by a gold developer in a project Prof. Wells is advising on in an undisclosed country*” which may well have related to the cost of equity and not the cost of capital.²⁰²¹ Claimant relies on Prof. Davis’ explanation that “[n]o large project anywhere in the world would survive a discount rate of 30% given that it can take almost a decade from first cash spent to first revenue spent.” Claimant also notes that its owners continued to invest millions of dollars in the Reko Diq project despite its projected IRR below 30% in the Scoping Study and the Expansion Pre-Feasibility Study.²⁰²²
1617. According to Claimant, “*the discount rates investors were actually using to value and make investment decisions about mining projects in Balochistan were consistent with the 10% discount rate TCCA used in the Expansion Study model.*”²⁰²³ It specifically refers to MCC which owns the Duddar mine in Balochistan and used a 12.55% pre-tax nominal discount rate in 2012, almost equivalent to the 12.86% nominal discount rate used in the Expansion Pre-Feasibility Study (equivalent to a 10% real discount rate).²⁰²⁴

²⁰¹⁹ Claimant’s Quantum Reply, ¶¶ 323-330.

²⁰²⁰ Claimant’s Quantum Post-Hearing Brief, ¶ 485, referring to Brailovsky/Wells I, ¶¶ 9(ii) and (iv), 10 and Brailovsky/Wells II, ¶4(iii), (iv) and (x).

²⁰²¹ Claimant’s Quantum Post-Hearing Brief, ¶ 486, quoting from Brailovsky/Wells II, ¶ 103 and referring to Brailovsky/Wells I, ¶ 73; Claimant’s Quantum Reply, ¶¶ 341-343.

²⁰²² Claimant’s Quantum Post-Hearing Brief, ¶ 487, quoting from Davis II, ¶ 311. See also Claimant’s Quantum Reply, ¶¶ 274-275, 345.

²⁰²³ Claimant’s Quantum Reply, ¶ 333.

²⁰²⁴ Claimant’s Quantum Reply, ¶ 346, referring to **Exhibit CE-1410**, pp. 174, 189 and Brailovsky/Wells I, ¶ 10 and note 11.

1618. Claimant further contends that the IRR reported in the Expansion Pre-Feasibility Study is “*not a particularly useful indicator of the value of the Project*” given that, as pointed out by Mr. Pingle, it is “*by definition, a conservative analytical tool*” which was “*the result of conservative assumptions*” and did not reflect the actual rate of return expected for the project.²⁰²⁵ In Claimant’s view, this is consistent with Mr. Luksic’s testimony that feasibility models are not intended to determine a mine’s value but to confirm that “*the project is robust enough to provide a reasonable rate of return even in the unfavorable circumstances.*” Claimant adds that the IRRs and NPVs are evaluations rather than valuations as they are intended to test the project and determine that it can break even but not to calculate how profitable it can be.²⁰²⁶
1619. Claimant refers to Mr. Sepúlveda who explained that the purpose of creating the financial model “*was not to determine a sales price for the project*” but rather “*to create a tool that would give TCCA and its owners a sense of the elements that drove project value, and how key assumptions affected that value, to help them evaluate and make decisions about the project.*” He also testified that “*no one involved in the project believed that this reflected the project’s fair market value*” and that he “*would have been astonished if Antofagasta and Barrick had agreed to sell their interest in the project at any valuation even close to that low, especially not in November 2011 when metals prices were even higher.*”²⁰²⁷
1620. Claimant also refers to Prof. Davis’ explanation that “[i]t is well-accepted in mine valuation that technical studies like feasibility and pre-feasibility studies do not attempt a project valuation. They attempt an economic analysis of the technical and financial merits of a project.” Quoting from the International Mineral Valuation Committee IMVal, Prof. Davis explained that standards organizations distinguish between valuation, which “*addresses the estimation of a value of a Mineral Property,*” and evaluation, which “*addresses the broader assessment of a Mineral Property for an investment decision.*”²⁰²⁸
1621. In addition, Claimant refers to Mr. Luksic who explained that “[t]he primary reason why the NPV of our Feasibility Study does not properly reflect the project’s value is that it is calculated using very conservative assumptions that are kept static for the entire life of the mine.”²⁰²⁹ According to Claimant, these conservative assumptions are reflected in: (i) the price assumptions of the model, which were considerably lower than spot prices as of June 2010 as well as in the fact that model valued only reserves; (ii) did not include any value for 2.7 billion ore tonnes of inferred resources and mineral inventories at Reko Diq,

²⁰²⁵ Claimant’s Quantum Post-Hearing Brief, ¶ 488, quoting from Pingle, ¶ 68.

²⁰²⁶ Claimant’s Quantum Post-Hearing Brief, ¶ 489, quoting from Luksic II, ¶ 14; Claimant’s Quantum Reply, ¶ 334.

²⁰²⁷ Claimant’s Quantum Reply, ¶¶ 357-358, quoting from Sepúlveda, ¶¶ 11-12, 21-22

²⁰²⁸ Claimant’s Quantum Reply, ¶¶ 359-360, quoting from Davis II, ¶¶ 92, 96 and **Exhibit CE-1526**.

²⁰²⁹ Claimant’s Quantum Reply, ¶ 362, quoting from Luksic II, ¶ 14.

which “[i]n actual sale, ... would have added considerable value”; (iii) gave no value to substantial potential cost savings that Claimant had identified as “CAPEX reduction opportunities” and “value engineering” opportunities; and (iv) did not take into account the value associated with flexible management that could respond to changing market conditions, which Mr. Luksic described as an “immensely valuable” feature that “would have been front and center in any negotiation for a price for the project in the event of a sale.”²⁰³⁰

1622. Claimant notes that “[d]espite all of this deliberate conservatism,” the Expansion Pre-Feasibility Study confirmed the robustness of the project, yielding a net present value of USD 1.206 billion at a 10% discount rate. It adds that Prof. Davis’ update of the calculation to the valuation date, using average price projections made by other mining companies that were significantly below the spot prices and Barrick’s updated capital and operating cost estimates, yielded a net present value of USD 4.0 billion with a “highly attractive 18.5% return on investment, even under the extremely conservative price projections in that updated model”; Claimant’s 75% share of that NPV would have been USD 3.0 billion.²⁰³¹ Claimant emphasizes that Respondent’s experts fail to account for the fact that the Expansion Pre-Feasibility Study was finalized more than 16 months before the valuation date, *i.e.*, in June 2010, even though gold prices rose considerably during that time, rendering the price projects in the model much lower than the future price projections as of the valuation date. In Claimant’s view, Mr. Brailovsky and Prof. Wells also incorrectly rely on the NPV calculated at using a 12% discount rate even though it is clearly stated in the Study that “a 10% discount rate has been selected as the ‘base case’ discount rate for the EXP study.”²⁰³²

1623. Claimant maintains that the updated calculation of Prof. Davis does not provide an accurate value estimate because it does not attribute any value to management flexibility or inferred resources and is “conservative in other ways,” particularly in its price assumptions, but argues that the calculation serves to contradict Mr. Brailovsky’s and Prof. Wells’ claim that the project had no value.²⁰³³

1624. Finally, Claimant argues that while Mr. Brailovsky and Prof. Wells criticized Prof. Davis for applying a “very low Discount Rate,” they did not provide any meaningful guidance to the Tribunal as to the appropriate treatment of risk given that they did not actually

²⁰³⁰ Claimant’s Quantum Reply, ¶¶ 363-368, quoting from **Exhibit CE-964**, pp. 28-38 to 28-39 and Luksic II, ¶¶ 15-16.

²⁰³¹ Claimant’s Quantum Post-Hearing Brief, ¶ 490, referring to Davis II, ¶ 302; Claimant’s Quantum Reply, ¶¶ 339, 369-370, 374-375, 377, referring to **Exhibit CE-964**, p. 28-2.

²⁰³² Claimant’s Quantum Reply, ¶¶ 335-337, 373-374, referring to Sepúlveda, ¶¶ 14, 17, **Exhibit RE-577-1**, p. 1-1, Davis II, ¶ 301, and quoting from **Exhibit CE-964**, p. 28-18.

²⁰³³ Claimant’s Quantum Reply, ¶¶ 339, 376-378.

calculate a discount rate that they would consider appropriate for the project as of the valuation date.²⁰³⁴ Claimant also emphasizes that contrary to Mr. Brailovsky's and Prof. Well's suggestion, Dr. Burrows also did not calculate a 23% discount rate but explicitly stated that his computation "*is not an estimate of the cost of capital as of November 2011.*" In Claimant's view, he mashed together a purported "*2006 cost of capital excl. country risk*" with the sovereign yield spread in 2011 which double-counted risks and further included several risks that the Reko Diq project would not have faced.²⁰³⁵

2. Summary of Respondent's Position

1625. Respondent submits that the only proper determination of the fair market value of Claimant's interest in Reko Diq has been provided by Dr. Burrows who, "*following best practices and his long forensic experience, ... identified the existence of a prior transaction that, with some adjustments, would be the best approximation to that fair market value.*"²⁰³⁶

1626. Respondent emphasizes that while Prof. Davis examined eight properties in his report and concluded that they were not comparable to Reko Diq, he neglected to consider an "*undoubtedly comparable*" arm's length transaction, *i.e.*, the acquisition by Barrick of 50% in Claimant in September 2006 for a value of USD 246 million. Respondent submits that it agrees with the requirements listed by Prof. Davis to establish comparability, "*[e]xcept for some details,*" but maintains that the past transaction involving Reko Diq meets those requirements and is thus "*extremely useful for the establishment of this valuation.*"²⁰³⁷

1627. Respondent rejects the argument that the project in 2006 was not comparable to the project in 2011 or that Dr. Burrows should have looked for other comparable transactions and refers to Dr. Burrows' explanation that "*[i]f there is a prior transaction in the property that is usable as a reference point, there is no need to search for comparable transactions. No transaction in any other property can be more representative of value than a transaction in the property itself.*" As Dr. Burrows explained, "*[m]ost of the factors that vary across mineral properties do not vary significantly for Reko Diq itself between the two dates.*"²⁰³⁸

²⁰³⁴ Claimant's Quantum Post-Hearing Brief, ¶ 491, *quoting from* Transcript Hearing on Quantum (Day 9), p. 2531.

²⁰³⁵ Claimant's Quantum Reply, ¶¶ 348-355, *quoting from* Burrows, Appendix 5, note to line [6] and lines [4][5].

²⁰³⁶ Respondent's Post-Hearing Brief on Quantum, ¶ 352, *referring to* Transcript Hearing on Quantum (Day 9), p. 2780 lines 8-17; Respondent's Counter-Memorial on Quantum, ¶ 404, *referring to* Burrows I, ¶ 3.

²⁰³⁷ Respondent's Counter-Memorial on Quantum, ¶¶ 405-407, *referring to* Burrows I, notes 7 and 8, and Davis I, ¶¶ 260-270 and note 240.

²⁰³⁸ Respondent's Rejoinder on Quantum, ¶¶ 440-442, *quoting from* Burrows II, ¶¶ 5-6.

1628. Respondent emphasizes that this valuation exercise was performed “*for ease of reference and to provide a valid answer in case the Tribunal was in fact—quod non—in the position to identify the fair market value of TCC’s interest in Reko Diq even when TCC failed to satisfy the burden of proof regarding the damages it seeks.*” It clarifies that “*the valuation submitted by Pakistan through the independent expert Dr. Burrows intends to challenge, and not to cure, the procedural and scientific defects of TCC’s case on quantum, which under applicable law should be dismissed by the Tribunal.*”²⁰³⁹
1629. Respondent refers to Dr. Burrows’ explanation that the fair market value would be determined in the most accurate manner by referring to the set of transactions by which Antofagasta and Barrick acquired Claimant in 2006, subject to a number of adjustments described by Dr. Burrows in his first report. Respondent claims that, by contrast, “[n]one of the remaining approaches or remedies proposed by TCC would have been taken into account by the hypothetical seller and buyer in finding a fair market value at which to transact over the asset,” including Claimant’s “*abandoned attempt at obtaining restitution or sunk costs*” or an “*uninformed, exaggerated guess on the size of the mineral deposits actually available for mining.*”²⁰⁴⁰
1630. Respondent contends that the adjustments made by Dr. Burrows to the 2006 transactions to account for changes that occurred in the intervening period were “*conservative and adequate.*”²⁰⁴¹ It rejects the argument that Dr. Burrows failed to account for changes in the reported resources of the property, operating costs and mining technology between 2006 and 2011. In Respondent’s view, “[n]one of the criticisms attempted are technically viable or procedurally relevant.” It argues that Antofagasta and Barrick claim to be among the top mining companies in the world who would have performed due diligence on the property. According to Respondent, “[i]t is therefore almost certainly the case that when the parties entered into the acquisition in 2006 they all had a good understanding of the total resource base of TCC.”²⁰⁴²
1631. Respondent refers to Dr. Burrows’ explanation that additional development work carried out between 2006 and 2011 resulted in negative surprises as the projections made in 2006 of the total copper and gold recovery over the life of the mine “*were very close, but higher, than the projections in the 2011 feasibility study*” whereas the projections of costs “*all increased significantly.*” Respondent also submits that “[t]he 2006 mine plan projected production of 52,000 million metric tons per year over 45 years, in comparison to 40,000

²⁰³⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 353.

²⁰⁴⁰ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 354-355, quoting from Burrows I, ¶ 3.

²⁰⁴¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 356.

²⁰⁴² Respondent’s Rejoinder on Quantum, ¶¶ 443-444.

*million metric tons per year in the base case and 40 million metric tons per year rising to 80,000 tons per year over 35 years in the expansion case.”*²⁰⁴³

1632. According to Respondent, the comparison demonstrates that “*the parties had an accurate understanding of the total mineralization of the Reko Diq project*” but that “*additional development after 2006 needed to design the mine led to negative surprises about recovery costs.*” Respondent argues that there was therefore no need for an adjustment in Dr. Burrows’ calculation to account for an increased size of the deposit or economies of scale.²⁰⁴⁴

1633. Respondent further rejects the argument that Dr. Burrows should have made an adjustment to account for increased geologic certainty or a more advanced stage of the project. According to Respondent, Dr. Burrows demonstrated that “*a mine increases in value over time as expenditures are made on exploration, drilling, feasibility studies and mine plans (i.e., as sunk costs at the time of valuation increase and remaining development costs decline) and as expected production increase or costs decline as a result of additional discoveries over time.*” Respondent considers that Dr. Burrows was conservative in not making downward adjustments to account for these changes.²⁰⁴⁵

1634. In addition, Respondent notes that Dr. Burrows did make an upward adjustment in value accounting for the reduction in time to construction between 2006 and 2011 which even overstates the value of Reko Diq. As for Claimant’s exploration expenditures, Respondent refers to Dr. Burrows’ explanation that Antofagasta had made a projection of efficient expenditures in the amount of USD 75 million in 2006 and that of the USD 219 million that Claimant claims to have spent, “*an unknown amount was spent on Reko Diq*” and “[m]uch of this expenditure was wasted or redundant” so that Dr. Burrows could not attribute any further value to these expenditures.²⁰⁴⁶ Respondent further quotes:

“Efficient and appropriate expenditure on Reko Diq, higher metals prices, and time advancement of the project would have increased its value. The increase in capital and operating costs and in country risk would have decreased its value. I adjust for the factors which increase the value but not for the changes which would have decreased the value. I conclude that the maximum value of Reko Diq on the Valuation Date was about \$149.2 million (assuming that all of the projected \$75 million in Exploration and Development expenditures projected in 2006 were efficiently and non-

²⁰⁴³ Respondent’s Post-Hearing Brief on Quantum, ¶ 356, quoting from Burrows II, ¶ 73; Respondent’s Rejoinder on Quantum, ¶¶ 445-446, referring to Burrows II, ¶ 11 and Appendix 8.

²⁰⁴⁴ Respondent’s Rejoinder on Quantum, ¶¶ 446-448.

²⁰⁴⁵ Respondent’s Rejoinder on Quantum, ¶¶ 449-450

²⁰⁴⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 356, quoting from Burrows II, ¶ 74; Respondent’s Rejoinder on Quantum, ¶ 451, referring to Burrows II, ¶¶ 25-26.

redundantly made and that a hypothetical buyer would not expect to have to re-do any of these expenditures)."²⁰⁴⁷

1635. Respondent considers that the adjustments made by Dr. Burrows are based on "*solid, non-speculative and a conservative evaluation of the available evidence*" and notes that Dr. Burrows did not implement reductions to account for the fact that the 2006 transactions involved more assets than Claimant's interest in Reko Diq or for litigation risks and tax increases or any of the technical shortcomings that Respondent claims to have identified, which would have decreased the value below the amount calculated by Dr. Burrows. Respondent emphasizes that the 2006 purchase price was primarily: (i) increased to reflect the rise in mineral prices between 2006 and 2011 and efficient expenditures; and (ii) decreased to account for "*the very significant increase in the perception of country risk for Pakistan in general and Balochistan in particular.*"²⁰⁴⁸ Respondent rejects the argument that the adjustments are "*large*" and "*subjective*," arguing that the characterization as "*large*" is in itself a "*subjective*" evaluation and that the adjustments were instead based on "*objective, appropriate, and transparent data.*"²⁰⁴⁹
1636. Specifically, Respondent submits that Dr. Burrows adjusted for: (i) changes in expectations about metals prices; (ii) inflation of production costs in the global mining industry; (iii) changes in the general cost of capital for metals mines; and (iv) changes in country risk for Pakistan. Based on the share price indices for copper mines and gold mines, Dr. Burrows first increased the transaction value by the weighted average of 104% to account for changes in prices and costs; based on the increase of the sovereign yield spread in Pakistan, Dr. Burrows then decreased the value to account for the change in country risk.²⁰⁵⁰
1637. Respondent submits that the results of these adjustments is a fair market value not exceeding USD 149.2 million as of the valuation date, which results from the "*simple exercise*" illustrated by Dr. Burrows at the Hearing on Quantum as follows.²⁰⁵¹

²⁰⁴⁷ Respondent's Post-Hearing Brief on Quantum, ¶ 356, quoting from Burrows II, ¶ 75.

²⁰⁴⁸ Respondent's Post-Hearing Brief on Quantum, ¶¶ 357-360; Respondent's Counter-Memorial on Quantum, ¶¶ 414-415.

²⁰⁴⁹ Respondent's Rejoinder on Quantum, ¶ 452, quoting from Burrows II, ¶ 26.

²⁰⁵⁰ Respondent's Counter-Memorial on Quantum, ¶¶ 409-412, referring to Burrows I, ¶¶ 28-31.

²⁰⁵¹ Respondent's Post-Hearing Brief on Quantum, ¶ 361; Burrows Presentation, p. 13.

(\$ millions)	Valuation of acquisition as of Nov-11
Acquisition in September 2006	\$246
Weighted average change in share indices	+104%
Adjusted for change in share indices	\$501
Adjustment for change in country risk/ timing	-88%
Adjusted for change in share indices and country risk/ timing	\$61
Assumed Exploration and Development expenditures	\$88
2011 value	\$149

1638. According to Respondent, this valuation shows that Claimant has “*artificially inflated its claim by billions of dollars, or over 98.2% of the value claimed of USD 8.5 billion.*”²⁰⁵²

1639. Respondent further argues that the value projected by Prof. Davis at USD 8.5 billion is also contradicted by the calculation in the Expansion Pre-Feasibility Study, claiming that “[b]oth reports presented very similar analyses of most of the variables, although with totally different results.” According to Respondent, the Expansion Pre-Feasibility Study “*assigns no positive value if any realistic discount rate is used.*”²⁰⁵³

1640. Respondent considers that the statements made by Claimant on the one hand and Prof. Davis on the other hand regarding the Expansion Pre-Feasibility Study contradict each other. In Respondent’s view, Claimant “*praised whole-heartedly the work carried out by SNC-Lavalin of the Reko Diq project*” which would lead one to conclude “*that the SNC-Lavalin studies provide exactly the basis the Claimant would use to value the project and determine its claim.*” Respondent emphasizes that each of the components used in Prof. Davis’ model, except for the government equity take, is also included in the Expansion Pre-Feasibility Study which even contained a “*risk register.*” It further notes that of the several price scenarios for copper and gold contained in the Study, the 20% below the central price scenario “*seems to approximate very closely the NPVs of Brattle, at a range of discount rates going from zero to 30%,*” i.e., the entire range of discount rates. In Respondent’s view, this contradicts Prof. Davis’ statement that the Expansion Pre-Feasibility Study is a “*stale technical study [the results of which do not allow one] to infer anything about the economic merits of the project on the Valuation Date.*”²⁰⁵⁴

1641. With regard to Prof. Davis’ update of the calculation in the Expansion Pre-Feasibility Study, Respondent contends that the Hearing on Quantum revealed “*myriad, unresolved and fatal errors in the determination of the project’s costs.*” Respondent points out that

²⁰⁵² Respondent’s Post-Hearing Brief on Quantum, ¶ 362.

²⁰⁵³ Respondent’s Rejoinder on Quantum, ¶ 435.

²⁰⁵⁴ Respondent’s Rejoinder on Quantum, ¶¶ 436-437, quoting from Claimant’s Quantum Memorial, ¶¶ 40-46 and Davis II, ¶ 302 and referring to Brailovsky/Wells II, ¶¶ 71-72, 74, 83.

the revised calculation introduced by Claimant during the Hearing “*admitted that their calculations of expenditures had to be increased by approximately a missing USD 1 billion.*”²⁰⁵⁵

1642. In Respondent’s view, these admitted errors as well as the “*very significant omissions, as yet unquantified*” it claims to have identified, “*make any attempt at actually assessing the net cash flows of the Reko Diq project described in the IMD FS and the EXP PFS an exercise in fantasy.*” As an example, Respondent refers to Prof. Davis’ assumption of all equity financing as opposed to the assumption in the Feasibility Study that 40% of the initial capital costs, *i.e.*, USD 1.5 billion, would be financed, as a result of which “*net cash flows did not account for the amortization of interest of that financing.*” Respondent therefore maintains that “*the valuation put forward by TCC fails to reflect the fair market value of its participation in Reko Diq.*”²⁰⁵⁶

3. Tribunal’s Analysis

1643. As noted in the context of the Tribunal’s assessment of the appropriate valuation method for Claimant’s investment in the present circumstances, neither Party has presented a valuation based on a traditional DCF analysis conducted for the purposes of this arbitration with inputs as of the valuation date. Mr. Brailovsky and Prof. Wells placed much emphasis in their expert reports on the “*conventional DCF calculations of the SNC-Lavalin analyses,*”²⁰⁵⁷ *i.e.*, the calculations in the Feasibility Study and the Expansion Pre-Feasibility Study, which were both completed in 2010. They did not, however, update these analyses to the valuation date. In particular, they did not update the prices for gold and copper, which dated from March 2010 in both Studies, to reflect price developments and contemporaneous expectations as of November 2011. The only reliable indication of the result that a traditional DCF analysis might have produced if it had been performed is Prof. Davis’ update of the calculation included in the Expansion Pre-Feasibility Study.

1644. In addition, the Tribunal has been provided with a valuation performed by Respondent’s expert Dr. Burrows, which is based on the past transactions by which Antofagasta and Barrick acquired Claimant in 2006.

1645. The Tribunal will address both calculations in turn and assess whether there are reasonable grounds for any remaining deviations between the conclusion reached by the Tribunal above and the results yielded by those calculations.

²⁰⁵⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 328, referring to Exhibits CE-1556A, CE-1778A and CE-1779A; Respondent’s Closing Presentation, p. 81.

²⁰⁵⁶ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 329-331, referring to Exhibit RE-576-29, p. 1 and Transcript Hearing on Quantum (Day 8), p. 2478 lines 3-9.

²⁰⁵⁷ Brailovsky/Wells I, ¶ 166.

a. Verification of the Tribunal’s Conclusion Taking Into Account the Updated DCF Calculation from the Expansion Pre-Feasibility Study

1646. As for the update of the calculation from the Expansion Pre-Feasibility Study, the Tribunal is aware that it was not presented by Prof. Davis as an alternative to his valuation based on the modern DCF method but rather to show why, in his opinion, the comparison drawn by Respondent’s experts to his valuation based on the 2010 calculation in the Expansion Pre-Feasibility Study was an “*apples and oranges*” comparison.²⁰⁵⁸ As noted above, a traditional DCF calculation conducted for this arbitration might have produced a result different from the (updated) calculation in the Expansion Pre-Feasibility Study, which was performed for a different purpose and did not aim at calculating the fair market value of the project. Mr. Sepúlveda, who was involved in assembling the financial model for the Feasibility Study in 2010, explained the purpose of the financial model as follows:

*“The purpose of the model was to create a tool that would give TCC and its owners a sense of the elements that drove project value, and how key assumptions affected that value, to help them evaluate and make decisions about the project. The tool’s uses included, among other things, assessing whether the project was economically feasible, the relative importance of various items that TCC was negotiating with the governments of Pakistan and Balochistan, and the value to Balochistan of different ownership structures.”*²⁰⁵⁹

1647. Mr. Sepúlveda added that “*our purpose in creating the model was not to determine a sale price for the project*” and testified that “*no one involved in the project believed that [the base case NPV of the Reko Diq IMD amounting to USD 656 million] reflected the project’s fair market value.*”²⁰⁶⁰ Apart from the fact that at the Expansion Pre-Feasibility Study already indicated a base case NPV of USD 1,209 million,²⁰⁶¹ Mr. Sepúlveda considered that “[i]n a sale process neither the seller nor the buyer would just take the Feasibility Study or Pre-feasibility Study evaluation figure as the price. Instead, each of them would consider what they thought it was worth to them. To do so the seller would provide the underlying geological and technical data, and the buyer would make its own determination of value using whatever model, assumptions and approaches it favored.”²⁰⁶² In addition, Mr. Sepúlveda considered it likely that a seller would “*update metals prices, costs and even the pit design and resource estimate (which can change with changing economics),*” “*assess realistic expansions*” and “*consider charging for the inferred resource as well as the proven resource because we already have strong*

²⁰⁵⁸ Cf. Davis II, ¶ 301.

²⁰⁵⁹ Sepúlveda, ¶ 11.

²⁰⁶⁰ Sepúlveda, ¶¶ 12, 22.

²⁰⁶¹ Exhibit CE-243, Table 1.3.

²⁰⁶² Sepúlveda, ¶ 24.

indications that there is a lot more metal to be mined than TCC provided in the Feasibility Study.” He also referred to the issue of “how to put an appropriate value on Reko Diq’s enormous, world-class size,” noting that “[a]t a 10% discount rate a conventional NPV analysis gives almost no value for revenues from 15 years and later” and arguing that “[t]he true value of Reko Diq lies in the fact that it promised to produce in times of both low and high prices for decades to come.”²⁰⁶³

1648. Mr. Luksic also testified in his second witness statement that “[t]he economic model in a feasibility study is merely intended to help the sponsors and potential financiers confirm that the project is economic and that there are sufficient cash flows to pay back the initial capital investment. While the Net Present Value (‘NPV’) can help guide the sponsor’s investment decisions, it is not the only indicator of value.” In support of his view that the NPV in the Feasibility Study “does not properly reflect the project’s value,” Mr. Luksic referred to what he considered to be “very conservative assumptions that are kept static for the entire life of the mine.” He explained that “[t]o stress test the project, you plug in conservative prices and a high discount rate into your financial model.”²⁰⁶⁴ Mr. Luksic further referred to the “immensely valuable” flexibility of a long-life mine that would have helped them to manage the volatility of commodity prices. He testified that “[t]he size of the Reko Diq deposit—and the potential for multiple expansions—meant that we would be able to exploit the highs and protect against the lows. This feature of the Reko Diq project is one that would have been front and center in any negotiation for a price for the project in the event of a sale but is completely absent from a model using static prices.”²⁰⁶⁵

1649. As addressed in detail above, Respondent’s experts relied on a comparison of the cash flows yielded by Prof. Davis’ modern DCF model with the (non-updated) calculation in the Expansion Pre-Feasibility Study in both of their expert reports. However, Mr. Brailovsky also confirmed at the Hearing on Quantum that “as you say, valuation is different from evaluation,” referring specifically to the differences in making price assumptions as “a feasibility study won’t say which price” but will have a “menu of prices, just like this one.”²⁰⁶⁶

1650. As pointed out by Prof. Davis, the distinction between valuation and evaluation is also confirmed by CIMVal in its Standards and Guidelines for Valuation of Mineral Properties, which clarify that “Valuation in the CIMVal Standards and Guidelines is concerned with the value or worth of a Mineral Property as opposed to ‘evaluation’

²⁰⁶³ Sepúlveda, ¶¶ 25-26.

²⁰⁶⁴ Luksic II, ¶¶ 13-14.

²⁰⁶⁵ Luksic II, ¶¶ 15-16.

²⁰⁶⁶ Transcript Hearing on Quantum (Day 9), p. 2656 line 7.

where the key objective is an economic assessment or determination of the economic merit of a property.”²⁰⁶⁷ Similarly, the International Mineral Property Valuation Standards Committee IMVal stated in its Standards Template that “[t]he Template deals with Valuation, which is distinct from Evaluation. The distinction inherent in these defined terms is that Valuation addresses the estimation of value of a Mineral Property, whereas Evaluation addresses the broader assessment of a Mineral Property for an investment decision.”²⁰⁶⁸

1651. Taking into account the explanations above, the Tribunal will bear in mind the differences between a calculation aimed at determining the fair market value of the project and the calculations performed in the Feasibility Study and Expansion Pre-Feasibility Study. However, recalling that it has not been provided with a traditional DCF calculation by either Party, or any other income-based calculation for that matter, the Tribunal considers it appropriate to take into account the indication of value reflected in the calculations as updated by Prof. Davis and to verify that it is reconcilable with the Tribunal’s conclusion on the value of Claimant’s investment.

1652. Prof. Davis explained in his second report that he took the following approach to updating the calculation in the Expansion Pre-Feasibility Study:

“... I updated the EXP PFS NPV calculation using metal prices consistent with technical reports published close to the Valuation Date. The average prices used across these technical reports published on SEDAR, the website of the Canadian Securities Administrators, were \$3.12/lb for copper and \$1,266/oz for gold, substantially higher than the \$2.20/lb and \$925/oz respectively assumed by the EXP PFS. I also updated the cost assumptions using the updated costs provided by Barrick and used in my own valuation.

Using prices and costs updated to reflect conditions at the Valuation Date, the EXP PFS calculation yields a NPV of \$4.03 billion for the Project and \$3.02 billion for TCC’s 75% share. The implied real IRR of the cash flows projections is 18.5%.”²⁰⁶⁹

1653. Noting that these numbers were “substantially higher than those calculated in the EXP PFS, and to which Mr. Brailovsky and Professor Wells refer,” Prof. Davis considered that this highlighted “the problem with using stale technical study results to infer anything about the economic merits of the project on the Valuation Date.” Specifically, he argued that the application of a 15% discount rate to the technical study “would produce a positive NPV, not a negative NPV” and thus, according to the logic presented by

²⁰⁶⁷ Exhibit CE-919, p. 5.

²⁰⁶⁸ Exhibit CE-1526, p. 6. See also Davis II, ¶¶ 95-96.

²⁰⁶⁹ Davis II, ¶¶ 301-302.

Respondent's experts, confirm that the project had a positive value as of the valuation date.²⁰⁷⁰

1654. Mr. Brailovsky and Prof. Wells addressed the updated calculation presented by Prof. Davis only in a footnote of their second report, arguing as follows:

“Brattle in its Second Report (¶ 302), ran the SNC-Lavalin model with certain prices and other adjustments to show that the IRR of the project at those prices is more than 18% and therefore would have a positive NPV even assuming a discount rate of 15%. (In CE-1556, which contains the spreadsheet of the version used by Brattle of the SNC-Lavalin model, the rate of return after government equity stake is only 17.2%, not 18%. Similarly, Brattle says that the NPV of the project for TCC is US\$3.3 billion at 15%. It is not. This is the NPV obtained at a discount rate of 10%. At 15%, the NPV is, instead, US\$620 million.) Of course, the higher the prices, the higher the IRR. Thus, for example, for this exercise Brattle used a flat real price for copper of US\$3.12/ton, whereas for its own model the average real price was US\$1.43/ton—less than half—and US\$2.2 in the SNC-Lavalin base scenario. In contrast, the price for gold used by Brattle in this exercise was lower than that contemplated in the Brattle model (US\$1.265/ton vs. US\$1,829/ton), which is not surprising given the untenable high values used by the Brattle reports, as we have indicated since our First Report. However, introducing both real average prices found in the Brattle Report to the same version of the SNC-Lavalin model presented by Brattle itself in CE-1556, the rate of return falls to 6.6% and the NPV at a 15% discount rate is –US\$1.978 billion, a large negative figure.”²⁰⁷¹

1655. As a preliminary point, the Tribunal notes that, contrary to what Mr. Brailovsky and Prof. Wells suggest in their footnote, Prof. Davis did not state that the net present value of Claimant's stake in the project would amount to USD 3.3 billion when using a discount rate of 15%. He rather stated that the application of a 15% discount rate would produce a positive NPV, without identifying this amount or specifying the discount rate by whose application he reached the conclusion that the calculation yielded a net present value of USD 3.02 billion. However, it can be deduced from the excel spreadsheet underlying Prof. Davis' calculation and was also confirmed by Prof. Davis at the Hearing on Quantum that the value of USD 4.03 billion for the project as a whole (*i.e.*, including the GOB's 25% stake) was calculated based on a 10% discount rate.²⁰⁷²

1656. More specifically, Prof. Davis' updated calculation yielded the following after-tax net present values of the project (including the GOB's 25% stake), depending on the discount rate to be applied:

²⁰⁷⁰ Davis II, ¶ 302.

²⁰⁷¹ Brailovsky/Wells II, ¶ 91 and note 119.

²⁰⁷² Exhibit CE-1556.

	0%	5%	8%	10%	12%	15%
NPV in USD million	36,516.6	11,968.2	6,285.7	4,031.4	2,490.6	1,004.7

1657. Mr. Brailovsky and Prof. Wells did not explain how they arrived at an amount of USD 620 million when applying a discount rate of 15%. Based on the figures presented above, Claimant's 75% stake in the project would have resulted in the following values:

	0%	5%	8%	10%	12%	15%
NPV in USD million	27,387.5	8,976.2	4,714.3	3,023.6	1,868.0	753.5

1658. In addition to their criticism regarding the use of a 10% discount rate, Respondent's experts also criticized the price assumptions made by Prof. Davis in his update and noted that when introducing "*real average prices found in the Brattle report to the same version of the SNC-Lavalin model presented by Brattle itself,*" the net present value at a 15% discount rate would be decreased to a negative USD -1.978 billion. Mr. Brailovsky and Prof. Wells did not provide any further explanation or support for this statement in their report; in particular, they did not substantiate their calculation or the prices on the basis of which they reached the aforementioned conclusion.

1659. Prof. Davis, on the other hand, identified in his second expert report a total of 33 technical reports dating from between November 2011 and January 2012 and the prices for gold and/or copper on which these reports had based their financial calculations. Specifically, Prof. Davis presented 25 gold prices and 11 copper prices as well as, *inter alia*, the average prices resulting from these technical reports, *i.e.*, USD 1,266/oz for gold and USD 3.12/lb for copper.²⁰⁷³ All 33 technical reports were submitted into the record.²⁰⁷⁴ On that basis, he used in his update a constant price of USD 1,260/oz for gold and USD 3,10/lb for copper.²⁰⁷⁵

1660. Mr. Brailovsky and Prof. Wells did not dispute in their second report that the technical reports on which Prof. Davis relied had used the prices presented in his Workpaper for the purposes of their financial calculations. At the Hearing on Quantum Mr. Brailovsky testified that Prof. Davis' update of the calculation was wrong "[b]ecause he took the peak prices prevailing at that time and kept them constant." When asked whether he was aware that Prof. Davis had taken prices from published feasibility studies available around the time of the valuation date which were lower than the spot price as of the valuation date, Mr. Brailovsky stated that "*I don't have to look into what other feasibility studies were*" and reiterated his understanding that Prof. Davis "*was taking the prices*

²⁰⁷³ Davis II, Workpaper R-31.

²⁰⁷⁴ Exhibits CE-1579 through CE-1614.

²⁰⁷⁵ Exhibit CE-1556.

prevailing at that point.” Mr. Brailovsky added that “*as you say, valuation is different from evaluation, so a feasibility study won't say which price. It will have a menu of prices, just like this one.*” He confirmed that he was not aware which of these prices Prof. Davis had taken for his update of the calculation.²⁰⁷⁶

1661. Mr. Brailovsky further testified that Prof. Davis’ updated calculation could not be taken seriously when considering that it yielded cash flows that were about 50% higher than the cash flows calculated by Prof. Davis based on his modern DCF model (USD 96,299 billion in gross revenues as opposed to USD 64,953 billion) and when considering that “*the Consensus Economics, which represents the opinion of all the major financial institutions in the world, will produce something lower than the 64 billion*” yielded by Prof. Davis’ modern DCF model. In his opinion, the updated calculation was “*completely irrelevant. It's a travesty.*”²⁰⁷⁷ Mr. Brailovsky reiterated that he could not accept the updated calculation because the methods on which he had relied to make price projections, *i.e.*, the Consensus Economics forecast and the Ornstein-Ohlenbeck process, “*will produce less than 64.9, less, not more.*”²⁰⁷⁸

1662. As a preliminary point, the Tribunal cannot agree with Mr. Brailovsky that the fact that the undiscounted gross revenues in the updated calculation were considerably higher than the risk-adjusted cash flows calculated by Prof. Davis would render this update unreliable. In the Tribunal’s view, this divergence rather supports Prof. Davis’ argument that the cash flows in his modern valuation already included considerable risk adjustments. Mr. Brailovsky’s oral testimony also clarified, however, that he considered the prices assumed by Prof. Davis for the purposes of updating the calculation in the Expansion Pre-Feasibility Study inappropriate and, in particular, inconsistent with the price forecasts of Consensus Economics on which Respondent’s experts relied in their expert reports. While Mr. Brailovsky and Prof. Wells did not identify what they described as the “*real average prices*” in their second report, Mr. Brailovsky’s testimony indicates that they may have been referring to the Consensus Economics forecast and that using these prices in the updated calculation of the Expansion Pre-Feasibility Study, the net present value of the cash flows would have turned negative at a discount rate of 15%.

1663. However, Mr. Brailovsky explicitly agreed that the calculation made in the Expansion Pre-Feasibility Study was not made for the purposes of determining the value of the project and therefore did not use a projection of a certain price development in the future but rather a “*menu of prices,*” *i.e.*, a static price and various sensitivity analyses. In addition and while Mr. Brailovsky considered that he did not have to look into the prices assumed by other feasibility studies published at the time, he did not dispute that these

²⁰⁷⁶ Transcript Hearing on Quantum (Day 9), p. 2655 line 1 to p. 2656 line 17.

²⁰⁷⁷ Transcript Hearing on Quantum (Day 9), p. 2659 line 18 to p. 2560 line 20; **Exhibit CE-1778**.

²⁰⁷⁸ Transcript Hearing on Quantum (Day 9), p. 2661 lines 11-19.

studies had used the prices recorded in Prof. Davis' Workpaper or that the prices Prof. Davis had used in his update reflected the average of these price assumptions. Given the undisputed different purpose for which calculations in technical feasibility studies are made, the Tribunal agrees with Prof. Davis that the best indication of the prices that would have been used in the Feasibility Study and the Expansion Pre-Feasibility Study if the financial analysis included therein had been prepared as of the valuation date can be found in the prices used in other feasibility studies published around the valuation date. While the Tribunal has found above that a buyer would likely not have ignored the much lower Consensus Economics forecast in the context of a valuation aimed at determining the fair market value of the project, it is not convinced that this forecast would have been a better indicator of the prices that would have been used in the calculation of a technical feasibility study at the time than the prices actually used in other feasibility studies. On balance, the Tribunal therefore cannot accept Mr. Brailovsky's and Prof. Wells' criticism of the price assumptions used in Prof. Davis' update of the calculation in the Expansion Pre-Feasibility Study.

1664. In the Tribunal's view, the above also shows, however, that the relevance of a calculation in a technical study to the question before this Tribunal, *i.e.*, the determination of the fair market value of Claimant's investment in the project, is limited. In particular, given the significant impact that the price assumptions for gold and copper have on the overall result of the calculation, the Tribunal considers that a calculation using a static price over the entire life of the mine cannot be considered a sufficiently reliable indicator of the fair market value to be determined on the basis of the entirety of the cash flows, part of which will be generated only several decades into the future. It rather confirms that the focus of the calculation in the Feasibility Study and Expansion Pre-Feasibility Study was on confirming the economic feasibility of the project and determining the length of the payback period, *i.e.*, the time it would take to recover capital costs, which was determined to be 7.1 years in the initial mine development scenario and 7.9 years in the expansion scenario.²⁰⁷⁹

1665. Having said that, it appears to the Tribunal that, in any event, the indication of value reflected in the updated calculation made by Prof. Davis does not contradict the conclusion reached by the Tribunal based on the modern DCF valuation model.

1666. The Tribunal notes that an issue arose at the Hearing on Quantum because Prof. Davis corrected the statement he had made in paragraph 302 of his second report with regard to the value yielded by the updated calculation in the Expansion Pre-Feasibility Study. Specifically, he stated that he had "*adjusted upward slightly*" the value and implied real IRR of the cash flow projections, which were now as follows:

²⁰⁷⁹ Cf. Sepúlveda, ¶ 16; **Exhibit CE-243**, Table 1.3.

“Using prices and costs updated to reflect conditions at the Valuation Date, the EXP PFS calculation yields a NPV of \$4.24 billion for the Project and \$3.18 billion for TCC’s 75% share. The implied real IRR of the cash flow projections is 18.9%.”²⁰⁸⁰

1667. He further explained the reason for his correction:

“So, the exercise here, as you know, the EXP study was completed in 2010 using 2009 costs. And, in my analysis, to build a cash flow model that I needed for my modern approach, I used an update of those costs as measured by Barrick to 2011. So, Barrick provided me with an update of the technical study costs to 2011.

In generating this update to respond to the idea that my cash flows are the same as the EXP cash flows, I felt it important to treat them on an apples to apples basis. So, in paragraph 302, I updated the EXP cash flows, whose costs were 2009 to 2011.

To be consistent, I should have used the escalations that Barrick did, but I did not. I used escalations from another source called Wood Mackenzie. Now, I do use Wood Mackenzie escalations going forward in my spreadsheet, but I did not use them to bring, in my own analysis, to bring the technical studies’ costs up to 2011 costs. So, I had an inconsistent set of escalators in there.

For one point of my Report I used the Barrick adjustments, and specifically to address this comment, I erroneously used Wood Mackenzie adjustments. And since they were not completely identical, it results in slightly different cash flows, NPV results, and IRRs for an updated 2011 EXP, and that was the correction that I wished to insert into my Report.”²⁰⁸¹

1668. In response to the correction presented by Prof. Davis which was provided to Respondent two days before Prof. Davis gave oral testimony at the Hearing on Quantum, Respondent sought to introduce certain additional documents into the record. Claimant objected to the introduction of these documents and disputed in particular Respondent’s submission that these documents were directly responsive to or triggered by the correction presented by Prof. Davis. This applied, in particular, to an analysis of “*implied prices*” that Respondent sought to introduce into the record. While Respondent acknowledged that Prof. Davis’ correction did not include any change to the copper and gold prices he had used in the updated calculation,²⁰⁸² it argued that the changes had an effect on the “*implied prices*” for both metals, *i.e.*, “[t]he price of the minerals times the cost you would have to incur to actually extract them,” and “*a very significant impact on the Valuation discussion*”; it therefore maintained that “*the changes introduced actually effect the prices of the*

²⁰⁸⁰ Davis Errata Sheet dated 21 May 2018; Transcript Hearing on Quantum (Day 8), p. 2322 line 12 to p. 2323 line 1.

²⁰⁸¹ Transcript Hearing on Quantum (Day 8), p. 2381 line 13 to p. 2382 line 18.

²⁰⁸² Transcript Hearing on Quantum (Day 8), p. 2302 lines 3-5.

minerals, of course, not the Base Prices, but the Implied Prices that are what is relevant for purposes of valuation.”²⁰⁸³ Claimant disputed the relevance of the calculation of implied prices, which in its view was only “*comparing gross revenues to copper payable,*” and emphasized that this was a “*wholly new analysis*” which had not been presented by Respondent’s experts in their second report but for the first time in response to the correction made by Prof. Davis to his updated calculation.²⁰⁸⁴ According to Claimant, this analysis “*ha[d] absolutely nothing to do with the correction*” made by Prof. Davis but was rather based on “*old data that hasn’t changed.*”²⁰⁸⁵

1669. Respondent emphasized that Prof. Davis’ update of the costs in the calculation indicated that the initial costs “*were off by over USD 1 billion*” and maintained that it “*would not have needed to make this new calculation of what the impact on the impact [sic] price of copper and gold were it not for the moving targets of what the calculations on the costs were*” based on the corrections introduced by Prof. Davis.²⁰⁸⁶ Respondent confirmed that the analysis it was seeking to introduce was “*not based on any piece of information that was not prior to this date already in the record of the case,*” i.e., including the correction provided by Prof. Davis shortly before his oral testimony, but rather “*at best, new calculations based on the data as submitted by Claimants yesterday.*”²⁰⁸⁷

1670. The analysis of “*implied prices,*” in particular, the timeliness of its introduction and whether it was triggered by the correction made by Prof. Davis or rather a stand-alone analysis that should have been made in Mr. Brailovsky’s and Prof. Well’s second report, was extensively discussed between counsel before the cross-examination of Prof. Davis.²⁰⁸⁸ Having heard both sides, the Tribunal decided that the spreadsheet containing the analysis of “*implied prices*” could be used during the cross-examination of Prof. Davis, subject to the Tribunal’s final decision on whether it would admit the document into the record once it had more clarity as to what was a response to Prof. Davis’ correction and what was not.²⁰⁸⁹

1671. The Tribunal further notes that following this discussion, Claimant proposed that as they did not believe the changes to be material or to “*really materially affect any number that [the Tribunal] will be concerned about in the case,*” it would be content to rely on the uncorrected numbers for the case. Respondent rejected this proposal, however, arguing that “[w]e have before us a case that is premised on the notion that the Valuation could

²⁰⁸³ Transcript Hearing on Quantum (Day 8), p. 2302 line 5 to p. 2303 line 15 and p. 2311 lines 2-4.

²⁰⁸⁴ Transcript Hearing on Quantum (Day 8), p. 2305 line 21 to p. 2307 line 18.

²⁰⁸⁵ Transcript Hearing on Quantum (Day 8), p. 2392 lines 8-16.

²⁰⁸⁶ Transcript Hearing on Quantum (Day 8), p. 2308 lines 7-18.

²⁰⁸⁷ Transcript Hearing on Quantum (Day 8), p. 2397 lines 2-15 and p. 2400 lines 16-21.

²⁰⁸⁸ Cf. Transcript Hearing on Quantum (Day 8), pp. 2235-2247, 2301-2319, 2382-2404.

²⁰⁸⁹ Transcript Hearing on Quantum (Day 8), p. 2404 lines 11-18 and p. 2408 line 10 to p. 2409 line 7.

be performed in certain equivalent terms for the projects, going 56 years into the future. And we have the Expert--Mr. Davis has found that months after the First Report--actually over a year after his First Report, his calculation on the Opex and Capex was off by over USD1 billion. So, I don't think that assuming that error had not been found is in any way useful, and I think that the fact that the error was found is very instrumental to the discussion that we still have to hold before the Tribunal.”²⁰⁹⁰

1672. The analysis of implied prices was not raised by Respondent during the cross-examination of Prof. Davis. Nor was it addressed in the presentation or examination of Respondent's experts or the expert conferencing held following their oral testimony. During Prof. Davis' cross-examination, his update of the calculation in the Expansion Pre-Feasibility Study was referred to only in the following discussion:

“[Y]our valuation of the Project based on the information primarily taken from the Feasibility Study yields a Net Present Value that is between 15 and 20 times higher than that calculated in the Feasibility Study itself; is that correct?

A. No. If you update the Feasibility Study to the Valuation Date in an apples to apples comparison, believe the number--and this gets into our errata--I would be happy with the 4 billion number for 100 percent, or 3 billion for 75 percent. That's the number from the updated Feasibility Study.

Or if we go with the corrected values--I'm not sure what is in the record now. It is 4.24 billion or 3.18 billion is really irrelevant for the purposes I'm going to speak to now. That number, if one wishes to just compare it to my number of 8.5, I think the multiple is more like 2.5.

Q. What Discount Rate for the Feasibility Study?

A. Feasibility Study, which is a study that was intended to evaluate the progress of the Project as opposed to value--and I made this clear in my Report too--the Project, the Feasibility Study used 10 percent real as a Base Case Discount Rate.”²⁰⁹¹

1673. In the absence of any further discussion or testimony on the analysis of “*implied prices*,” the Tribunal does not see any basis to assume that Prof. Davis' correction had an impact on the price assumptions he used in his update of the calculation in the Expansion Pre-Feasibility Study. Nor does the Tribunal see any basis to revisit the conclusion it has reached above regarding Prof. Davis' approach to base his price assumptions for the update on the average of the prices used in other feasibility studies published around the time of the valuation date.

²⁰⁹⁰ Transcript Hearing on Quantum (Day 8), p. 2406 line 3 to p. 2407 line 20.

²⁰⁹¹ Transcript Hearing on Quantum (Day 8), p. 2500 line 16 to p. 2501 line 17.

1674. Respondent further argued that by correcting his initial calculation, Prof. Davis admitted that his calculation had been “*off by over a billion dollars*” and considered it accepted that the project had not been de-risked as assumed in Prof. Davis’ valuation based on certainty-equivalent cash flows.²⁰⁹² However, as pointed out by Claimant and Prof. Davis, the correction concerned only his update of the calculation in the Expansion Pre-Feasibility Study and not his modern DCF valuation model. This calculation, however, is not based on the concept of “*de-risked*” or “*certainty-equivalent*” cash flows.
1675. In addition, the Tribunal cannot follow Respondent’s argument that Prof. Davis’ correction would raise more general doubts as to the reliability of his valuation. Prof. Davis explained that he corrected the costs in his updated calculation because he realized in preparing for the Hearing on Quantum that he had escalated the costs up to the valuation date by using a dataset different from the dataset used for the escalation of costs throughout the same time period in his modern valuation model. As pointed out by Respondent, relying on the same dataset as in his modern valuation model resulted in an overall decrease of Prof. Davis’ Capex and Opex estimates from USD 38,689 billion to USD 37,655 billion over the life of the project.²⁰⁹³ Respondent did not dispute Prof. Davis’ explanation regarding the source of his corrections. Nor did it provide any further substantiation as to why this correction should have any impact beyond the slight increase in value of Claimant’s stake yielded by the updated calculation which, as specified in Prof. Davis’ errata sheet, corresponded to an increase from USD 3.02 billion to USD 3.18 billion when using a 10% discount rate.
1676. In any event, as noted above, Claimant offered during the Hearing on Quantum not to rely on the corrected, higher value yielded by the corrected escalation of costs and, in fact, it relied on the initial, uncorrected figures in both its Closing Presentation and its Post-Hearing Brief on Quantum.²⁰⁹⁴ Consequently, the Tribunal sees no reason to attach any further significance to the correction of the updated calculated that was presented at the Hearing on Quantum.
1677. As a final point, the Tribunal has taken note of the dispute between the Parties and their experts with regard to the discount rate to be used when comparing the updated calculation with the result yielded by Prof. Davis’ valuation model. Prof. Davis relied on the value yielded by the application of a 10% discount rate whereas Mr. Brailovsky and Prof. Wells considered that a discount rate of 15% or more would have been appropriate.

²⁰⁹² Transcript Hearing on Quantum (Day 10), p. 3020 lines 1-4. See also (Day 8), p. 2308 lines 7-10 and p. 2408 lines 6-18.

²⁰⁹³ Exhibits CE-1778 and CE-1778A; Respondent’s Closing Presentation, p. 81.

²⁰⁹⁴ Claimant’s Closing Presentation, p. 120; Claimant’s Quantum Post-Hearing Brief, ¶ 503; Exhibit CE-1556.

1678. Bearing in mind that the calculation in the Expansion Pre-Feasibility Study was based on a traditional DCF analysis, the Tribunal recalls that Prof. Davis agreed in his second report that, in principle, the modern DCF method and traditional method should lead to the same value, *i.e.*, the fair market value, of the project. He stated that “[b]oth the traditional DCF and modern DCF produce an estimate of this FMV, they just come to that FMV via different approaches to discounting for systematic risk.”²⁰⁹⁵ In his first report, he had also stated that “modern DCF and traditional DCF are both cash-flow based models that could, in principle, produce the same FMV for a mining asset.”²⁰⁹⁶ However, noting that the traditional DCF method required inputs such as the expected copper price and a time-varying discount rate over copper risk, which he considered to be “not easily known,” Prof. Davis considered it “unlikely for the two approaches to produce the same value, particularly if a constant discount rate is used, as is typical in the application of the traditional DCF method.” In his opinion, the prevalence of the modern DCF method was clear: “If the two values are not the same, we know that it is the traditional approach, which uses non-market information, that is failing to come up with the market value of the revenue stream. We cannot know whether the traditional method’s copper price forecast was incorrect, its discount rate was incorrect, or whether both were incorrect.”²⁰⁹⁷

1679. At the Hearing on Quantum, Prof. Davis confirmed that assuming one would come up with the right discount rate, the traditional and modern DCF methods should lead to the same result. He stated:

“That’s exactly right. And, in fact, what we do sometimes when we--and especially when I teach this, I do a simple and I do a modern. I generate the value in the modern, and I back-calculate what Discount Rate I need in the simple to come up with the same value. And you get some astounding results. The Discount Rate that you’d have to use for long-life assets is very low, and you can imagine why because for a long-life asset, to get all that value, you can’t use 10, 12, or 15 because it will discount away those long-life cash flows. So, you could, if you knew what the right Discount Rate was, you would get the same number, exactly.

*My belief is the only way you know what the right Discount Rate is, is to do the modern, get the value, and then impute what Discount Rate you would need to use in the traditional to get that same value.”*²⁰⁹⁸

1680. Prof. Davis further confirmed that, in his opinion, due to the compounding factor of the discount rate, the use of a single discount rate for a 50-year project yielded either inaccurate results or amounted to “two wrongs making a right”:

²⁰⁹⁵ Davis II, ¶ 53.

²⁰⁹⁶ Davis I, ¶ 95.

²⁰⁹⁷ Davis I, ¶ 91.

²⁰⁹⁸ Transcript Hearing on Quantum (Day 8), p. 2374 lines 2-15.

“ARBITRATOR ALEXANDROV: ... If you were to use the traditional DCF method, you would have to use a different Discount Rate over different periods of time; is that correct?”

THE WITNESS: That is exactly correct.

ARBITRATOR ALEXANDROV: It would be incorrect to use the same Discount Rate to bring it up to that Present Value in the traditional DCF method from 30 years in the future to today?

THE WITNESS: You could probably find a single Discount Rate that gives you the right value, but it's two wrongs making a right. So, some firms do use a constant Discount Rate, but they tend to use a low one, again, because they don't want it to be compounding that risk over the life of the asset.”²⁰⁹⁹

1681. Prof. Davis noted that the Feasibility Study had used a 10% real discount rate as the base case discount rate and added that his calculated value of USD 8.5 billion corresponded to a multiple of about 2.5 compared to the value yielded by using a 10% discount rate in the updated calculation.²¹⁰⁰ This indicates that the discount rate to be used to arrive at the value yielded by Prof. Davis’ modern valuation model would have had to be considerably lower than 10%.

1682. Mr. Sepúlveda confirmed in his witness statement that while the financial model for the Feasibility Study presented discount rates in the range of 0% to 12%, *“the TCC Board selected 10% as the indicative rate.”* This statement is confirmed by the Expansion Pre-Feasibility Study, which states with regard to the use of discount rates:

“Given the complexity and location of the project a 10% discount rate has been selected as the ‘base case’ discount rate for the EXP Study. In addition, the asset model also considers discount rates of 0%, 5%, 8%, and 12% for the calculation of the NPV; these were selected to cover the financial expectations of the owners.”²¹⁰¹

1683. Mr. Sepúlveda further noted that *“[b]ecause of the enormous size of the resource and the long mine life of 56 years in the IMD case, the discount rate had a significant effect on the NPV the model produced. This is no surprise, given that NPV only attributes value to the cash flows created in the initial years of a long-life asset.”²¹⁰²* He further explained why he considered the selection of 10% *“reasonable for this kind of model of this asset”*:

“Copper projects are usually discounted at a uniform rate of 8%, and gold projects at 5%, as this is their capital cost. The weighted capital cost for Reko Diq, as it was a mixture of the two metals, was 7.28%. To this we added a premium to account for risk associated with investing in Pakistan. That

²⁰⁹⁹ Transcript Hearing on Quantum (Day 8), p. 2377 line 17 to p. 2378 line 8.

²¹⁰⁰ Transcript Hearing on Quantum (Day 8), p. 2501 lines 8-17.

²¹⁰¹ **Exhibit CE-964**, p. 28-18.

²¹⁰² Sepúlveda, ¶ 17.

*premium was based on the Pakistani Emerging Market Bond Index ('EMBI'), or sovereign spread, of 3.41%. As I explained to others in TCC at the time, the inclusion of the entire sovereign spread was inappropriate since metals prices do not depend on the Pakistani economy, and Reko Diq was to be 'an export-oriented project with offshore dollar denominated revenues[.]'"*²¹⁰³

1684. As already noted above, Mr. Sepúlveda further agreed with Prof. Davis that for valuation purposes even the 10% discount rate may have been considered too high:

*"The seller would also try to figure out how to put an appropriate value on Reko Diq's enormous, world-class size. At a 10% discount rate a conventional NPV analysis gives almost no value for revenues from 15 years and later. But the Feasibility Study and Pre-Feasibility Study make clear that this is not just a 15 year mine, and it would command a sale price much higher than a similar mine that had only a 15 year life. The true value of Reko Diq lies in the fact that it promised to produce in times of both low and high prices for decades to come."*²¹⁰⁴

1685. The same was also confirmed by Mr. Luksic who testified:

*"A final reason why the NPV in a feasibility study evaluation is often not reflective of fair market value is the fact that the compounding effect of the discount rate means that the NPV assigns little if any value beyond the first decade of the project. The fact that the NPV does not capture a lot of value beyond the first ten to fifteen years is not a problem when you are simply trying to determine whether an investment is viable because then you mostly care about the payback period. But it is a very different story when it comes to determining the fair market value of an asset. In such a case, it makes absolutely no sense to assign no value to the full life of mine. It goes without saying that a sixty-year mine will be worth more than a twelve-year mine."*²¹⁰⁵

1686. In support of this statement, Mr. Luksic referred to the Los Pelambres mine owned by Antofagasta in Chile:

"The Los Pelambres mine provides a useful illustration of the shortcomings of a feasibility study NPV. Like Reko Diq, Los Pelambres is a world-class porphyry copper deposit with a very long life of mine. When the Los Pelambres Feasibility Study was approved in 1996, it showed a range of NPVs between US\$ 800 million and US\$ 1.5 billion. In our view this was a healthy NPV and it gave us comfort that the mine was a safe investment but we knew that the mine was actually worth much more. During the mine's first sixteen years of operation, it has paid out more than US\$ 14 billion in dividends to our shareholders and has also paid for the several marginal expansions that have occurred over this period. Furthermore, the resource is

²¹⁰³ Sepúlveda, ¶ 18.

²¹⁰⁴ Sepúlveda, ¶ 26.

²¹⁰⁵ Luksic II, ¶ 17.

*by no means exhausted: based on current expansion proposals, the mine will be in operation for at least another thirty years.”*²¹⁰⁶

1687. Mr. Luksic considered that buyers would not take the conservative approach used in a feasibility study for in-house development but rather, “*instead of using conservative price assumptions and a large discount rate in order to determine what the project’s value will be in the worst-case scenario, buyers use price assumptions that are at—or sometimes even above—the current prices and a discount rate in the low single digits.*” He added that buyers were thereby “*correcting for the conservatism that they know is built into the feasibility study and compensating for the value of future expansions and for the discoveries that are likely to be made through further exploration but is simply not captured in the feasibility study.*”²¹⁰⁷ As an example, Mr. Luksic referred to the sale of a 30% interest in Antucoya by Antofagasta to a Japanese general trading company in December 2011, noting that the purchase price the company was willing to pay implied that it had used a copper price of USD 3.50 and a discount rate of 5%.²¹⁰⁸

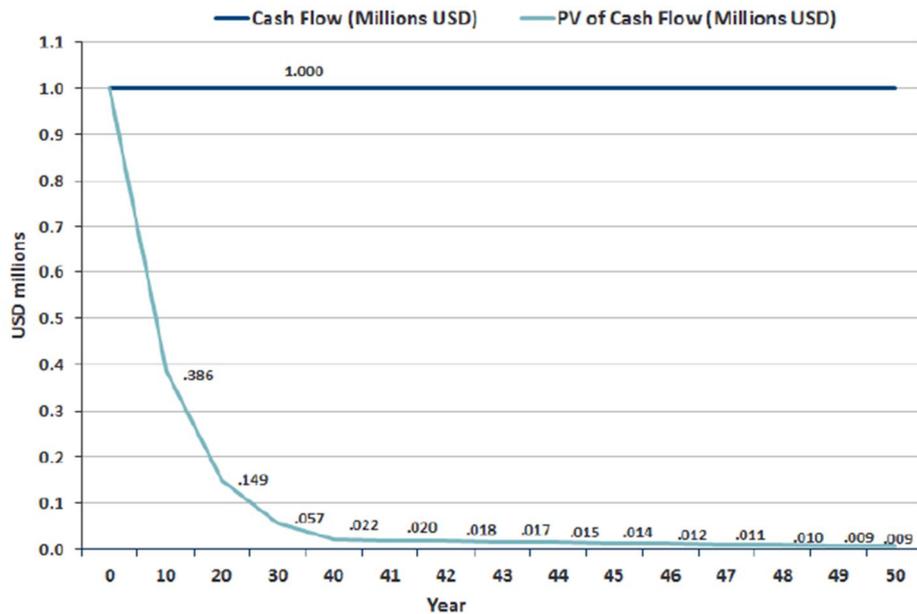
1688. In the Tribunal’s view, it is clear that the example referred to by Mr. Luksic is not comparable to Reko Diq in that it concerned a minority interest in a much smaller mine located in a different part of the world facing different asymmetric risks. However, the Tribunal does take note of the explanation provided by Prof. Davis, Mr. Sepúlveda and Mr. Luksic as to why they considered that even the 10% discount rate used as the base case in the Feasibility Study and the Expansion Pre-Feasibility Study yielded a result that did not reflect the fair market value of the project. In particular, they all referred to the compounding factor of the discount rate, which has a particular impact on cash flows that are generated more than 15 or 20 years into the future. In this regard, the Tribunal also considers it worth recalling the illustration provided by Prof. Davis of discounting cash flows at a constant 10% discount rate over the anticipated life of the mine:

²¹⁰⁶ Luksic II, ¶ 18.

²¹⁰⁷ Luksic II, ¶ 19.

²¹⁰⁸ Luksic II, ¶ 20.

**Figure 13. Present Value of a Fixed Cash Flow
When Discounted at a Constant 10% Discount Rate**



Year	0	10	20	30	40	41	42	43	44	45	46	47	48	49	50
Cash Flow (Millions USD)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Discount Factor	1.000	0.386	0.149	0.057	0.022	0.020	0.018	0.017	0.015	0.014	0.012	0.011	0.010	0.009	0.009
PV of Cash Flow (Millions USD)	1.000	0.386	0.149	0.057	0.022	0.020	0.018	0.017	0.015	0.014	0.012	0.011	0.010	0.009	0.009
Cumulative Cash Flows for Years 41-50 (USD):						10,000,000									
Cumulative PV of Cash Flows for Years 41-50 (USD):						135,764									

1689. The Tribunal also recalls the statement in the 2012 CIMVal report that “[v]ery long-life base metal asset may require that long-term cash flows be explicitly modeled with a CeQ DCF approach because of price reversion in base metal prices (i.e. the tendency of metal price to revert to a long-term equilibrium level). This approach may be used if in the particular situation a standard DCF model with aggregate risk adjustments to the net cash flow has difficulty recognizing the explicit risk characteristics of a cash flow stream.”²¹⁰⁹ While CIMVal does not explicitly make reference to the discount rate, it does refer to difficulties that may be implied in using “aggregate risk adjustments to the net cash flow” in the standard DCF model for a very long-life asset.

1690. Against this background, the Tribunal is not convinced that it was inappropriate for Prof. Davis to refer in his comparison to the value yielded by the updated calculation at a 10% discount rate. The Tribunal specifically emphasizes that it thereby does not make a finding that the application of a 10% discount rate would have been appropriate in the

²¹⁰⁹ Exhibit CE-1483, pp. 7-8.

context of a traditional DCF valuation of the project. Neither Party has provided the Tribunal with such a valuation and Respondent's experts have not expressed a definitive opinion as to the discount rate they would have considered appropriate if it had been performed. In their first report, Mr. Brailovsky and Prof. Wells referred to the nominal discount rate above 23% estimated by Dr. Burrows and noted that they would "*expect a higher rate for the region of western Balochistan where Reko Diq is located,*" also stating that they believed that the discount rate that would actually be applied by an investor in 2011 would have been "*above 30%*"; they also noted, however, that "*there is no need to choose an exact number to understand that the project would attract no investor even if one accepts the optimistic assumptions on which the SNC-Lavalin reports are based.*"²¹¹⁰ In their second report, Mr. Brailovsky and Prof. Wells maintained that the rate above 30% they had suggested in their first report was "*not outrageous and we have seen very high rates repeatedly in practice and in arbitral decisions, which are applied to projects far less risky than Reko Diq.*" They added, however, that their conclusion did not depend on the application of 30% discount rate but that "[a]t one third of that rate Reko Diq becomes uneconomic."²¹¹¹ Most importantly, Mr. Brailovsky and Prof. Wells did not provide any support for their assertion that a buyer would actually have applied a discount rate of 30% or more to determine the value of the project, other than a reference to Prof. Wells' involvement in negotiations for a gold mining development in an unidentified other country.²¹¹²

1691. In addition, the Tribunal recalls that for the reasons set out in detail above, the calculations made in the Feasibility Study and Expansion Pre-Feasibility Study cannot be set equal to a DCF valuation of the project for the purposes of this arbitration. Mr. Brailovsky and Prof. Wells did not substantiate in their report that the 10% base case discount rate used in the Studies did not reflect what was commonly used in technical studies for projects like Reko Diq. At the Hearing on Quantum, Mr. Luksic confirmed Mr. Sepúlveda's testimony that the 10% base case discount rate used in the Feasibility Study had been approved by Claimant's Board of Directors and by both Antofagasta and Barrick.²¹¹³ He further testified that he considered both 12% and 10% to be a conservative discount rate for a feasibility study and that 8% was "*more traditional*" and "*more what we're normally using,*" whereas 5% could be considered "*aggressive.*"²¹¹⁴

1692. In the specific circumstances of this case and again noting that it is thereby not making a finding on the appropriateness of a 10% discount rate for a traditional DCF valuation of a project located in Pakistan, the Tribunal therefore concludes that the best indication of

²¹¹⁰ Brailovsky/Wells I, ¶¶ 162, 17 and note 22. *See also* ¶¶ 73, 153.

²¹¹¹ Brailovsky/Wells II, ¶ 47.

²¹¹² Cf. Brailovsky/Wells I, ¶ 73.

²¹¹³ Transcript Hearing on Quantum (Day 5), p. 1289 lines 16-22.

²¹¹⁴ Transcript Hearing on Quantum (Day 5), p. 1333 line 14 to p. 1335 line 4.

value to be derived from the updated calculation of the Expansion Pre-Feasibility Study, with all the caveats expressed above, is the value calculated by Prof. Davis in his second report. In the Tribunal's view, this indication of value calculated at approximately USD 3 billion for Claimant's 75% stake in the project, does not contradict the Tribunal's conclusion reached on the basis of Prof. Davis' modern DCF valuation model, *i.e.*, that the value of Claimant's investment amounts to USD 4,087 million.

1693. In the Tribunal's view, the remaining difference between the valuation and the indication of value yielded by the updated calculation is explained by the considerations set out in detail above, in particular that the calculation in the Expansion Pre-Feasibility Study was not intended to capture the value of the project as reflected in the cash flows to be generated over the life of the mine. This difference therefore does not warrant a different conclusion regarding the value of Claimant's investment.

b. Verification of the Tribunal's Conclusion Taking Into Account the Past-Transaction-Based Valuation Performed by Dr. Burrows

1694. The Tribunal will now turn to the valuation performed by Dr. Burrows, which was based on the past transactions by which Antofagasta and Barrick acquired Claimant in 2006. In his first report, Dr. Burrows explained his approach to assessing the fair market value of the project as follows:

*"In the context of the circumstances of that project as of the Valuation Date, fair market value is best assessed based on past transactions, adjusted by several factors occurring between those transactions and the Valuation Date. These factors include changes in world metals markets and country risk, as well as any subsequent efficient, proven investments that might have been taken into account by a hypothetical buyer of the asset on the Valuation Date."*²¹¹⁵

1695. Noting that Prof. Davis had identified eight transactions involving mineral assets but concluded that these were not comparable to Reko Diq, Dr. Burrows considered that Prof. Davis had failed to consider *"an arm's-length transaction for a property that is much more comparable to Reko Diq than the eight properties he examined: the September 22, 2006 acquisition by Barrick of 50% of TCC for an amount consistent with a value for TCC of \$246 million."*²¹¹⁶ He further explained:

"To use this transaction as a basis to calculate the fair market value of TCC's interest in Reko Diq on the Valuation Date, I adjust the September 2006 enterprise value for changes in the following factors between September 2006 and the Valuation Date: (a) changes in expectations about metals prices, (b) inflation in costs of production in the world mining industry, (c) changes in

²¹¹⁵ Burrows I, ¶ 3.

²¹¹⁶ Burrows I, ¶¶ 8, 23.

the general cost of capital for metals mines, and (d) changes in Pakistan country risk. I also consider expenditures by TCC subsequent to September 2006 and changes in expected capital expenditures and operating costs.

The first three factors (changes in expectations of copper and gold prices, general inflation in mining costs, and changes in the general cost of capital for copper and gold mining) are factors that are common to all copper and gold projects. I therefore adjust for the effects of these factors by escalating the September 2006 transaction value using published indices of share prices of copper and gold mining companies. I then adjust for the increase in country risk between 2006 and 2011.”²¹¹⁷

1696. On that basis, Dr. Burrows accounted for an average increase in value of 78% for gold mining companies and 107% for copper mining companies, resulting in a weighted average increase of 104%. He then made an adjustment for “*the effect of higher country risk,*” which he determined on the basis of Pakistan’s sovereign yield spread. Noting that the sovereign yield spread increased from 2.5% in September 2006 to 12.1% in November 2011, he determined that the cost of capital for Reko Diq had increased from 14.5% in 2006 to 24.2% in 2011 and that the present value of cash flows had therefore declined by 70% due to the increased country risk. He emphasized that the 24.2% estimate “*is not an estimate of the cost of capital as of November 2011; rather, it reflects the 2006 cost of capital adjusted for changes in country risk.*” According to Dr. Burrows, these adjustments resulted in an adjusted transaction value on the valuation date of USD 150.4 million.²¹¹⁸

1697. Dr. Burrows further noted that Claimant had incurred expenditures in the amount of USD 219 million after the transaction date but saw “*no basis for adding value to the adjusted transaction value of \$150.4 million*”:

“To the extent that these expenditures were proven, efficient, and relevant to the development of Reko Diq, they might add value to a potential purchaser on the Valuation Date. However, I understand that many of these expenditures were not productive or efficient and that many costs were incurred for purposes not related to the development of the property that is the subject of this dispute. Costs that were unproductive and inefficient, and costs related to other assets than EL-5, would not add value to the value of TCC’s interest in EL-5. As noted in footnote 30, the expected metals production did not increase between 2006 and 2011. Furthermore even costs that were productive, efficient, and related to the assets that are subject to this dispute would probably not be valued dollar for dollar by a prospective buyer, as the buyer would probably wish to invest development expenditures to satisfy its own standards and approaches for developing a mineral deposit. As the Claimant has provided little detail on the expenditures between 2006

²¹¹⁷ Burrows I, ¶¶ 24-25.

²¹¹⁸ Burrows I, ¶¶ 26, 28-30 and note 34.

*and 2011, I have no basis for adding any value to the adjusted transaction value of \$150.4 million for TCC's interest in EL-5.”*²¹¹⁹

1698. Specifically with regard to his assumption that “*the expected metals production did not increase between 2006 and 2011,*” Dr. Burrows considered it “*reasonable to believe that, when [the buyers of TCC which were two of the world’s largest mining companies] entered that acquisition in 2006, they had a good understanding of the total resource base.*” In terms of documentary evidence, Dr. Burrows referred to a news article on the acquisition by Antofagasta as well as “[a] *spreadsheet apparently prepared by Antofagasta or its advisors on February 16, 2006*” and compared the expected total recoverable copper and gold in that spreadsheet with the projected total recoverable copper and gold in the Financial Asset Model of the Expansion Pre-Feasibility Study.²¹²⁰

1699. Prof. Davis commented on Dr. Burrows’ approach in his second report, considering the calculation “*futile, because the asset in that one trade, Reko Diq in 2006, is fundamentally different from Reko Diq in 2011.*” In his opinion, “*critical knowledge had been gained about the asset between 2006 and 2011 that fundamentally changed its value.*” Prof. Davis noted that his own screening algorithm for comparable transactions had “*rejected the transaction as not useful*” because Reko Diq had then not been in the feasibility or pre-production stage but was classified as in the earlier “*Reserves Development*” stage.²¹²¹ In his opinion, “*Reko Diq in 2006 is not reasonably similar to Reko Diq on the Valuation Date, and no adjustment or set of adjustments is possible to account reliably for the full scope of differences.*”²¹²²

1700. According to Prof. Davis, a “*key criterion for comparability*” is the development stage of the project. He noted that Reko Diq went from a Mineral Resource Property in 2006 to a Development Property in 2011, which had “*completed a successful bankable feasibility study, had more certainty in the resource estimate, and was being heralded as a world-class asset.*”²¹²³ Prof. Davis added:

“Between 2006 and 2011, Reko Diq went up the mine value curve. By 2011, four technical studies had been completed, at a cost of over \$125 million and totaling thousands of pages, and managing to get the project past the feasibility study stage. According to Enders and Leveille, respected geologists in the mining industry, there is only a 20% chance that a project at the scoping study stage will get to the feasibility study stage due to technical and economic risks. The market value of Reko Diq in early 2006 would reflect a discount for the low probability of getting to a successful scoping study, let

²¹¹⁹ Burrows I, ¶ 31.

²¹²⁰ Burrows I, note 30; **Exhibits CRA-10, CRA-11 and CRA-12B.**

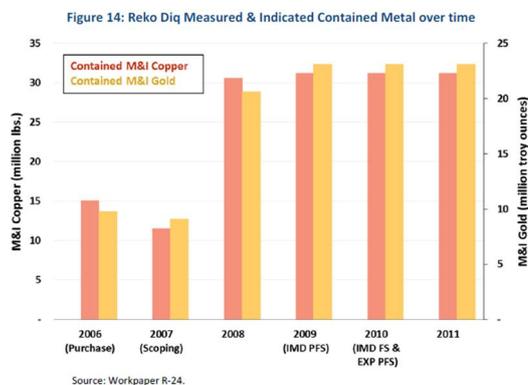
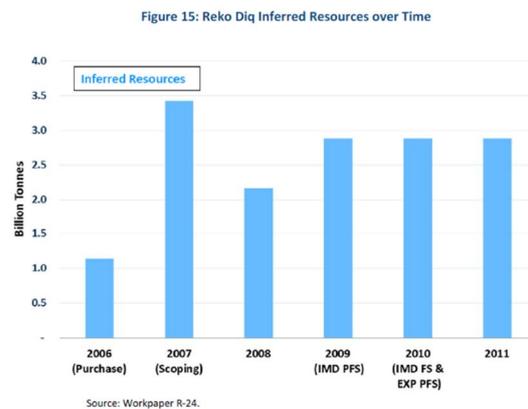
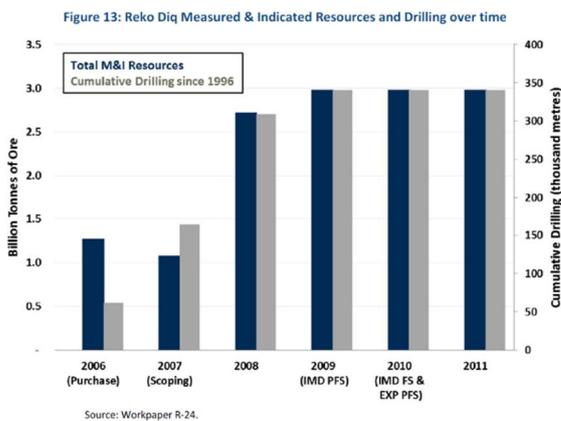
²¹²¹ Davis II, ¶ 237 and note 318.

²¹²² Davis II, ¶ 241.

²¹²³ Davis II, ¶¶ 242-244.

*alone to feasibility (and later into production). However, once that stage is achieved, that discount is removed. Thus, Reko Diq in 2006 is fundamentally different from Reko Diq in 2011.*²¹²⁴

1701. Prof. Davis considered that the amount of resources and reserves also constituted a fundamental difference. He stated that while the project had had indicated resources and a large amount of inferred resources in 2006, the additional drilling conducted after 2006, which amounted to 80% of the cumulative drilling, “*both found additional Resources and provided additional confidence in the existing Resource such that the Inferred Resources could be transformed into Measured and Indicated Resources.*”²¹²⁵ Prof. Davis illustrated the increases in both categories of resources as well as the increase in measured & indicated contained metal as follows:²¹²⁶



1702. Noting that “*Measured and Indicated Resources more than doubled between the 2006 purchase date and 2011*” and that “[t]he Inferred Resources and Mineral Inventory as of 2011 could, if proved up, extend the mine life by nearly 50%,” Prof. Davis expressed the opinion that “[t]his difference in resources and classification makes Reko Diq in 2011 fundamentally different from Reko Diq in 2006.”²¹²⁷

²¹²⁴ Davis II, ¶ 245.

²¹²⁵ Davis II, ¶¶ 246-248.

²¹²⁶ Davis II, Figures 13, 14 and 15; Workpaper R-24.

²¹²⁷ Davis II, ¶¶ 247-248.

1703. On that basis, Prof. Davis rejected Dr. Burrows' statement that "*the expected metals production did not increase between 2006 and 2011*" and expressed the opinion that the comparison he had drawn between the 2006 spreadsheet, which he described as "*prepared by Antofagasta,*" and the Expansion Pre-Feasibility Study was "*inappropriate because the 2006 spreadsheet includes all resources, including Inferred, known at the time, while the EXP PFS values cited by Dr. Burrows only include Measured and Indicated resources.*" He added that "[a] *fair, like-to-like comparison of Reko Diq's 2011 resource base with the 2006 Antofagasta spreadsheet would include the Inferred resources as of 2011. Such a comparison implies a 2.4x increase in the size of the total resource between 2006 and 2011.*" Prof. Davis therefore maintained his opinion that "[t]he *increased size and confidence level in Reko Diq's resource base by 2011 makes the property incomparable with itself in 2006.*"²¹²⁸

1704. Prof. Davis identified several additional reasons why he considered the 2011 project to be "*fundamentally different*" from the 2006 project. These reasons included, *inter alia*: (i) the project's stripping ratio which was "*far superior to the industry average*" but had not been known in 2006; (ii) economies of scale which would have lowered the project's costs of production but which had not been known in 2006 when the rate of economic production was still unclear; and (iii) the specific location of Reko Diq the risks of which would not be reflected in the sovereign yield spread which instead reflected other developments such as the government's debt and severe flooding in 2010 and 2011.²¹²⁹

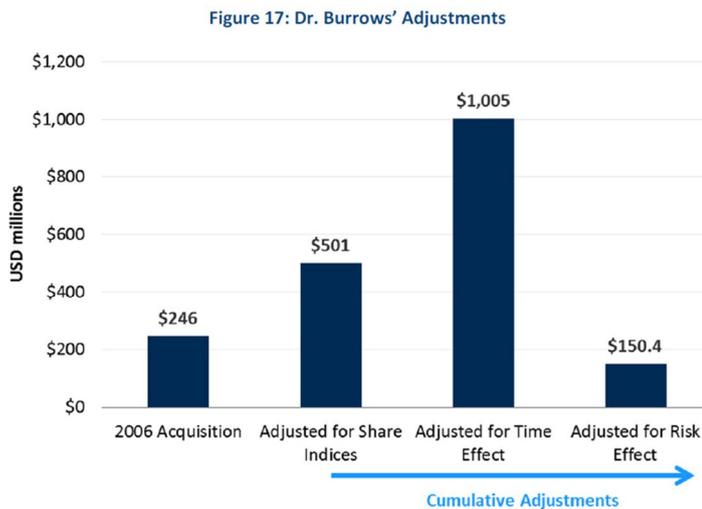
1705. Prof. Davis further considered that the magnitude of the "*large and subjective adjustments to the deal value*" made by Dr. Burrows "*is evidence in itself that Reko Diq in 2006 is not comparable and that therefore the method cannot be applied reliably,*" as "*each of Dr. Burrows' adjustments, which range from twice to almost four times the original transaction value, overwhelms whatever signal of value the transaction reflected.*"²¹³⁰ Prof. Davis illustrated the magnitude of Dr. Burrows' adjustments as follows:²¹³¹

²¹²⁸ Davis II, ¶ 250.

²¹²⁹ Davis II, ¶¶ 251-261.

²¹³⁰ Davis II, ¶¶ 263, 265.

²¹³¹ Davis II, Figure 17 and Workpaper R-28.



Source: Burrows Report, Appendix 5.

Note: Intermediate adjustments for time and risk effect calculated by Davis. See Workpaper R-28.

1706. Prof. Davis also criticized these adjustments as “*flawed.*” Specifically, he considered that Dr. Burrows’ use of two mining indices to adjust for the value impact of market factors between 2006 and 2011 was “*in theory reasonable, though in practice imprecise*” as it would have been applied to “*any copper gold project with the same copper-gold ratio in any country, at any stage, underground or open pit, high grade or low grade, high cost or low cost, remote or accessible, arctic or desert, heavily taxed or lightly taxed, and so on.*” Prof. Davis further expressed the opinion that “[t]here is no reason to believe that the average share price change of the companies in the sample, and what it implies about the change in their project values, applies to a Resource stage project like Reko Diq.”²¹³² Prof. Davis also pointed to an adjustment made by Dr. Burrows to account for time effects by advancing the weighted average timing of cash flows by 5.2 years and noted that each of these two adjustments had more than doubled the value, which confirmed in his opinion that the 2006 comparison could not be considered a valid comparison trade.²¹³³

1707. In particular, however, Prof. Davis criticized the adjustment for country risk that Dr. Burrows made on the basis of Pakistan’s sovereign yield spread and “[w]ithout taking into account any specifics of the Project,” which lowered the value of Reko Diq by 85%. Apart from his disagreement with the use of the sovereign yield spread to determine the country risk premium to be added to the cost of capital, Prof. Davis argued in particular that Dr. Burrows failed to account for the fact that certain country risks would already be reflected in the indices of mining companies and ignored that the “*extreme value*

²¹³² Davis II, ¶¶ 266-271.

²¹³³ Davis II, ¶¶ 273-274.

discount” of 85% was not supported by the performance of Pakistani oil and gas companies which indicated only a decrease in value of up to 20%.²¹³⁴

1708. In addition to his criticisms of the adjustments that Dr. Burrow had made, Prof. Davis expressed the opinion that “*Dr. Burrows ignores all of these project-specific effects and does not make any adjustment for the improvements to the asset that TCC made in the five years since it was acquired by Barrick and Antofagasta, despite calculating that TCC spent \$219 million in exploration, evaluation, and development expenditures between July 1, 2006 and December 31, 2011.*” In particular, Prof. Davis referred to the absence of adjustments for stage of development and reserves and concluded that “[n]ot making adjustments for these factors leaves Dr. Burrows’ analysis incomplete and unreliable.”²¹³⁵

1709. In his second report, Dr. Burrows maintained his analysis and conclusion. He emphasized that his analysis was not based on an assessment of comparable properties but rather a transaction involving Reko Diq itself and expressed the opinion that “[m]ost of the factors that vary across mineral properties do not vary significantly for Reko Diq itself between the two dates. For those that do vary (such as metals prices, mining industry costs, general costs of capital, local country risk, incremental investments in the property, and time to production), I adjust for the variations.”²¹³⁶

1710. With regard to the criteria listed by Prof. Davis as not or insufficiently accounted for in the adjustments, Dr. Burrows reiterated that “*the parties involved in the transaction were not naïve and uninformed.*” In his opinion, “*Professor Davis would have the reader conclude that in such a highly contested transaction, the buyers would have hoodwinked the sellers (who would be likely to know much more about the property than the buyers) by paying \$246 million when according to Professor Davis it was actually worth over \$8 billion dollars (after a further expenditure of just several hundred million dollars).*”²¹³⁷

1711. Dr. Burrows maintained that he had relied on common sense as well as on a document prepared by Antofagasta which “*demonstrate[d] that the parties at the time of the transaction had a very accurate understanding of the resource base of Reko Diq and of the costs of extracting and recovering the metals.*” He noted that the information used as a basis for this document could only have come from the seller and eliminated the need to speculate about what was known by the transacting parties in 2006. According to Dr. Burrows, the additional development work conducted until 2011 even “*resulted in negative surprises about metals production and costs between 2006 and 2011*” as the total

²¹³⁴ Davis II, ¶¶ 276-283.

²¹³⁵ Davis II, ¶¶ 285-289.

²¹³⁶ Burrows II, ¶ 8.

²¹³⁷ Burrows II, ¶ 9.

amount of ore milled (both copper and gold) decreased whereas initial and sustaining capital expenditures as well as operating expenditures increased.²¹³⁸ Dr. Burrows did not dispute Prof. Davis' statement that the Expansion Pre-Feasibility Study included only Measured and Indicated Resources but argued:

*“The key facts are that the 2006 document represented the buyer’s projection of production and costs at that time and the 2010 technical study also represented the projections of production and costs at that time. The two production projections are nearly the same. Any additional resources delineated as of 2010 that were not represented in the production projections were obviously not in the future production plans.”*²¹³⁹

1712. As for Prof. Davis' distinction between the development stages of a Mineral Resource Property and a Development Property, Dr. Burrows considered this to be “a semantic distinction without a difference.” In his opinion:

*“The relevant factor is that the buyers in 2006 made a projection of production that was very similar to their projection four years later, and based an acquisition decision on that projection. It is clear from the contemporaneous valuation document that the buyers did not apply a discount for any semantic distinction about stage of production. The information available at the time to the transacting parties on Reko Diq was sufficient to provide a highly accurate projection of its production potential.”*²¹⁴⁰

1713. Dr. Burrows considered that the transacting parties had been “well aware of the scale of the resource in 2006” and projected a mine life of 45 years with approximately the same life-of-mine production as the 2010 Base Case with a 55-year mine life, thus contemplating an even larger mine with similar scale benefits. He also noted that contrary to Prof. Davis' suggestions, the 2006 spreadsheet did include an estimate of operating costs and maintained that “the projected costs of production increased dramatically between 2006 and 2011.” Dr. Burrows also addressed Prof. Davis' further criticisms and maintained that these adjustments were either insignificant or would have led to a downward adjustment in his calculation.²¹⁴¹

1714. Specifically, with regard to Prof. Davis' argument that he failed to account for the increased geologic certainty and more advanced stage of the project, Dr. Burrows argued:

“Professor Davis seems to be confusing changes in value from expenditures that are needed to develop the mine, changes in expected production and costs, and the appropriate discount rate for valuing the expected future cash flow stream. A mine increases in value over time as expenditures are made

²¹³⁸ Burrows II, ¶¶ 10-12 and Appendix 8.

²¹³⁹ Burrows II, ¶ 13.

²¹⁴⁰ Burrows II, ¶ 15.

²¹⁴¹ Burrows II, ¶¶ 17-22.

*on exploration, drilling, feasibility studies and mine plans (i.e., as sunk costs at the time of valuation increase and remaining development costs decline), as expected production increases or costs decline as a result of additional discoveries over time, and as the time remaining until production commences declines. I have accounted for all of these effects.”*²¹⁴²

1715. Specifically, Dr. Burrows stated that: (i) he had found that expected production did not increase between 2006 and 2011 as a result of which no adjustment was necessary in that regard; (ii) he had made an upward adjustment to account for the reduction in time to construction; (iii) he had considered the value of expenditures incurred by Claimant but found that there was not sufficient detail to determine the amount spent on Reko Diq and, relying on Respondent’s expert Prof. Dagdelen, that “*much of the expenditures were redundant or ineffective*” as a result of which he was “*unable to attribute any increased value to the project as a result of investments made after the 2006 transaction date.*” Noting that Antofagasta had expected in 2006 to spend USD 75 million during the development period, Dr. Burrows added that “*a maximum estimate of any increment in value between 2006 and 2011 as a result of further investments made to advance the project is \$75 million, the estimate Antofagasta, an experienced mining company, made at the time of the transaction.*”²¹⁴³

1716. According to Dr. Burrows, “[t]he resolution of geologic uncertainty can only have an impact on value if it changes the expectation of the mine’s cash flows.” Depending on the expectation of the parties before technical studies are conducted and the impact of subsequent development work on these initial expectations, these studies could “*increase, decrease or have no effect on value.*” Dr. Burrows argues that “*ex post values change because in the process of reducing uncertainty the expected values change*” but not because of the reduction of uncertainty itself. He considered:

*“The original ex ante expectation was a statistical expectation, or average, of possible outcomes. There is no need to discount this ex ante value for idiosyncratic technical risks. This is because technical uncertainty is a diversifiable risk and therefore investors do not take such risks into account in valuing the project. With respect to the Reko Diq project, between 2006 and 2010 expected metals production declined and expected capital and operating costs increased. The resolution of technical uncertainty during this period resulted in a reduction in value ex post.”*²¹⁴⁴

1717. Dr. Burrows further rejected Prof. Davis’ characterization of his adjustments as “*subjective,*” arguing that they were based on “*objective, appropriate, and transparent data.*” As for the use of mining indices, Dr. Burrows agreed that “*there is some imprecision in the adjustment*” but did not consider this to be significant as there was “*no*

²¹⁴² Burrows II, ¶ 24.

²¹⁴³ Burrows II, ¶¶ 23-27.

²¹⁴⁴ Burrows II, ¶ 29.

reason to believe that Reko Diq is so different from other copper-gold mining projects that the effects of changes in these underlying factors would be significantly different for Reko Diq than for the average of other companies” and the effects cited by Prof. Davis were either “trivial” or “immaterial” or would only result in a downward adjustment of Reko Diq’s value.²¹⁴⁵ Dr. Burrows further rejected the suggestion that his approach was double-counting country risk, noting that “a large proportion of mining asset values is in low-risk countries” and it was “unlikely that the change in aggregate country risk in the indices is related with the change in the Pakistan country risk.”²¹⁴⁶

1718. Dr. Burrows also rejected Prof. Davis’ assertion that he had not made adjustments specific to Reko Diq and pointed to his adjustments for reduced production development time until construction and for the increased country risk in Pakistan.²¹⁴⁷ Dr. Burrows maintained that the latter adjustment was appropriate, as the oil and gas companies in Pakistan referred to by Prof. Davis were either government controlled or Pakistani controlled, which rendered them “irrelevant,” and these companies had all been producing oil and gas between 2006 and 2011, which meant that they had a different exposure to country risk than the pre-production project Reko Diq.²¹⁴⁸

1719. Dr. Burrows argued that his approach to measuring country risk based on the sovereign spread was commonly used by practitioners and that such a method would also have been used by “most if not all potential buyers (and bankers) of a project such as Reko Diq.”²¹⁴⁹ He also rejected the argument that Pakistan’ sovereign yield spread had increased between 2006 and 2011 for reasons unrelated to risks affecting private investments and maintained that it was an adequate measure for country risk affecting the Reko Diq project because “(i) there is significant agreement by researchers and practitioners that private risks are correlated with sovereign spreads, and (ii) though there may be disagreement as to whether the appropriate level of such risks is higher or lower than the sovereign spread, it is reasonable to use the sovereign spread itself both as a compromise across such disagreements and to reflect methods used by practitioners and that are highly likely to be used by potential buyers of the project.”²¹⁵⁰

1720. As a final point, Dr. Burrows noted that while he had assumed in his first report that as of 2011, the project was five years closer to production than in 2006, the time period modeled by Prof. Davis in his modern valuation model indicated that “the project was only about one year closer to production than as of the 2006 transaction date.” Dr.

²¹⁴⁵ Burrows II, ¶¶ 30-35, 39-41.

²¹⁴⁶ Burrows II, ¶ 36.

²¹⁴⁷ Burrows II, ¶ 38.

²¹⁴⁸ Burrows II, ¶¶ 42-43.

²¹⁴⁹ Burrows II, ¶¶ 49-50.

²¹⁵⁰ Burrows II, ¶¶ 59-60.

Burrows therefore revised his estimate of the 2011 adjusted value to USD 61.2 million. Further assuming that the amount of USD 75 million that Antofagasta expected to spend on the development of the project (USD 88 million in 2011 dollars) had in fact been spent as of the valuation date, he concluded that the maximum estimate of the value of the project as of the valuation date amounted to USD 149.2 million.²¹⁵¹

1721. The Tribunal has taken note of the fact that the value calculated by Dr. Burrows is significantly lower than the value yielded by Prof. Davis' modern DCF valuation model, even after making all of the additional deductions made by the Tribunal in its detailed assessment above. Prof. Davis has not presented an alternative figure for Dr. Burrows' market-based approach that would reflect the adjustments he would have considered more appropriate; he rather argued that the project in 2006 cannot reasonably be compared to the project in 2011. At the Hearing on Quantum, he summarized the reasons for his opinion as follows:

“Dr. Burrows used the Reko Diq trade in 2006 as being comparable to the Reko Diq Fair Market Valuation in 2011. In my view, they were different assets. In 2006 it was pre-scoping. It did have a resource base, but it had not had one technical study completed. By 2011, it had several technical studies completed. It had a Mining Lease. It had a Mine Plan. And it had had 290 kilometers of additional drilling that had identified where the resource body was, where the high-grade and low-grade zones were, what the mining pits should look like, where the plant should be located so as not to cover any of the viable mineralization. There was sampling for the pilot plant and testing. An awful lot had happened to de-risk the Project, as we say, in the industry, and bring it to a development property from a mineral resource property. And that de-risking adds substantial value to a property.

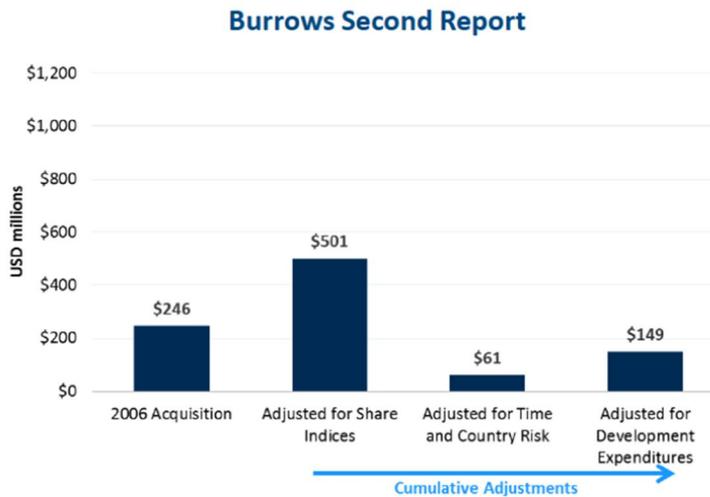
Incidentally, while that de-risking was happening, the amount of Measured and Indicated copper and gold virtually doubled, on the left-hand side, and the Inferred Resources more than doubled, on the right-hand side. So, the scope of the Project grew. Dr. Burrows does not include in his analysis any of that project advancing other than in ... his second approach, where he attributes USD75 million roughly to the incremental value from that drilling or from that advancement.”²¹⁵²

1722. Prof. Davis considered his opinion regarding the differences in market circumstances confirmed by the magnitude of the adjustments made by Dr. Burrows, in particular by his adjustment for country risk which Dr. Burrows determined based on an approach with which Prof. Davis disagreed. Prof. Davis illustrated the revised adjustments made in Dr. Burrows' second report as follows:²¹⁵³

²¹⁵¹ Burrows II, ¶¶ 70-72.

²¹⁵² Transcript Hearing on Quantum (Day 8), p. 2363 line 20 to p. 2365 line 9.

²¹⁵³ Davis Presentation, p. 50.



1723. In addition to the adjustments that Dr. Burrows had made, the second major point of disagreement between the Parties' experts concerned the adjustments he had not made, in particular the question whether Dr. Burrows should have accounted for an increase in value created by the additional exploration work and studies carried out after the 2006 transaction as a result of which the project went from the development stage of a Mineral Resource Property to a Development Property.

1724. The Tribunal is aware that there are several additional points of disagreement between the experts regarding allegedly lacking or incorrect adjustments. However, the Tribunal considers that if it reaches the conclusion that Dr. Burrows should have accounted for an increase in value created between 2006 and 2011 and there is therefore a reasonable explanation for the deviation between the results yielded by both approaches, it is not necessary to examine the additional points of disagreement in further detail.

1725. In the Tribunal's view, Dr. Burrows' approach to value the project based on a past transaction involving the very same project might generally appear plausible. It is undisputed, however, that the transaction occurred more than five years before the valuation date and that during this time period, considerable changes affecting the value of the project occurred. Apart from undisputed developments with regard to market prices and costs as well as the disputed factor of country risk, Claimant carried out a significant amount of exploration work. As the Tribunal has already set out in detail in its Decision on Jurisdiction and Liability, Claimant expanded the scope of its exploration program following the acquisition by Antofagasta from Tanjeel to other ore deposits within Reko Diq, in particular the orebodies at the Western Porphyries.²¹⁵⁴

1726. Based on the results of its drilling programs, Claimant also continuously revised its estimates of the mineral resources contained in these orebodies. The Decision on

²¹⁵⁴ Cf. Decision on Jurisdiction and Liability, ¶¶ 350 *et seq.*

Jurisdiction and Liability explicitly records the following developments: (i) in a meeting of the Operating Committee held on 11 February 2006, Claimant stated that “*the drilling program had now demonstrated the world class potential of the Reko Diq caldera with a global resource of over 2 billion tonnes*”;²¹⁵⁵ (ii) at the OC meeting held on 15 July 2006, Claimant reported that the total indicated and inferred resources at all of the examined orebodies were estimated at “*2.42 billion tonnes @ 0.51% copper and 0.27g/t gold*”;²¹⁵⁶ (iii) in its Quarterly Report for the period ended 31 December 2006, Claimant reported that the indicated and inferred mineral resources at the Western Porphyries (*i.e.*, excluding the other ore deposits included in the other estimates), currently stood at “*1.61 billion tonnes @ 0.54% copper and 0.30g/t gold*”;²¹⁵⁷ and (iv) following additional exploration work and completion of the Pre-Feasibility Study for Initial Mine Development in July 2009, Claimant reported in the Pre-Feasibility Study that the total amount of measured, indicated and inferred resources at all of the examined ore deposits amounted to a grand total of 4.701 billion tonnes @ 0.48% copper and 0.28g/t gold as of May 2009.²¹⁵⁸ The Tribunal specifically noted that this represented a nearly 100% increase over the mineral resource estimate that Claimant had produced in early 2006.²¹⁵⁹

1727. As noted above, an essential point in Dr. Burrows’ argument as to why he considered it appropriate not to make any adjustment for the additional exploration work carried out by Claimant after the 2006 transaction was that in his opinion, reducing geologic uncertainty did not produce value in itself but only if it resulted in an increase in the expected production of copper and/or gold, thereby increasing the expected cash flows. However, relying on a comparison between the production projected in a spreadsheet prepared shortly before the acquisition of Claimant by Antofagasta in February 2006 and the production projected in the Expansion Pre-Feasibility Study, he concluded that the amount of recoverable copper and gold had not increased but in fact even decreased between 2006 and 2011 and that production projections were nearly the same while production costs increased. At the Hearing on Quantum, Dr. Burrows illustrated this comparison in the following table:²¹⁶⁰

²¹⁵⁵ **Exhibit CE-55**, p. 3. *See* Decision on Jurisdiction and Liability, ¶ 343.

²¹⁵⁶ **Exhibit CE-58**, p. 12. *See* Decision on Jurisdiction and Liability, ¶ 357.

²¹⁵⁷ **Exhibit CE-209**, p. 12. *See* Decision on Jurisdiction and Liability, ¶ 365.

²¹⁵⁸ **Exhibit CE-74**, Table 8.3.

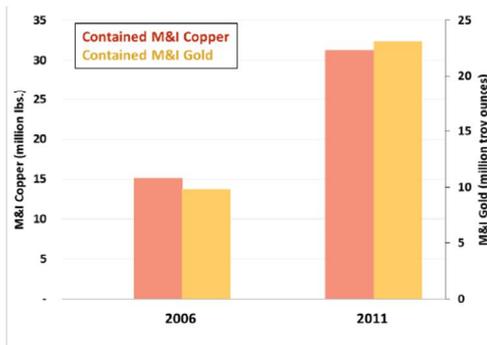
²¹⁵⁹ Decision on Jurisdiction and Liability, ¶ 390.

²¹⁶⁰ Burrows Presentation, p. 5.

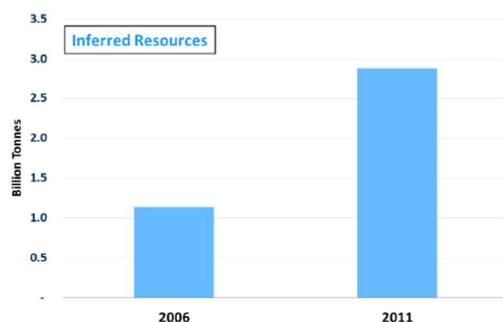
	16-Feb-06 Projections	2011 Base Case Study	2011 Expansion Case Study
Mine Startup	1-Jan-13	15-Nov-17	15-Nov-17
Mine Life (Years)	45	56	35
Projected Ore Milled - LOM (Million Tonnes)	2,340	2,219	2,523
Projected Copper Production - LOM (Million Tonnes)	11.9	10.3	11.4
Projected Gold Production - LOM (Million Troy Oz.)	18.7	13.6	14.7
Expected Initial Capex (2011 \$US billion)	\$1.8	\$3.9	\$3.9
Expected Expansion Capex (2011 \$US billion)			\$2.6
Expected Sustaining Capex (2011 \$US billion)	\$1.8	\$2.7	\$2.4
Expected Total Capex (2011 \$US billion)	\$3.7	\$6.6	\$9.0
Expected Cash Cost (2011 \$US/lb Cu Equivalent)	\$0.96	\$1.20	\$1.17
Projected Cash Cost Less By-product Gold (2011 \$US/lb Cu)	-\$0.16	\$0.46	\$0.43

1728. Prof. Davis, on the other hand, pointed out that the projection of the Expansion Pre-Feasibility Study included only measured and indicated resources whereas the 2006 spreadsheet had largely consisted of inferred resources. He pointed out that, as the Tribunal already noted in its Decision on Jurisdiction and Liability, the amounts of measured / indicated resources and inferred resources increased between 2006 and 2011, which he illustrated in a direct comparison at the Hearing on Quantum:²¹⁶¹

Measured and Indicated Resources more than doubled



Although some of the Inferred Resources were upgraded to Reserves, new Inferred Resources were added to the resource base



1729. During his examination at the Hearing on Quantum, Dr. Burrows was pointed to an interview he had given in 2014 on the role of economics in disputes involving mining operations in which he had stated with regard to the valuation of mineral properties:

“Mineral properties vary enormously by factors such as the nature of the resource base, including depth, type of mineralization, hard rock vs. soft rock, and ore, grade and presence of contaminants. Other factors affecting mineral properties include operating costs, stage of development such as early

²¹⁶¹ Davis Presentation, p. 49.

exploration vs. partially-developed projects, amount of proven and probable reserves and measures, indicated and inferred resources, type of mining and processing technology, tax environments and remaining concession lives.”²¹⁶²

1730. Dr. Burrows testified that the factors he had listed in the interview were “*not significantly*” different for Reko Diq between 2006 and 2011.²¹⁶³ Specifically with regard to the amount of measured and indicated resources, his testimony was as follows:

“Q. ... Now, am I right that the amount of Measured and Indicated Resources and the amount of Inferred Resources doubled from 2006 to 2011?”

A. In terms of what they reported, the issue is what did they know was there? And here, if you're just looking--if you're just doing a paper study and you're comparing two projects and all you have is what was reported, it would look different. But here we know from facts and circumstances that the Parties had a good grasp at what was there in 2006, that there was no real change.

Q. Sorry; but you accept in your article where you're giving an interview--you say the amount of Reserves and Resources matters to comparability; right?”

A. It's one of the things being looked at, and I just explained why in this case it's not relevant. The expected size of the project didn't change.

Q. So, if--so, in your view, it wasn't--it's not a relevant distinction that at the time of the 2006 transaction, it only had, let's say, half of the Measured and Indicated Resources that it had then in 2011?”

That's not relevant?”

A. What would be relevant is if the knowledge of what was there changed significantly between 2006 and 2011. What you're talking about is what they were able to report, not what they expected.”²¹⁶⁴

1731. When asked about the importance of “*the level of confidence that you have into what you know*” in the mining industry, Dr. Burrows expressed the opinion that it was “*an example of a nonsystematic risk which isn't priced in the financial markets.*” He did not dispute that level of confidence was one of the characteristics that moved a project from one development stage to the other but noted that “*the other thing that is going to have to moved from one stage to another is you spent money*” for which he had accounted in his calculation. He maintained that the level of confidence “*actually doesn't improve the economic value unless it changes the expected value.*”²¹⁶⁵ Dr. Burrows acknowledged that this sounded rather circular but confirmed:

²¹⁶² Exhibit CE-1439, p. 5.

²¹⁶³ Transcript Hearing (Day 9), p. 2812 lines 9-11.

²¹⁶⁴ Transcript Hearing (Day 9), p. 2813 line 7 to p. 2814 line 12.

²¹⁶⁵ Transcript Hearing (Day 9), p. 2814 line 13 to p. 2815 line 19.

“Q. ... [A]re you really testifying that moving the property from Mineral Resource stage with a certain amount of Inferred Resources to a Development Stage property with twice the amount of Measured and Indicated Resources and twice the amount of Inferred Resources added no value worthy of an adjustment in your approach?”

A. I believe because of the facts and circumstances of this deposit, there was a value increase. I measured it at USD 88 million. But just simply changing the words on how you describe it didn't add value because the Parties ... didn't change their expectations about the output between those two dates.”²¹⁶⁶

1732. Dr. Burrows confirmed that his opinion regarding the knowledge and understanding of the resource base that Antofagasta had at the time it acquired Claimant was based on a spreadsheet prepared in February 2006. He clarified with regard to the origin of the spreadsheet that in his first report he had not been aware of the source of the spreadsheet, which had been *“handed over as part of a set of documents that were represented by Antofagasta’s documents showing how they valued the property.”* After Prof. Davis had referred to it as an Antofagasta document in his second report, he had assumed this to be correct. Dr. Burrows added that *“[w]e have since learned that the document was prepared by an analyst, but that doesn't really change anything, in my mind. Analysts get their information from the company. I was a CEO of a public company for 10 years, so I know how it works. Analysts don't go off and do a whole lot of research on their own.”²¹⁶⁷* Dr. Burrows considered that *“when this analyst got this data, he obviously had somehow got information. How he got it, I don't know, probably somebody in the company told him.”* He denied that this was speculation on his part, rather calling it *“an informed judgment based on my experience with analysts.”* Dr. Burrows confirmed that when he prepared his second report he had been *“under the mistaken impression ... that this was an Antofagasta document”* but maintained: *“If I had known at the time it was an analyst's document, I think I would have reached the same conclusions, because it has very detailed information after 45 years, on a number of factors that the analyst didn't just make up.”²¹⁶⁸* He clarified that he was *“not speculating that the analyst was involved in the purchase. I'm just saying from my experience with analysts' work, they talk to the company. The companies will usually help them a bit, and he was able to produce an analysis. It was remarkably close to what the actual plan was four years later.”²¹⁶⁹*

1733. Based on the explanations provided by Dr. Burrows in his reports and in his oral testimony at the Hearing on Quantum, the Tribunal is not convinced by Dr. Burrows' arguments as to why he considered that no adjustment was warranted to account for the

²¹⁶⁶ Transcript Hearing (Day 9), p. 2815 line 20 to p. 2816 line 20.

²¹⁶⁷ Transcript Hearing (Day 9), p. 2818 line 5 to p. 2821 line 10.

²¹⁶⁸ Transcript Hearing (Day 9), p. 2821 line 16 to p. 2825 line 6.

²¹⁶⁹ Transcript Hearing (Day 9), p. 2826 line 18 to p. 2827 line 2.

increased level of confidence regarding the resource estimates at Reko Diq. Besides the fact that it became clear at the Hearing that the spreadsheet on which Dr. Burrows had relied in making his comparison was not prepared by Antofagasta itself but rather by an analyst who may or may not have received information from Antofagasta beyond the publicly available information at the time, the Tribunal does not consider it plausible that the considerable increase of measured / indicated resources and inferred resources was entirely irrelevant to the valuation of the project. As pointed out by Prof. Davis, the estimates of contained copper and gold increased from 2006 to 2011 as follows:²¹⁷⁰

	2006	2011
Inferred		
Contained Cu (lbs.)	11,517,333,333	22,381,333,333
Contained Au (troy oz.)	10,636,107	15,553,119
Indicated		
Contained Cu (lbs.)	15,1333,333,333	10,757,333,333
Contained Au (troy oz.)	8,774,302	7,388,886
Measured		
Contained Cu (lbs.)	0	20,525,333,333
Contained Au (troy oz.)	0	15,715,966

1734. The Tribunal is not convinced by Dr. Burrows' argument that an increased level of confidence is relevant only if it also increases the amount of projected production. Again besides the uncertainty as to whether the spreadsheet on which Dr. Burrows based his comparison of projected production between 2006 and 2011 indeed reflected internal estimates made by Antofagasta at the time, the Tribunal does not consider it likely that a buyer determining the fair market value of the project in 2011 would not attach any value to an increased level of confidence into the fact that the resource is actually there and that the projected quantities of production are technically and economically feasible. Between 2006 and 2011, Claimant carried out significant amounts of exploration work, completed a Scoping Study, an Initial Mine Development Pre-Feasibility Study, the Initial Mine Development Feasibility Study and the Expansion Pre-Feasibility Study. As reflected in the resource estimates set out above, Claimant thereby managed to achieve a significantly increased level of confidence regarding the resource base at Reko Diq which is reflected particularly in the estimate of measured resources. As pointed out by Claimant, Dr. Burrows himself explained in an article outside this arbitration that the stage of

²¹⁷⁰ Davis II, Workpaper R-24.

development and the amount of measured, indicated and inferred resources are among the factors affecting the value of mineral properties.

1735. The Tribunal is also not convinced by Dr. Burrows' testimony that he fully accounted for the increase in value created by the work carried out by Claimant by adding the amount of projected expenditures to his adjusted transaction value. Besides the fact that the Tribunal is not convinced by the basis for Dr. Burrows' decision to recognize only the amount projected in the 2006 analyst spreadsheet rather than the amount of USD 219 million that Claimant actually spent on its further exploration work, the Tribunal also does not find it plausible that the work carried out by Claimant increased the value of the project only by the amount of (projected) expenditures. Dr. Burrows maintained at the Hearing on Quantum that "[y]ou wouldn't expect to get more than the money you spent on it, unless you made some discovery that wasn't known before"²¹⁷¹ and that Claimant "did work that didn't change the expected value" but only "[r]educed the risk somewhat" which, however, did not add value because it concerned only asymmetric risk.²¹⁷² At the same time, however, Dr. Burrows confirmed that "[t]he property was further advanced between 2006 and 2011" and also agreed that the distinction between mineral resource stage and development stage had some meaningful significance in the mining industry.²¹⁷³ In the Tribunal's view, it is not plausible that this transition would have an impact on value only if "some discovery" is made but not to account for an increased level of confidence that the discovered resources exist and can be economically extracted from the ground. In addition, the Tribunal is also not convinced that even on Dr. Burrows' argument, no such "discovery" was made. As pointed out by Prof. Davis and already noted in the Decision on Jurisdiction and Liability, the amount of inferred, indicated and measured resources nearly doubled between early 2006 and mid-2009. Dr. Burrows' explanation as to why he does not consider this development a value-increasing "discovery" does not convince the Tribunal.

1736. Consequently, the Tribunal believes that Dr. Burrows did not adequately account for the increase in value created by the additional exploration work carried out by Claimant between 2006 and 2009 as well as the pre-feasibility and feasibility studies completed by Claimant in 2009 and 2010. Given that Dr. Burrows has not made any adjustment besides the addition of projected expenditures in this regard, the Tribunal considers that his value estimate cannot serve to help identifying or verifying the fair market value of the project as of the valuation date.

1737. The Tribunal therefore also does not consider it necessary to examine the several additional areas of disagreement between the Parties' experts in further detail. In

²¹⁷¹ Transcript Hearing (Day 9), p. 2775 lines 1-3.

²¹⁷² Transcript Hearing (Day 9), p. 2778 lines 15-19.

²¹⁷³ Transcript Hearing (Day 9), p. 2783 lines 5-12.

particular, the Tribunal does not see the need to make a finding on the appropriateness of the adjustments that Dr. Burrows has made to account for increased prices and costs as well as for country risk. It suffices to note at this point that, as criticized by Prof. Davis, the adjustments made by Dr. Burrows appear to be rather general and detached from any project-specific considerations as they are largely based on mining indices and the sovereign yield spread of Pakistan. Specifically with regard to the latter, the Tribunal has already set out above why it is not convinced that the sovereign yield spread reflects the country-related risks faced by the project in the present circumstances. In the present context, the Tribunal specifically does not consider it established that the sovereign spread reflected the perception of country risk that Claimant's owners included in the purchase price they were willing to pay in 2006 or that the spread's increase reflected an increase in the country risk as perceived by a buyer of the project in 2011. More generally, the Tribunal is not convinced that Dr. Burrows' adjustments, which, beyond the projected start of construction and the project's location in Pakistan, did not take into account any project-specific factors, would result in a more adequate estimate of the project's fair market value than the very project-specific risk adjustments made by Prof. Davis in his modern DCF model.

1738. On that basis, the Tribunal also does not consider it necessary to explore in further detail whether the market-based approach used by Dr. Burrows would have been considered a relevant indication of value by a buyer. The Tribunal only notes that Dr. Burrows confirmed at the Hearing on Quantum that, contrary to what was indicated in his first report, he had been "*instructed to determine the value based on the 2006 transaction*" and was "*not instructed to look at other potential avenues for valuing*" as "*another Expert ... was looking at DCF.*"²¹⁷⁴ He also testified:

Q. ... [A]m I right that, in all those decades you have been consulting with minerals companies, you have never seen them make any major investment decision based on a comparable transaction analysis?

A. I think that's pretty true.

Q. And every major investment decision you have seen a mining company make has been based on Discounted Cash Flow analysis; right?

A. Well, at least the ones I've been involved in that I've seen or that I've seen in my work. I think companies will use comparable numbers to screen acquisitions, but when they get an actual one, they usually use a DCF, if they can.

Q. Well, no. I want to be precise about this, that you have never seen any major investment decision made on the basis of a comparable; right?

A. Except as a confirmation.

²¹⁷⁴ Transcript Hearing (Day 9), p. 2789 lines 8-11 and p. 2796 lines 20-21.

Q. And every single instance will be based on discounted Present Value; right?

A. Usually, yes.

Q. No. Every single instance that you've seen; right?

*A. Yes. Yes.*²¹⁷⁵

1739. While Dr. Burrows testified that he had seen the use of comparable transaction analysis “as a confirmation” of a DCF analysis, his testimony was very clear as to the prevalence of income-based valuation methods in valuing mining projects. In the Tribunal’s view, this confirms its conclusion that the valuation performed by Dr. Burrows, which did not account for any increase in value created by Claimant’s work after 2006, cannot serve to call into question the result reached on the basis of Prof. Davis’ modern DCF valuation model. More specifically, the Tribunal considers that there is a reasonable explanation for the deviation between the values yielded by the two valuations and therefore does not see any basis for revisiting the conclusion it has reached on the value of Claimant’s investment above.

c. Conclusion on the Verification of the Tribunal’s Conclusion on the Value of Claimant’s Investment

1740. In conclusion, the Tribunal finds that the results yielded by the other valuation or evaluation methods relied on by Respondent’s experts or contemporaneously applied by TCCA do not warrant any adjustments to the conclusion that the Tribunal has reached on the basis of Prof. Davis’ modern DCF valuation model above.

1741. As a final point, the Tribunal considers that this result is also in line with generally recognized principles of valuation as referred to in the second sentence of Article 7(2) of the Treaty. The Tribunal found above that it is not required to resort to those principles, which are set out in that sentence as additional criteria for determining the market value of Claimant’s investment, because the value can be “readily ascertained” on the basis of the Prof. Davis’ valuation model. The Tribunal nevertheless decided to take due account of those principles of valuation. Based on all of the considerations set out above, the Tribunal is, in particular, convinced that the compensation awarded to Claimant is also reconcilable with the amount of capital invested by Claimant. As discussed in its assessment of the market-based valuation presented by Dr. Burrows, the Tribunal considers it plausible that by investing an amount of over USD 240 million into the exploration of Reko Diq and by creating a detailed plan on how to economically extract the minerals from the ground, as reflected in the Feasibility Study and the Expansion Pre-Feasibility Study, Claimant has significantly increased the value of the project. The

²¹⁷⁵ Transcript Hearing (Day 9), p. 2837 line 22 to p. 2839 line 1.

Tribunal has not accepted Dr. Burrows' suggestion that the value would increase only by the amount invested. It rather follows the economically sound argument that by increasing the geologic certainty of the resource and, more generally, by decreasing the risks affecting future cash flows that can be obtained from the project, Claimant raised the value of its investment by far more than the amount of capital invested. In the Tribunal's view, this increase of value is captured by Prof. Davis' income-based valuation methodology; it is not captured by Dr. Burrows' backward-looking, market-based approach and it is also not captured by the – equally backward-looking – assessment of the amount of capital invested.

1742. Consequently, the Tribunal maintains its conclusion that for the reasons set out in detail above, the value of Claimant's investment amounts to USD 4,087 million.

G. Pre-award and Post-award Interest

1743. Finally, the Tribunal will address Claimant's request for an award of pre-award and post-award interest on the amount of compensation owed to it by Respondent.

1. Summary of Claimant's Position

1744. Claimant submits that the principle of full reparation requires that it be awarded pre-award and post-award compound interest at Respondent's borrowing cost. Claimant notes that Respondent accepts the necessity to award pre-award and post-award interest and the compensatory function of interest but argues that, while the compensatory function is indeed "*the primary function of interest at international law*," tribunals have a "*wide margin of discretion in awarding interest*" and should also take into account two further functions of interest, *i.e.*, to "*prevent unjust enrichment of the respondent*" and to "*ensure efficiency in the arbitral process*."²¹⁷⁶

1745. In Claimant's view, interest should be calculated at either: (i) Respondent's short-term, unsecured, dollar-denominated borrowing rate, which corresponds to an annualized compound rate of 4% and reflects the market price of Pakistan's default risk that Claimant has borne since the date of Respondent's Treaty breaches and will continue to bear until full payment of the award; or, in the alternative, (ii) "*another conservative rate*" such as the US prime rate plus two percentage points, which corresponds to an annualized compound rate of 5.6% and reflects "*the rate that commercial banks charge to their most*

²¹⁷⁶ Claimant's Quantum Post-Hearing Brief, ¶¶ 508-509; Claimant's Quantum Reply, ¶¶ 379-380, 386-387, referring to Respondent's Counter-Memorial on Quantum, ¶ 435 and quoting from *Yukos Universal Limited (Isle of Man) v. Russian Federation*, PCA Case No. AA 227, Final Award of 18 July 2014 [CA-178], ¶ 1658, and John Y. Gotanda, "Interest," in *International Investment Law* (Bungenberg et al. eds. 2015) [CA-437], p. 1143; Claimant's Quantum Memorial, ¶ 193.

*creditworthy borrowers plus a premium to reflect the fact that not all businesses can borrow at that rate.*²¹⁷⁷

1746. Claimant contends that Respondent misrepresents authorities as “[n]umerous authorities” on which Respondent relies in fact reject a risk-free rate; the tribunals in *Impregilo v. Argentina* and *Victor Pey Casado v. Chile* “adopt rates of 6% and 5% as reasonable.”²¹⁷⁸ By contrast, Claimant considers the risk-free rate proposed by Respondent, which corresponds to an annualized compound rate of 0.3% and is thus considerably lower than the US inflation rate (corresponding to an annualized compound rate of 1.5%), “plainly unreasonable” as it would result in an award worth less on the award date, in real inflation-adjusted terms, than on the valuation date.²¹⁷⁹ In its view, the rate proposed by Respondent is contrary to the principle of full reparation and ignores commercial reality as well as the risks that Claimant was forced to bear; in addition, it would ignore the two additional functions of interest, *i.e.*, the prevention of unjust enrichment and efficiency.²¹⁸⁰

1747. Claimant contends that adopting any rate below Pakistan’s borrowing rate would “create the worst possible incentives in terms of both the conduct of the proceedings and the payment of an eventual award: Pakistan would be incentivized to systematically delay and then to withhold payment.” Claimant reiterates that, in its view, the functions of interest can be fulfilled only if interest is awarded at a rate “at least equal to Pakistan’s borrowing cost.”²¹⁸¹

1748. Claimant also rejects the argument that a final award would not be subject to any risk and maintains that it was forced to bear: (i) during the pre-award period, Pakistan’s default risk and the litigation risk; and (ii) during the post-award period, Pakistan’s default risk. Claimant agrees that it would be “improper to compensate for the litigation risk” but maintains that the rate it has proposed does not incorporate such risk but only reflects the

²¹⁷⁷ Claimant’s Quantum Post-Hearing Brief, ¶¶ 510-512, referring to **Exhibit CE-1785**, p. 1; Claimant’s Quantum Reply, ¶¶ 383, 406-407, referring to Davis II, ¶ 361 and Table 12 and quoting from Marboe, *Calculation of Compensation and Damages in International Investment Law* [CA-368], ¶ 6.83; Claimant’s Quantum Memorial, ¶¶ 196-198.

²¹⁷⁸ Claimant’s Quantum Post-Hearing Brief, ¶ 512, referring to *Victor Pey Casado and Fundación “Presidente Allende” v. Republic of Chile*, ICSID Case No. ARB/98/2, Arbitral Award of 8 May 2008 [CA-32a], ¶ 712 and *Impregilo S.p.A. v. Argentine Republic*, ICSID Case No. ARB/07/17, Award of 21 June 2011 [CA-439], ¶ 383; Claimant’s Quantum Reply, ¶¶ 384, 401, 403, also referring to *S.D. Myers, Inc. v. Government of Canada*, NAFTA, Second Partial Award of 21 October 2002 [RLA-342], ¶ 424; *Tza Yap Shum v. Republic of Peru*, Case No. ARB/07/6, Award of 7 July 2011 [RLA-150], ¶ 290; and *Marion Unglaube and Reinhard Unglaube v. Republic of Costa Rica*, ICSID Case Nos. ARB/08/1 & ARB/09/20, Award of 16 May 2012 [RLA-100], ¶ 319.

²¹⁷⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 513, referring to **Exhibit CE-1785**, p. 1; Claimant’s Quantum Reply, ¶¶ 382, 389, 402 referring to Davis II, ¶ 361 and Table 12.

²¹⁸⁰ Claimant’s Quantum Reply, ¶¶ 380, 384, 388, 401; Claimant’s Quantum Memorial, ¶¶ 199-200.

²¹⁸¹ Claimant’s Quantum Reply, ¶¶ 390-391.

default risk which remains in the post-award period and for which Claimant should be compensated in both periods.²¹⁸²

1749. In response to Respondent's reliance on the tribunal's reasoning on *Vestey v. Venezuela*, Claimant contends that the tribunal "*had it backwards*" because it found that the claimant would not have borne the respondent State's default risk in the "*but for*" scenario but failed to account for the fact that, in reality, it did. Claimant further rejects the tribunal's reasoning that accounting for default risk would be aimed at repairing a hypothetical breach of the ICSID Convention. Claimant maintains that it aims at "*fully compensating TCCA for the risk that it was actually forced to bear because of Pakistan's breaches of the Treaty.*"²¹⁸³

1750. In the alternative to its primary request, Claimant submits that the Tribunal should adopt a "*commercially reasonable rate,*" *i.e.*, the U.S. prime rate plus two percentage points., Claimant argues that using the prime rate is a variant of the "*borrowing rate*" approach based on the cost of borrowing rate of the compensated party, which was set out in the separate opinion of Judge Holtzmann in *Sylvania v. Iran*, stating that it is "*reasonable to assume that most businesses habitually borrow while fewer regularly invest in certificates of deposit.*"²¹⁸⁴

1751. According to Claimant, "[a] *great number of tribunals*" have relied on the "*borrowing rate*" approach, "*typically adopting rates based on the LIBOR interbank rate plus a premium.*"²¹⁸⁵ Claimant considers that the US prime rate would be preferable, however "*because of the announced phasing out of LIBOR and the fact that the prime rate better reflects actual commercial borrowing rates than the interbank LIBOR rate.*"²¹⁸⁶ It notes

²¹⁸² Claimant's Quantum Reply, ¶¶ 392-397 and note 573, referring to **Exhibit BW-58**, pp. 147-148 and Michael S. Knoll, "A Primer on Prejudgment Interest," 75 Texas L. R. 302 (1996) [CA-374], p. 311 note 98.

²¹⁸³ Claimant's Quantum Reply, ¶¶ 398-400, referring to *Vested Group Ltd. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/06/4, Award of 15 April 2016 [CA-262A], ¶¶ 440, 445.

²¹⁸⁴ Claimant's Quantum Reply, ¶¶ 406-407, quoting from *Sylvania Technical Systems, Inc. v. Iran*, Award No. 180-64-1 of 27 June 1985 [CA-449], p. 329 and note 13.

²¹⁸⁵ Claimant's Quantum Reply, ¶ 408, referring to *Emilio Agustin Maffezini v. Kingdom of Spain*, ICSID Case No. ARB/97/7, Award of 13 November 2000 [RLA-130], ¶ 96; *MTD Equity Sdn. Bhd. & MTD Chile S.A. v. Republic of Chile*, ICSID Case No. ARB(AF)/07/3, Award of 25 May 2004 [RLA-131], ¶ 250; *Waguieh Elie George Siag and Clorinda Vecci v. Arab Republic of Egypt*, ICSID Case No. ARB/05/15, Award of 1 June 2009 [RLA-363], ¶ 598; *OAQ Taftnet v. Ukraine*, UNCITRAL, Award on the Merits of 29 July 2014 [RLA-371], ¶¶ 626-627; *Quiborax S.A. & Non Metallic Minerals S.A. v. Plurinational State of Bolivia*, ICSID Case No. ARB/06/2, Award of 16 September 2015 [CA-213] ¶ 526; *Mobil Investments Canada Inc. & Murphy Oil Corporation v. Canada*, ICSID Case No. ARB(AF)/07/4, Decision on Liability and on Principles of Quantum of 22 May 2012 [RLA-249], ¶ 170; *Bernhard von Pezold and Others v. Republic of Zimbabwe*, ICSID Case No. ARB/10/15, Award of 28 July 2015 [CA-354], ¶¶ 947-948; *Crystallex International Corp. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/11/2, Award of 4 April 2016 [CA-360], ¶ 938; *Rusoro Mining Ltd. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/12/5, Award of 22 August 2016 [CA-361], ¶¶ 836-838.

²¹⁸⁶ Claimant's Quantum Reply, ¶ 408, referring to **Exhibit CE-1480**.

that the prime rate was characterized by Judge Holtzmann as “*generally representative*” of commercial borrowing rates and argues that it has “*wide commercial recognition*” and has been adopted by “[n]umerous arbitral tribunals.”²¹⁸⁷ In Claimant’s view, it is necessary to add a two percentage premium to the prime rate to reflect the fact that “*not all enterprises can borrow money from the banks at the prime rate*” and to achieve “*a rate that is broadly available to the market.*”²¹⁸⁸

1752. Claimant further contends that in accordance with the principle of full reparation, interest should be awarded on a compound basis, being the “*quasi-universal norm in business, finance, commerce, and investment law.*” Quoting from *Quiborax v. Bolivia*, Claimant submits that compound interest now constitutes “*the standard of international law ... in expropriation cases.*” In Claimant’s view, awarding compound interest “*is a matter of realism.*”²¹⁸⁹

1753. Claimant argues that, contrary to Respondent’s argument, Pakistani law “*does not apply and is therefore irrelevant*” because interest is due as part of the principle of full reparation under international law. Claimant quotes from the tribunal in *Quiborax v. Bolivia*, which held that “[r]eparation for expropriation is governed by international law and full reparation includes interest for late payment. The application of national law may be appropriate for contract claims, but not for a claim of breaches of the BIT.” Claimant adds that even if the Tribunal were to apply Pakistani law, it should adopt the rate of 14% that Pakistani courts “*routinely*” apply – which results in an annualized compound rate of 10.5%.²¹⁹⁰

²¹⁸⁷ Claimant’s Quantum Reply, ¶ 409, referring to *S.D. Myers, Inc. v. Government of Canada*, NAFTA, Second Partial Award of 21 October 2002 [RLA-342], ¶¶ 306–307; *Teco Guatemala Holdings LLC v. The Republic of Guatemala*, ICSID Case No. ARB/10/13, Award of 19 December 2013 [RLA-154], ¶ 768; *Venezuela Holdings, B.V. and others v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/07/27, Award of 9 October 2014 [RLA-365], ¶ 396; *Cargill, Inc. v. United Mexican States*, ICSID Case No. ARB(AF)/05/2, Award of 18 September 2009 [RLA-96], ¶ 544.

²¹⁸⁸ Claimant’s Quantum Reply, ¶ 409, quoting from Marboe, *Calculation of Compensation and Damages in International Investment Law* [CA-434], ¶ 6.90; *Teco Guatemala Holdings LLC v. The Republic of Guatemala*, ICSID Case No. ARB/10/13, Award of 19 December 2013 [RLA-154], ¶ 767.

²¹⁸⁹ Claimant’s Quantum Post-Hearing Brief, ¶ 514, quoting from *Quiborax S.A. & Non Metallic Minerals S.A. v. Plurinational State of Bolivia*, ICSID Case No. ARB/06/2, Award of 16 September 2015 [CA-213], ¶ 524; Claimant’s Quantum Reply, ¶¶ 410, 412, 420-421.

²¹⁹⁰ Claimant’s Quantum Post-Hearing Brief, ¶ 515, referring to **Exhibit CE-1785**, p. 1; Claimant’s Quantum Reply, ¶¶ 413-414, quoting from *Quiborax S.A. & Non Metallic Minerals S.A. v. Plurinational State of Bolivia*, ICSID Case No. ARB/06/2, Award of 16 September 2015 [CA-213], ¶ 520 and referring to *Government of Pakistan vs. Arif*, 2001 SCMR 785, 787-88 (2 JJ) (Siddiqui, J.) [CA-441]; *Karachi Water and Sewerage Board v. Famous Art Printers (Pvt) Ltd.*, PLD 2016 Sindh 527, 531 (2JJ) (Rajput, J.) [CA-442]; *Mirza Muhammad Moin Baig v. Mst. Amtul Rauf*, 2007 MLD 1978 (Iqbal, J.) [CA-443]; *Grindlays Bank Ltd. v. Delite House*, PLD 1987 Lah. 51, 55 (DB) (Ikram, J.) [CA-444]; *Abdul Karim vs. Syed Usman Qureshi*, 1984 MLD 1122, 1124 (Zahid, J.) [CA-445].

1754. Claimant again contends that Respondent misrepresents authorities because “*a number of cases*” relied on by Respondent in fact “*explicitly endorse*” compounding of interest and the others are either irrelevant or indiosyncratic decisions based on the parties’ submissions.²¹⁹¹ In Claimant’s view, the only authority supporting Respondent’s position, i.e., the statement made in the Commentary to the ILC Articles that “[t]he general view of courts and tribunals has been against the award of compound interest” was “*doubtful in 2001, when the ILC adopted the Articles, and it is now clearly incorrect.*”²¹⁹²

1755. Claimant acknowledges that “*tribunals were historically reluctant to award compound interest*” but quotes from legal authority that the “*change of trend towards accepting compound interest became obvious in the year 2000*” and that compound interest “*became the rule rather than the exception.*” Claimant also refers to Dr. Ripinsky who called the Santa Elena decision “*a turning point in jurisprudence*” and submits that it has now become a “*jurisprudence constante*” in investment treaty arbitration.²¹⁹³

1756. With regard to Respondent’s emphasis that the pre-award interest claimed represents 25.5% of the total amount claimed, Claimant argues that “[t]here is nothing unusual about interest representing a significant percentage of the total sum claimed” and refers to “*a number of famous cases*” in which the interest awarded even exceeded the principal amount. According to Claimant, interest is “*a crucial element of full reparation.*”²¹⁹⁴

2. Summary of Respondent’s Position

1757. Respondent submits that under the applicable rules of international law, any interest awarded should be simple and accrue at a risk-free rate such as the one-month US Treasury bills. According to Respondent, any higher rate would reward Claimant for risks

²¹⁹¹ Claimant’s Quantum Reply, ¶¶ 415-416, referring to *Victor Pey Casado and Fundation “Presidente Allende” v. Republic of Chile*, ICSID Case No. ARB/98/2, Arbitral Award of 8 May 2008 [CA-32a], ¶¶ 713-718; *Tza Yap Shum v. Republic of Peru*, Case No. ARB/07/6, Award of 7 July 2011 [RLA-150], ¶ 291 note 277, *Wena Hotels Limited v. Arab Republic of Egypt*, ICSID Case No. ARB/98/4, Award of 8 December 2000 [CA-69], ¶¶ 128-129.

²¹⁹² Claimant’s Quantum Reply, ¶¶ 415-416, quoting from International Law Commission, Articles on State Responsibility of States for Internationally Wrongful Acts, Y.B. INT’L COMM’N (2001), VOL. II, UN Doc. A/CN.4/SER.A/2001/Add.1 (Part 2) [CA-1], Art. 38, commentary ¶ 8.

²¹⁹³ Claimant’s Quantum Reply, ¶ 418, quoting from Marboe, *Calculation of Compensation and Damages in International Investment Law* [CA-434], ¶¶ 6.239–6.243; Ripinsky & Williams, *Damages in International Investment Law* [CA-431], p. 385; *OKO Pankki Oyi and others v. Republic of Estonia*, ICSID Case No. ARB/04/6, Award of 19 November 2007 [CA-145] ¶ 349.

²¹⁹⁴ Claimant’s Quantum Post-Hearing Brief, ¶ 516, referring to *Wena Hotels Limited v. Arab Republic of Egypt*, ICSID Case No. ARB/98/4, Award of 8 December 2000 [CA-69], ¶¶ 127, 130; *Compañía del Desarrollo de Santa Elena, S.A. v. The Republic of Costa Rica*, ICSID Case No. ARB/96/1, Final Award of 17 February 2000 [CA-373], ¶¶ 95, 107; *Ioannis Kardassopoulos & Ron Fuchs v. Republic of Georgia*, ICSID Case Nos. ARB/05/18, ARB/07/15, Award of 3 March 2010 [CA-50], ¶¶ 693(f)–693(g); *The American Independent Oil Company v. Kuwait*, 21 I.L.M. 976, Award of 24 March 1982 [CA-436], ¶¶ 178–179; Claimant’s Quantum Reply, ¶ 381.

to which the assets being valued were not exposed after the valuation date or “*simply contradict the applicable law.*”²¹⁹⁵

1758. Respondent contends that pursuant to the applicable provisions of the Treaty, “[o]nly commercial interest at a risk-free rate should accrue as from the valuation date.”²¹⁹⁶ Respondent notes that the language used in Article 7(3), i.e., “*at a commercial reasonable rate,*” also appears in Article 1110(4) of the North American Free Trade Agreement (“NAFTA”) and submits that these and similar clauses have led tribunals to effectively award interest at a risk-free rate. Specifically, Respondent refers to the tribunal in *ADM v. Mexico* which awarded “*the simple interest rate for U.S. Treasury bills,*” the tribunal in *SD Myers v. Canada* which fixed interest at the rate applicable to the investor’s receivables in Canadian dollars, and the tribunal in *Siemens v. Argentina* which considered “*the average rate of interest applicable to US six-month certificates of deposit*” appropriate.²¹⁹⁷ Respondent adds that the application of US Treasury bond rates was also endorsed by various other tribunals.²¹⁹⁸

1759. Respondent also refers to sources of literature endorsed by both Parties’ experts which state:

“At first glance, it may seem that the plaintiff is entitled to interest at its opportunity cost of capital, r . After all, had the plaintiff received Y at time 0 [the time of the event], it would have invested the funds, receiving presumably its average rate of return. Hence, by time t , the plaintiff would have had $Yert$ [i.e., Y plus compounded continuous returns at a rate equal to r during period t], so this is the amount that would make it whole. Another version of this argument would compensate the plaintiff at the rate it reasonably expected to earn on the destroyed asset.

The fallacy here (in either version) has to do with risk. The plaintiff’s opportunity cost of capital includes a return that compensates the plaintiff for the average risk it bears. But, in depriving the plaintiff of an asset worth Y at time 0, the defendant also relieved it of the risks associated with investment in that asset. The plaintiff is thus entitled to interest compensating it for the

²¹⁹⁵ Respondent’s Post-Hearing Brief on Quantum, ¶ 364; Respondent’s Counter-Memorial on Quantum, ¶ 416.

²¹⁹⁶ Respondent’s Post-Hearing Brief on Quantum, ¶ 365.

²¹⁹⁷ Respondent’s Post-Hearing Brief on Quantum, ¶¶ 421-425, quoting from *Archer Daniels Midland Company and Tate & Lyle Ingredients Americas, Inc. v. The United Mexican States*, ICSID Case No. ARB (AF)/04/5, Award (21 November 2007), ¶ 300; *S.D. Myers, Inc. v. Government of Canada*, UNCITRAL, Second Partial Award (21 October 2002), ¶ 304; *Siemens A.G. v. Argentine Republic*, ICSID Case No. ARB/02/8, Award (17 January 2007), ¶ 396.

²¹⁹⁸ Respondent’s Counter-Memorial on Quantum, ¶ 426, referring to *Tza Yap Shum v. Republic of Peru*, ICSID Case No. ARB/07/6, Award, 7 July 2011; *Victor Pey Casado and President Allende Foundation v. Republic of Chile*, ICSID Case No. ARB/98/2, Award (8 May 2008); *Impregilo S.p.A. v. Argentine Republic*, ICSID Case No. ARB/07/17, Award (21 June 2011); *Azurix Corp. v. The Argentine Republic*, ICSID Case No. ARB/01/12, Award (14 July 2006); *CMS Gas Transmission Company v. The Argentine Republic*, ICSID Case No. ARB/01/8, Award (12 May 2005).

*time value of money, but it is not also entitled to compensation for the risks it did not bear. Hence prejudgment interest should be awarded at the risk-free interest rate.*²¹⁹⁹

1760. Respondent also refers to its experts who explain in their second report that “[t]he central point is clear: ‘The plaintiff should not be compensated (positively or negatively) for risks he or she did not bear.’” Similarly, Mark Kantor, in his book on valuation, agrees with this position: ‘The interest rate used for bringing historical amounts forward will clearly not contain the same risk factors as the discount rate used to present value future amounts. As a practical matter, the interest rate used for the historical amount is often a ‘risk-free’ rate (such as the rate for US Treasuries).’ *Brattle’s choices of rates are exactly the opposite of what economic theory dictates, and what the authors quoted above favor.*²²⁰⁰

1761. By contrast, Respondent considers that Claimant requests “an additional outrageous compensation of between USD 750 million and 7.5 billion as interest,” with its primary request for interest at Pakistan’ borrowing rate amounting to over USD 2.3 billion or 25.5% of its total damages claim.²²⁰¹ According to Respondent, Claimant has failed to provide any valid explanation as to why the Tribunal should award interest at a rate “that accrues monies to TCC’s benefit so extraordinarily and disproportionately” instead of at the risk-free rate, which “is the criterion favored by scholars, legal materials and a large number of prior, persuasive decisions.”²²⁰²

1762. Specifically, Respondent considers that the use of a risk-free rate such as US Treasury bond rates is supported by the tribunals in *Vestey v. Venezuela*, *Unglaube v. Costa Rica* and “an extensive number of other international tribunals.”²²⁰³ It quotes from the *Unglaube* tribunal which held:

“One well-recognized approach to determining the applicable interest rate was established by the Iran-US Claims Tribunal in Sylvania Technical Systems v. Iran where it focused on developing a rate ‘based approximately on the amount that the successful claimant would have been in the position to have earned if it had been paid in time and thus had the funds Treaty Art. 4(2). Additionally, the German Model BIT refers in the same section to the ‘usual bank interest rate’ available to invest in a form of commercial

²¹⁹⁹ Respondent’s Post-Hearing Brief on Quantum, ¶ 366; Respondent’s Counter-Memorial on Quantum, ¶ 430, quoting from Fisher and Romaine, *Janis Joplin’s Yearbook and the Theory of Damages*, 5 *Journal of Accounting, Auditing and Finance* 145 (1990), p. 146. (Exhibit BW-58), and referring to Brailovsky/Wells I, ¶ 174;

²²⁰⁰ Respondent’s Rejoinder on Quantum, quoting from Brailovsky/Wells II, ¶ 191.

²²⁰¹ Respondent’s Post-Hearing Brief on Quantum, ¶ 367, referring to Davis II, Table 12; Respondent’s Counter-Memorial on Quantum, ¶ 416.

²²⁰² Respondent’s Counter-Memorial on Quantum, ¶ 417.

²²⁰³ Respondent’s Counter-Memorial on Quantum, ¶ 419, referring to *Vestey Group Ltd. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/06/04, Award (15 April 2006), ¶ 472.

investment in common use in its own country. Such an approach was also adopted in Santa Elena.

The Sylvania Technical Systems tribunal ultimately decided to use the rate from six-month United States certificates of deposit. Similarly, in other cases such as LG&E and CMS v. Argentina, the interest rate used was that applicable to short-term United States Treasury Bills. Both instruments have been chosen by tribunals because they reflect conservative rates for essentially risk-free investments. It is also worth noting that such rates have been used in cases, like British Gas v. Argentina and Siemens v. Argentina, which did not involve the U.S. government or U.S. companies.

Although some tribunals apply an interest rate based on the requirements of the host State's domestic law, this is not the prevailing practice under international law. Additionally, commentators maintain that, '[t]he host-country-law approach has been criticized on the basis that where State's international responsibility is engaged, the award of interest should follow the rules of international law' rather than domestic law. Furthermore, in looking back to the investment alternatives approach from Sylvania Technical Systems, it is rational to conclude that an appropriate interest rate may be based on the 'deposit rate... commonly used in the country of the currency in which payment is to be made.' Interest rates from such instruments reflect the risk-free investments that investors were impeded from making with their property as a result of the expropriation."²²⁰⁴

1763. In Respondent's view, it is also contradictory that Claimant claims that its investment should be valued applying only a risk-free discount rate but then requests that additional risks should be added to the pre-award interest rate, "*the only area of the valuation for which the prevailing literature actually considers that no risks exist.*" Respondent quotes a legal commentary stating that "*[t]he interest rate used for bringing historical amounts forward will clearly not contain the same risk factors as the discount rate used to present value future amounts. As a practical matter, the interest rate used for the historical amount is often a 'risk-free' rate (such as the rate for US Treasuries) or a statutory rate for pre-judgment interest.*"²²⁰⁵

1764. According to Respondent, Claimant is not exposed to any compensable risk. More specifically, Respondent argues that "*[a] final award is not subject to any type of risk. The amount awarded is not subject to any changes, i.e. increases or reductions in principal amount, until effective payment. None of the risk elements of an investment are*

²²⁰⁴ Respondent's Counter-Memorial on Quantum, ¶ 419, quoting from *Marion Unglaube v. Republic of Costa Rica*, ICSID Case No. ARB/08/1, Award (16 May 2012), ¶ 321.

²²⁰⁵ Respondent's Post-Hearing Brief on Quantum, ¶¶ 367-368, quoting from Mark Kantor, Valuation for Arbitration: Compensation Standards, p. 42 (**Exhibit BW-55**) and referring to *Archer Daniels Midland Company and Tate & Lyle Ingredients Americas, Inc. v. United Mexican States*, ICSID Case No. ARB(AF)/04/5, Award of 21 November 2007 [RLA-345], ¶ 300 and *Siemens v. Argentina*, ICSID Case No. ARB/02/8, Award of 17 January 2007 [RLA-405], ¶ 396; Respondent's Counter-Memorial on Quantum, ¶ 420.

replicated in a tribunal's determination of compensation."²²⁰⁶ In Respondent's view, Prof. Davis adopted the same opinion in *Bear Creek v. Peru* where he argued that "[t]he question whether compensation for risk is appropriate, and therefore whether a spread above the risk-free rate should be included in the pre-award interest, hinges on legal questions of when the liability is created and whether certain risks are best characterized as financial risks or litigation risks."²²⁰⁷

1765. Respondent argues that contrary to Prof. Davis' description of Claimant as a "forced creditor," any amount of damages awarded "is not being loaned on the same risky terms as those under which bondholders may extend credit to Pakistan" but rather "awarded pursuant to the Treaty and the ICSID Convention." Respondent claims that "[b]ecause there is no risk of not collecting a valid damages award, TCC is not entitled to a rate of interest that compensates it for both the time value of money and default risk." Respondent also emphasizes that Claimant did not bear the risk associated with alternative investments and should therefore not be entitled to the returns commensurate with those risks as it would be speculative to assume that such returns would actually have been earned.²²⁰⁸

1766. With regard to Prof. Davis' calculation of pre-award interest at five different rates, *i.e.*: (i) 14% flat; (ii) US prime rate + 2%, compounded; (iii) Pakistan's short-term credit default swap rate, compounded; (iv) US inflation rate, compounded; and (v) the risk-free US Treasury Bill rate, not compounded that Pakistan proposed, Respondent refers to the explanation provided by its experts that "*the strategy of Brattle and Claimant appears to be: choose rates in a way that their first choice, the credit default swaps for Pakistan, sits in the middle of the set. For that, they selected two outrageously high rates, one that is lower than their choice (although it is not even an interest rate), and list the rate we propose at the bottom of the table. The message is apparently intended to be that their rate is 'reasonable' or 'conservative', and ours is extreme.*"²²⁰⁹

1767. Respondent submits that the interest rate must be determined according to the currency of payment of the obligation, *i.e.* US dollars, and argues that by contrast, "*Claimant's claim of an interest rate equal to Pakistan's cost of borrowing would seem to indicate a rate which is designed to apply to sums borrowed in local currency.*" In Respondent's view, this also addresses Claimant's argument that the risk-free rate is below the rate of inflation because "[t]o the extent that TCC made its claim in US dollars, it is impossible

²²⁰⁶ Respondent's Rejoinder on Quantum, ¶ 459; Respondent's Counter-Memorial on Quantum, ¶ 427.

²²⁰⁷ Respondent's Rejoinder on Quantum, ¶ 460; Respondent's Counter-Memorial on Quantum, ¶ 431, quoting from *Bear Creek Mining Corporation v. Republic of Peru*, ICSID Case No. ARB/14/21, Quantum of Damages Analysis, Prepared by Graham A. Davis, Ph.D. and Florian A. Dorobantu, Ph.D., 6 October 2015, ¶ 191.

²²⁰⁸ Respondent's Counter-Memorial on Quantum, ¶¶ 428-429.

²²⁰⁹ Respondent's Rejoinder on Quantum, ¶¶ 455-456, quoting from *Brailovsky/Wells II*, ¶¶ 195-196.

*to assign hypothetical risks of inflation or devaluation of the local currency of Pakistan, which has nothing to do with the currency in which the compensation was requested.”*²²¹⁰

1768. Specifically with regard to Claimant’s argument that the risk-free rate would create the wrong incentives, Respondent quotes from the tribunal in *Vestey v. Venezuela*, which held that the “*Tribunal does not find it appropriate for it to assume by anticipation that a sovereign state will breach a treaty obligation. Having said this, even if the assumption were made, it would in any event not justify an interest rate incorporating the risk of defaulting on the payment of the award. Indeed, accounting for this risk would mean seeking to repair a (hypothetical) breach of the ICSID Convention when this Tribunal’s jurisdiction is limited to breaches of the BIT.*”²²¹¹ Respondent argues that “*the Tribunal cannot prejudge or even assume that Pakistan will not fulfill its duty to pay an obligation*” and rejects the suggestion that to award interest at a rate lower than Pakistan’s borrowing rate would incentivize it to violate international investment treaties or to delay the resolution of investment disputes.²²¹²

1769. Respondent also refers to the holding of the *Vestey* tribunal:

*“The function of reparation is to compensate the victim for its actual losses. It is not to reward it for risks which it does not bear. As the Claimant itself argues, the award should reestablish the situation which would in all probability have existed but for the wrongful measures. As the Parties agree on the Valuation Date, the ‘but for’ scenario involves placing [the claimant party] in the position in which it would have been if it had received compensation on that date. In that case, [that claimant] would have been able to make use of the funds received as compensation. At no point in that scenario would [that claimant] have borne the risk of [the respondent State]’s sovereign default. The Claimant argues that ‘[a]n award of interest at a rate lower than the state’s borrowing cost would create an incentive for states to ‘refinance’ fiscal obligations by withholding compensation for internationally wrongful acts’. However, reparation focuses on making the victim whole; it is not concerned with the possible enrichment of the Respondent. As the SPP tribunal stressed, ‘the measure of compensation should reflect the claimant’s loss rather than the defendant’s gain.’”*²²¹³

1770. Also referring to the tribunal in *Siag v. Vecchi*, which held that the relief to be awarded to claimant is purely compensatory, Respondent argues that the appropriate rate must only

²²¹⁰ Respondent’s Rejoinder on Quantum, ¶¶ 457, 461-462; Respondent’s Counter-Memorial on Quantum, ¶ 418.

²²¹¹ Respondent’s Rejoinder on Quantum, ¶ 463, quoting from *Vestey Group Ltd. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/06/04, Award (15 April 2006), ¶ 445; Respondent’s Counter-Memorial on Quantum, ¶ 433.

²²¹² Respondent’s Counter-Memorial on Quantum, ¶ 432.

²²¹³ Respondent’s Counter-Memorial on Quantum, ¶ 434, quoting from *Vestey Group Ltd. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/06/04, Award (15 April 15 2006), ¶ 440.

reflect the time value of money and be equal to an interest rate applicable for lending to a borrower at no default risk.²²¹⁴

1771. With regard to Claimant's claim for an award of compound interest, Respondent further contends that, contrary to Claimant's assertion, "*multiple tribunals continue to apply simple interest, as they should.*" It agrees with Claimant's statement that "*tribunals were historically reluctant to award compound interest*" and maintains that "*that current did not change in investment arbitration.*"²²¹⁵ Respondent refers to the Commentary to the ILC Articles, which noted that "[t]he general view of courts and tribunals has been against the award of compound interest, and this is true even of those tribunals which hold claimants to be normally entitled to compensatory interest." The Commentary referred in particular to decisions rendered by the Iran-US Claims Tribunal, which "*has consistently denied claims for compound interest,*" and concluded that "[t]he preponderance of authority thus continues to support the view expressed by Arbitrator Huber in the *British Claims in the Spanish Zone of Morocco case: the arbitral case law in matters involving compensation of one State for another for damages suffered by the nationals of one within the territory of the other ... is unanimous ... in disallowing compound interest. In these circumstances, very strong and quite specific arguments would be called for to grant such interest.*"²²¹⁶

1772. On that basis, Respondent contends that "*only exceptional circumstances*" justify a departure from the general rule to award simple interest. According to Respondent, this rule is confirmed by "*decisions new and old.*"²²¹⁷

1773. In any event, Respondent emphasizes that under Pakistani law, which is relevant "*on the face of the mandate under Art. 42.1 of the ICSID Convention,*" the application of compound interest is forbidden in the absence of a specific agreement to that effect. According to Respondent, the Treaty cannot be interpreted to "*obliterate that legal prohibition,*" which would contradict the object and purpose of the Treaty, and in any event, "*a compound rate which contradicted Pakistani law would not by any length*

²²¹⁴ Respondent's Counter-Memorial on Quantum, ¶ 436.

²²¹⁵ Respondent's Post-Hearing Brief on Quantum, ¶ 369, quoting from Claimant's Quantum Reply, ¶ 418; Respondent's Rejoinder on Quantum, ¶ 466.

²²¹⁶ Respondent's Counter-Memorial on Quantum, ¶ 439, quoting from International Law Commission, Articles on State Responsibility of States for Internationally Wrongful Acts, Y.B. INT'L COMM'N (2001), VOL. II, UN Doc. A/CN.4/SER.A/2001/Add.1 (Part 2) [CA-1], Art. 38, commentary ¶ 8.

²²¹⁷ Respondent's Counter-Memorial on Quantum, ¶ 440, referring to *Astaldi S.p.A. v. Republic of Honduras*, ICSID Case No. ARB/07/32, Award of 17 September 2010, ¶ 80; *Autopista Concesionada de Venezuela, C.A. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/00/5, Award of 23 September 2003, ¶ 426; *Duke Energy Electroquil Partners & Electroquil S.A. v. Republic of Ecuador*, ICSID Case No. ARB/04/19, Award of 18 August 2008, ¶ 491; *Elsamex, S.A. v. Republic of Honduras*, ICSID Case No. ARB/09/4, Award of 16 November 2012, ¶ 866; *SGS Société Générale de Surveillance S.A. v. The Republic of Paraguay*, Award of 10 February 2012, ¶ 183. *Tza Yap Shum v. Republic of Peru*, ICSID Case No. ARB/07/6, Award of 7 July 2011, ¶ 303.

constitute a 'commercially reasonable rate' under Art. 7.3 of the BIT."²²¹⁸ According to Respondent, the prohibition of compound interest under local law also led to the rejection of such a request in *Duke Energy v. Ecuador* and *Desert Line v. Yemen*.²²¹⁹

1774. Respondent submits that the legality of compound interest in Pakistan is regulated in the Code of Civil Procedure of 1908, the Arbitration Act of 1940 and the Land Acquisition Act of 1894. According to Respondent, these rules as they have been interpreted by Pakistani courts render it "*impossible to applying compound interest absent an agreement by the parties,*" leaving simple interest as "*the only possible result.*"²²²⁰

1775. Specifically, Respondent refers to Section 34 of the Civil Code of Procedure which is concerned with interest payable from the date of the suit to the date of the decree as well as after the date of the decree and provides:

"34. Interest. (1) *Where and in so far as a decree is for the payment of money, the Court may, in the decree, order interest at such rate as the Court deems reasonable to be paid on the principal sum adjudged, from the date of the suit to the date of the decree, in addition to any interest adjudged on such principal sum for any period prior to the institution of the suit, with further interest at such rate as the Court deems reasonable on the aggregate sum so adjudged, from the date of the decree to the date of payment, or to such earlier date as the Court thinks fit.* 2) *Where such a decree is silent with respect to the payment of further interest on such aggregate sum as aforesaid from the date of the decree to the date of payment or other earlier date, the Court shall be deemed to have refused such interest, and a separate suit therefore shall not lie.*"²²²¹

1776. Respondent argues that while Pakistani courts have "*on occasion*" upheld agreements providing for compound interest, such authority requires an express agreement between the parties. In the absence of such an agreement between the Parties in this case, Respondent maintains that the Tribunal must reject Claimant's request for an award of compound interest.²²²²

1777. Consequently, Respondent submits that any interest awarded should accrue as simple interest based on the yield of the one-month US Treasury bill.²²²³

²²¹⁸ Respondent's Post-Hearing Brief on Quantum, ¶ 370; Respondent's Rejoinder on Quantum, ¶ 467; Respondent's Counter-Memorial on Quantum, ¶ 441.

²²¹⁹ Respondent's Counter-Memorial on Quantum, ¶ 441, referring to *Duke Energy Electroquil Partners & Electroquil S.A. v. Republic of Ecuador*, ICSID Case No. ARB/04/19, Award of 18 August 2008, ¶457.

²²²⁰ Respondent's Post-Hearing Brief on Quantum, ¶ 371; Respondent's Rejoinder on Quantum, ¶ 468.

²²²¹ Respondent's Rejoinder on Quantum, ¶ 469.

²²²² Respondent's Rejoinder on Quantum, ¶ 470, quoting from *House Building Finance Corporation v. Shahinshah Humanyun Cooperative Building Society* 1992 SCMR 19 [RLA-419], ¶ 13; *Ghulam Naseer v. House Building Finance Corporation* 1994 CLC 464 [RLA-420], ¶ 5; *United Contractor Limited v. Province of Sindh* 1999 CLC 1938 (SHC) [RLA-421].

²²²³ Respondent's Post-Hearing Brief on Quantum, ¶ 372, referring to *Brailovsky/Wells II*, ¶ 193; Respondent's Rejoinder on Quantum, ¶ 471; Respondent's Counter-Memorial on Quantum, ¶ 442.

3. Tribunal's Analysis

1778. At the outset of its analysis on interest, the Tribunal notes that while Claimant relies on the principle of full reparation as the applicable standard of compensation, Respondent refers to the expropriation provision of the Treaty and, in the context of interest, specifically to Article 7(3). In its analysis of the legal standards governing Claimant's claim for compensation, the Tribunal has determined that if the market value of Claimant's investment can be "*readily ascertained*" based on the evidence and valuation methods before it, there is no need to decide whether this result is based on the compensation provision in Article 7(2) of the Treaty or a compensation standard under customary international law. As set out in detail above, the Tribunal has determined the market value of Claimant's investment based on the modern DCF valuation method applied by Prof. Davis. Consequently, the Tribunal did not have to make a conclusive finding on the applicable standard of compensation.

1779. As for the standard to determine the applicable interest rate, Respondent relies on Article 7(3) of the Treaty, which provides with regard to interest:

*"The compensation ... shall include interest at a commercially reasonable rate from the date the measures were taken to the date of payment ..."*²²²⁴

1780. Claimant refers to the principle of full reparation under customary international law. As both Parties have referred to the Commentary to Article 38 of the ILC Articles in the context of their submissions on interest, this provision may also be quoted as reflective of the standard under customary international law:

"1. Interest on any principal sum due under this chapter shall be payable when necessary in order to ensure full reparation. The interest rate and mode of calculation shall be set so as to achieve that result.

*2. Interest runs from the date when the principal sum should have been paid until the date the obligation to pay is fulfilled."*²²²⁵

1781. While the Parties are in dispute as to the applicable standard of compensation, there is common ground with regard to interest to the extent that: (i) Claimant is entitled to payment of interest from the date of Respondent's Treaty breaches until the date of payment of the award, *i.e.*, pre-award and post award interest; and (ii) interest has a compensatory function, *i.e.*, it is aimed at complementing the amount of compensation to which Claimant is entitled for the losses it has incurred as a result of Respondent's breaches. Respondent explicitly confirms that "*the appropriate interest rate must be*

²²²⁴ Exhibit C-4, Article 7(3).

²²²⁵ International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, Y.B. INT'L L. COMM'N (2001), VOL. II, UN Doc. A/CN.4/SER.A/2001/Add.1 (Part 2) [CA-1], Article 38.

determined only with a view to appropriately compensate the creditor.”²²²⁶ Claimant also confirms that “[t]he compensatory function is the primary function of interest at international law.”²²²⁷

1782. Claimant further refers to a “wide margin of discretion in awarding interest” and argues that two additional functions of interest should inform the Tribunal’s discretion, *i.e.*, the aim “to prevent unjust enrichment of the respondent at the expense of the claimant” and “to promote efficiency.”²²²⁸ The Tribunal does not consider it established, however, that the interest rate is the proper means to address either of these considerations.

1783. The Tribunal recalls that the entire exercise of valuing Claimant’s investment has been aimed at determining the amount of compensation that corresponds to the damage that Claimant has incurred as a result of Respondent’s Treaty breaches. This assessment did not look at a possible enrichment from which Pakistan may have benefitted as a result of these same actions but only at the damage incurred by Claimant which has to be compensated. In the Tribunal’s view, it would be inconsistent if a different perspective were to be taken to determine the applicable interest rate. In this regard, the Tribunal agrees with the tribunal in *Vestey v. Venezuela*, which held that “reparation focuses on making the victim whole; it is not concerned with the possible enrichment of the Respondent. As the SPP tribunal stressed, ‘the measure of compensation should reflect the claimant’s loss rather than the defendant’s gain.’”²²²⁹

1784. Given the Parties’ agreement on the compensatory function of interest under both of the standards of compensation on which they have relied, the Tribunal believes that in the present case, it is not necessary to make a conclusive finding on the applicable standard of compensation because it is possible to determine an interest rate that is both “commercially reasonable” as required by Article 7(3) of the Treaty and ensures full reparation of the damage that Claimant has incurred as a result of Respondent’s breaches as required under customary international law.

1785. The Tribunal notes that with regard to the appropriate interest rate, neither Party has argued that a distinction should be drawn between pre-award and post-award interest. Consequently, the Tribunal will determine a uniform interest rate which applies from the date of Respondent’s Treaty breaches, *i.e.*, 15 November 2011, until the date on which Claimant receives payment of the amount of compensation that Respondent is ordered to pay to it pursuant to this Award.

²²²⁶ Respondent’s Counter-Memorial on Quantum, ¶ 435.

²²²⁷ Claimant’s Quantum Reply, ¶ 387.

²²²⁸ John Y. Gotanda, “Interest,” in *International Investment Law* (Bungenberg et al. eds. 2015) [CA-437], p. 1143.

²²²⁹ *Vestey Group Ltd. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB/06/04, Award of 15 April 2006 [RLA-402], ¶ 440.

1786. Table 12 of Prof. Davis' report, which was updated shortly before the Hearing on Quantum, shows the two rates proposed by Claimant (primarily [1]; in the alternative [2]), and the rate proposed by Respondent [3] as well the rate of US inflation [4] and a rate which, according to Claimant, is routinely awarded by Pakistani courts [5].²²³⁰

Davis Reply Report Table 12 (Updated). Damages to TCC Inclusive of Pre-Award Interest to April 30, 2018

Method		Cumulative Pre-Award Interest	Annualized Compound Rate	Damages Amount as of Valuation Date	Damages Amount Including Pre-Award Interest
Pakistan's cost of borrowing	[1]	28.5%	4.0%	8,490	10,909
U.S. Prime Rate + 2%	[2]	42.4%	5.6%	8,490	12,093
Brailovsky-Wells method	[3]	1.7%	0.3%	8,490	8,638
U.S. inflation rate	[4]	10.3%	1.5%	8,490	9,365
Pakistan simple interest at 14%	[5]	90.4%	10.5%	8,490	16,163

Sources and Notes:

[1]: Workpaper R-34-U1.

[2]: Workpaper R-35-U1.

[3]: Workpaper R-36-U1.

[4]: Workpaper R-37-U1. Latest CPI data available is as of March 2018.

[5]: 14.0% per year without compounding.

1787. Mr. Brailovsky and Prof. Wells criticized this table as being part of an attempt to show the reasonableness of the rate proposed by Claimant by selecting “*two outrageously high rates, one that is lower than their choice (although it is not even an interest rate), and list the rate we propose at the bottom of the table*” in order to show that the rate proposed by Respondent's experts was “*extreme.*” They also argued that “*no explanation is given as to why they decided to present these rates and not others*” and maintained that “*the only rate that has a solid economic justification is the last one, insofar as it contains no element of risk and is the one recommended by authorities.*”²²³¹ Mr. Brailovsky and Prof. Wells did not, however, dispute the calculation made by Prof. Davis on the basis of the rates presented in the table above, neither with regard to the annualized compound rate to which each rate would correspond, nor the amount of pre-award interest by which Claimant's compensation would, respectively, increase.

1788. Consequently, the Tribunal considers it appropriate to refer to the results presented in lines [1] to [3] of this table to discuss the proposals made by the Parties and their experts. As for line [4], Claimant does not contend that the US inflation rate is an interest rate but has rather presented this rate in support of its argument that the rate proposed by Respondent is significantly below the rate of inflation in the United States. As for line [5], labelled “*Pakistan simple interest at 14%,*” Claimant does not actually request that this rate be applied in the present case but has rather referred to it in response to Respondent's reliance on Pakistani law with regard to the question of compound interest. As will be discussed in more detail below, the Tribunal is of the view that the interest rate

²²³⁰ Davis II, Table 12; update submitted as **Exhibit CE-1785**, p. 1.

²²³¹ Brailovsky/Wells II, ¶¶ 195-196.

applicable to Claimant's compensation for losses incurred as a result of Respondent's breaches of the Treaty must be determined on the basis of international law and not domestic Pakistani law. For this reason, the Tribunal will not refer any further to the interest rate in line [5].

1789. The Tribunal notes that a considerable part of both Parties' submissions on interest concerns the question whether Claimant bears, and should thus be compensated for, the risk of Pakistan's default as a result of the fact that Claimant has not received the amount of compensation on 15 November 2011 but will receive payment only at a future point in time after this Award. While Claimant argues that its position is that of a "*forced*" creditor and that it has borne and continues to bear Pakistan's default risk just like other creditors of the State,²²³² Respondent claims that "*there is no risk of not collecting a valid damages award*" rendered pursuant to the Treaty and the ICSID Convention.²²³³

1790. In the Tribunal's view, it is not necessary in the present case to express a conclusive opinion on this point. The Tribunal has already determined above that interest has compensatory function, *i.e.*, it serves to complement the compensation to which Claimant is entitled for the losses it has incurred as a result of Respondent's Treaty breaches. The relevant question is thus whether and in what amount Claimant would likely have achieved a return on the amount of compensation if it had received such amount on 15 November 2011. As will be set out in more detail below, the Tribunal considers that this compensatory function, which applies under both compensation standards relied on by the Parties, is fulfilled by awarding interest at a rate that serves as a proxy for the borrowing costs of Claimant's owners. While an argument could be made that the interest rate should in any event not fall below Pakistan's borrowing rate, this question does not arise in the present case because the rate that the Tribunal determines to be applicable below exceeds Pakistan's borrowing rate. Consequently, Claimant's arguments that Respondent would lack an incentive to pay the award and that Claimant should be compensated for having to bear Pakistan's default risk until payment is made can be considered moot.

1791. As to the applicable compensatory considerations, it appears to be undisputed between the Parties and their experts that it would not be appropriate to award interest at a rate of return that Claimant might have been able to achieve if it had invested the amount, most likely in the mining business, because that investment would have been associated with risks that Claimant did not actually bear. Prof. Davis specifically stated in his second report that he "*did not calculate interest at Claimant's opportunity cost of capital and did not suggest Claimant should be awarded their cost of capital ... which the authors* [of a

²²³² See, *e.g.*, Claimant's Quantum Reply, ¶ 383.

²²³³ Respondent's Counter-Memorial on Quantum, ¶ 428.

publication relied on by Respondent's experts] *argue would inappropriately compensate Claimant for a risk it did not bear.*"²²³⁴ At the Hearing on Quantum, Prof. Wells emphasized in response to the question whether the cost of capital or average rate of return would be the relevant benchmark that "[i]f you invest it in something that you think is going to yield a higher Rate of Return, that's because there is risk attached to it. There is no risk attached to the money for the Award."²²³⁵

1792. In accordance with the agreement between the experts, the Tribunal will therefore not aim at determining an interest rate reflecting Claimant's cost of capital or the average rate of return that it might have achieved. However, the fact remains that Claimant is entitled to compensation for the expropriation and other Treaty breaches that have occurred on 15 November 2011. While it may be speculative to make assumptions as to the returns that Claimant or its owners might have achieved by investing this amount and the risk that would have been associated with such an alternative investment, the Tribunal considers it sufficiently likely and in line with basic economic considerations that Claimant or its owners would have put this money to use for the business they are involved in. Given the undisputed opportunities to achieve high returns in the mining business and the undisputed risks associated with these opportunities, the Tribunal is not convinced that the application of a risk-free rate, as an approximation of the returns that Claimant could have made from making a risk-free investment, would adequately capture the damage that Claimant has incurred. In the Tribunal's view, the fact that the amount of compensation was not available to Claimant and its owners as of November 2011 can rather be considered captured in their own borrowing costs, *i.e.*, the cost for having to borrow the amount of money that should have been, but was not, made available to Claimant in November 2011. In this case, the Tribunal considers that the relevant borrowing costs are those of Antofagasta and Barrick, *i.e.*, the companies which had undisputedly paid for the exploration work and (pre-)feasibility studies and which would have contributed the required amounts of equity into the project if it had proceeded to the construction and mining operations stage.

1793. As pointed out by Claimant, the "*borrowing rate*" approach was put forward by Judge Holtzmann in his Separate Opinion in *Sylvania Technical Systems v. Iran*. While the majority of the tribunal had found that the interest rate should be "*based approximately on the amount that the successful claimant would have been in a position to have earned if it had been paid in time and thus had the funds available to invest in a form of commercial investment in common use in its own country*" and concluded that the six-month certificates of deposit in the United States represented such a form of

²²³⁴ Davis II, ¶ 356.

²²³⁵ Transcript Hearing on Quantum (Day 9), p. 2742 lines 10-14.

investment,²²³⁶ Judge Holtzmann “believe[d] that using the average rate paid on six-month certificates of deposit in the United States is not unreasonable, but that it would be more appropriate to base the Tribunals interest rate on the prime rate during the relevant period. In his view, it is reasonable to assume that most businesses habitually borrow while fewer regularly invest in certificates of deposit. Moreover, although the prime rate is not applicable to all businesses, it is generally representative because the difference between it and other lending rates is relatively small. In contrast, the six-month deposit rate is less representative because of the wide range of possible uses that businesses make of their funds and the relatively large differences in the rates of return on such uses.”²²³⁷

1794. As pointed out in an authority addressing the calculation of compensation and damages in international investment law on which Claimant has also relied in the context of interest, the use of the borrowing rate of the claimant as a reference rate for pre-award interest is also reflected in international codifications of contract law such as the the Principle of European Contract Law and the UNIDROIT Principles on International Commercial Contracts. She explained that the prime rate to which these provisions referred “represents the interest rate that commercial banks charge their most creditworthy borrowers, such as large corporations,” noting that “[o]nly a few businesses qualify for the prime rate.” She noted that Judge Holtzmann and other decisions of the Iran-US Claims Tribunal usually referred to the US prime rate and identified further investment decisions in which tribunals had applied the US or New York prime rate, in two cases with a premium of two and three percentage points, respectively, and in other cases with no additional premium.²²³⁸ She added:

“The ‘prime’ or ‘base’ rate plays an important role in negotiations about company loan conditios in Anglo-American countries. As such, it seems to be an appropriate basis for the assessment of the damages incurred by delayed payment. However, it must be taken into account that not all enterprises can borrow money from the banks at the prime rate so that an increase by a few percentage points might be necessary. The question then arises, how many percentage points are appropriate. The practice of tribunals is not entirely consistent, but the variations remain rather limited. In addition, the prime rate as such fluctuates less than other commercial benchmarks, for example,

²²³⁶ *Sylvania Technical Systems, Inc. v. Iran*, Award No. 180-64-1 of 27 June 1985, 8 IRAN-U.S. C.T.R., 298 *et seq.* [CA-449], p. 320.

²²³⁷ *Sylvania Technical Systems, Inc. v. Iran*, Award No. 180-64-1 of 27 June 1985, 8 IRAN-U.S. C.T.R., 298 *et seq.* [CA-449], p. 329.

²²³⁸ Irmgard Marboe, *Methods of Valuation in International Practice, Calculation of Compensation and Damages in International Investment Law* (2d ed. 2017) [CA-434], ¶¶ 6.78-6.89.

*the LIBOR. These advantages add to the conceptual logic of the application of the prime rate as a proxy for the borrowing rate of the investor.”*²²³⁹

1795. The same authority also stated that “one could also think of applying the actual borrowing rate of the investor” but noted that “[i]t appears, however, very difficult to identify the borrowing rate of the investor” and presented possible means of achieving an estimation of that actual borrowing rate.²²⁴⁰

1796. The Tribunal notes that it has not been provided with the borrowing rate, or an estimation of such rate, for either Antofagasta or Barrick. The Tribunal therefore considers it appropriate to apply, as the Iran-US Claims Tribunal and several investment treaty tribunals have done, a reasonable approximation of such a borrowing rate. Claimant argues that in that case, the Tribunal should apply the US Prime Rate plus two percentage points, referring to the fact that “not all enterprises can borrow money from banks at the prime rate” and an aim to achieve “a rate that is broadly available to the market.” It further argues that the addition of that premium is “especially important ‘[i]n the present market situation of ultra-low interest rates.”²²⁴¹

1797. In the Tribunal’s view, however, the decisive question is not whether the interest rate would be “broadly available to the market” but rather whether it reasonably reflects the borrowing costs of Claimant’s owners which would have funded the project and, thus, the damage caused by the fact that the owed amount of compensation has not been paid on 15 November 2011. Given that Barrick and Antofagasta are undisputedly large and creditworthy companies – a fact which has played a role in various aspects of the Tribunal’s assessment of the concerns raised by Respondent regarding the alleged unfeasibility of the project – the Tribunal is not convinced that the addition of two percentage points would be appropriate in the present circumstances.

1798. The Tribunal also cannot follow the argument that “the present market situation of ultra-low interest rates” would warrant a different result. As calculated by Prof. Davis, the US Prime Rate plus two percentage points corresponds to an annualized compound rate of 5.6%. This indicates that the US Prime Rate as such is not “ultra low.” In any event, the statement quoted by Claimant was made by tribunal in *Rusoro v. Venezuela* in the context of assessing a four percent premium to the LIBOR rate, which is not at issue here, and together with its finding that the interest rate should not fall below a minimum of 4% p.a.²²⁴² In the Tribunal’s view, this indicates that the base rate considered by the *Rusoro*

²²³⁹ Irmgard Marboe, *Methods of Valuation in International Practice, Calculation of Compensation and Damages in International Investment Law* (2d ed. 2017) [CA-434], ¶ 6.90.

²²⁴⁰ Irmgard Marboe, *Methods of Valuation in International Practice, Calculation of Compensation and Damages in International Investment Law* (2d ed. 2017) [CA-434], ¶¶ 6.91-6.96.

²²⁴¹ Claimant’s Quantum Reply, ¶ 409.

²²⁴² *Rusoro Mining Ltd. v. Bolivarian Republic of Venezuela*, ICSID Case No. ARB(AF)/12/5, Award of 22 August 2016 [CA-361], ¶ 838.

tribunal was below zero at certain times and is thus not comparable to the base rate at issue in this case.

1799. At the same time, the Tribunal is also not convinced that interest at the US Prime Rate with no additional premium is sufficient to compensate Claimant for the damage it has incurred as a result of Respondent's Treaty breaches. On balance, the Tribunal therefore concludes that interest should accrue at the US Prime Rate plus 1 percentage point, corresponding to a reasonable approximation of the borrowing cost of Claimant's owners and thus the damage that Claimant has incurred as a result of Respondent's Treaty breaches and the fact that compensation will be paid only after this Award.

1800. In the Tribunal's view, this rate is consistent with both standards of compensation advanced by the Parties, *i.e.*, it corresponds to a "*commercially reasonable*" rate as required under Article 7(3) of the Treaty and it ensures full reparation as required under customary international law.

1801. The final question for the Tribunal to assess is therefore whether interest should be calculated on a compound or simple basis.

1802. One of the arguments put forward by Respondent is that under Pakistani law, compound interest is prohibited in the absence of a specific agreement to that effect. It argues that "*any interpretation that the Australia-Pakistan BIT would lend itself to interpretations that would obliterate that legal prohibition would contradict the object and purpose of the BIT, and should thus be abandoned.*"²²⁴³ The Tribunal is not convinced by this argument, however. It is undisputed between the Parties that the present dispute arises under international law and is to be decided pursuant to the rules of international law, in particular the provisions of the Treaty. The Tribunal also notes that in the context of its submissions on the applicable interest rate, Respondent itself relies on a quote from the reasoning of the tribunal in *Unglaube v. Costa Rica*, which stated, *inter alia*, that "[a]lthough some tribunals apply an interest rate based on the requirements of the host State's domestic law, this is not the prevailing practice under international law. Additionally, commentators maintain that, '[t]he host-country-law approach has been criticized on the basis that where State's international responsibility is engaged, the award of interest should follow the rules of international law' rather than domestic law."²²⁴⁴ It might be worth noting that the commentator from whose book on damages in international law the *Unglaube* tribunal quoted is Dr. Ripinsky, who appeared as legal expert for Respondent in this arbitration. Dr. Ripinsky did not express an opinion on interest in either of his legal opinions.

²²⁴³ Respondent's Post-Hearing Brief on Quantum, ¶ 370.

²²⁴⁴ *Marion Unglaube et al. v Costa Rica*, ICSID Case Nos. ARB/08/1 and ARB/09/20, Award of 16 May 2012 [RLA-100], ¶ 323.

1803. The Tribunal also notes that Respondent itself has not proposed the application of an interest rate applicable under Pakistani law but has rather based its proposal of a risk-free rate based on US Treasury bills on considerations and authorities of international law. In the Tribunal's view, it would be inconsistent, however, to then resort to Pakistani law in order to determine whether that interest, which undisputedly had to be determined in accordance with the rules and principles of international law, shall be calculated on a compound or simple basis. The Tribunal will therefore look to international law to resolve this question as well.

1804. There is common ground between the Parties to the extent that in earlier decisions, tribunals tended to reject requests for compound interest. Claimant acknowledges that "*tribunals were historically reluctant to award compound interest.*"²²⁴⁵ As pointed out by Respondent, the Commentary to Article 38 of the ILC Articles, which dates from 2001, noted that "[t]he general view of courts and tribunals has been against the award of compound interest, and this is true even of those tribunals which hold claimants to be normally entitled to compensatory interest."²²⁴⁶ The Commentary specifically referred to decisions rendered by Iran-US Claims Tribunal in 1984 and 1986, which held that "*special reasons*" were required to depart from "*international precedents which normally do not allow the awarding of compound interest*" and which, according to Commentary demonstrated that "[t]he preponderance of authority thus continues to support the view expressed by Arbitrator Huber in the *British Claims in the Spanish Zone of Morocco case*," which took place from 1923 to 1925 and in which he held that "*the arbitral case law ... is unanimous ... in disallowing compound interest.*"²²⁴⁷

1805. The Parties are in dispute, however, as to whether there has been a change in more recent case law reflecting a trend towards granting compound interest as part of the compensation awarded to investors. As pointed out by Claimant, Dr. Ripinsky stated in his book on damages in international investment law dating from 2008:

*"The practice of investment tribunals has been mixed. However—perhaps a positive response to the academic criticism of simple interest—in the last 10 years tribunals have predominantly awarded compound interest. There have been more than 15 publicly known awards rendered by international tribunals in investor-State disputes where compound interest was granted, most of them issued after 2000. Although it would be wrong to suggest that tribunals have stopped awarding simple interest, the preference for compound interest has become apparent."*²²⁴⁸

²²⁴⁵ Claimant's Quantum Reply, ¶ 418.

²²⁴⁶ International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, Y.B. INT'L L. COMM'N (2001), VOL. II, UN Doc. A/CN.4/SER.A/2001/Add.1 (Part 2) [CA-1], Article 38, ¶ 8.

²²⁴⁷ International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, Y.B. INT'L L. COMM'N (2001), VOL. II, UN Doc. A/CN.4/SER.A/2001/Add.1 (Part 2) [CA-1], Article 38, ¶ 8.

²²⁴⁸ Sergey Ripinsky & Kevin Williams, *Damages in International Investment Law* (2008) [CA-431], p. 384.

1806. Following a discussion of the case law rendered in and after 2000, in particular the tribunal's reasoning in *Santa Elena v. Costa Rica* which awarded compound interest in 2000 and which he described as “*a turning point in jurisprudence*,” Dr. Ripinsky also made express reference to the ILC Articles quoted above and noted that while this codification of the international law on State responsibility “*continues to treat simple interest as the norm, viewing compound interest as exceptional and to be awarded only where special circumstances warrant it in order to achieve full reparation*,”²²⁴⁹ a different trend could be seen in international investment law:

“*As far as international investment law is concerned, there has been a reversal of the presumption of simple interest: a significant number of recent tribunal decisions provide a strong indication that compound interest has come to be treated as the default solution. This may be due to the nature of economic activity of the claimants in investor-State disputes and strong theoretical support for granting compound interest in such cases.*”²²⁵⁰

1807. The trend described by Dr. Ripinsky in 2008 and specifically that “[a] *real change of trend towards accepting compound interest became obvious in the year 2000*,” starting with the *Santa Elena* decision, was confirmed by the authority relied on by Claimant, which discusses the calculation of compensation and damages in international investment law and is dated 2017.²²⁵¹ Following an overview on relevant case law, including more recent case law rendered after 2008, this authority also concluded that “[t]he *brief overview shows that compound interest as opposed to simple interest is predominantly accepted in recent international investment arbitration. It is regarded as better reflecting actual economic realities both for the purpose of remedying the loss actually incurred by the injured party and for the prevention of unjustified enrichment of the respondent state.*”²²⁵²

1808. While the Tribunal has determined above that it does not consider it appropriate to mix considerations of unjust enrichment with the determination of damages based on compensatory principles, the Tribunal agrees with the authorities quoted above as well as with the tribunals whose decisions they discussed that compound interest more adequately reflects economic reality and thus the loss that Claimant has in fact incurred as a result of Respondent's Treaty breaches.

1809. Consequently, the Tribunal concludes that Claimant is entitled to interest at a rate corresponding to the US Prime Rate plus 1 percentage point, compounded annually,

²²⁴⁹ Sergey Ripinsky & Kevin Williams, *Damages in International Investment Law* (2008) [CA-431], pp. 384-387.

²²⁵⁰ Sergey Ripinsky & Kevin Williams, *Damages in International Investment Law* (2008) [CA-431], p. 387.

²²⁵¹ Irmgard Marboe, *Methods of Valuation in International Practice, Calculation of Compensation and Damages in International Investment Law* (2d ed. 2017) [CA-434], ¶ 6.239.

²²⁵² Irmgard Marboe, *Methods of Valuation in International Practice, Calculation of Compensation and Damages in International Investment Law* (2d ed. 2017) [CA-434], ¶¶ 6.240-6.248.

which accrues on the amount of compensation determined by the Tribunal above. Specifically, Respondent shall pay to Claimant interest at the rate specified above: (i), starting from the valuation date, *i.e.*, 15 November 2011 until the date of this Award (pre-award interest); and (ii) starting from the date of this Award until the date on which Claimant receives payment of the full amount pursuant to this Award (post-award interest).

VIII. THE TRIBUNAL'S DECISION ON COSTS

1810. On 28 September 2018, both Parties submitted their statements of costs, reflecting the costs, fees and expenses they incurred in this arbitration.

1811. Pursuant to Article 61(2) of the ICSID Convention, the decision on the costs of the arbitration, *i.e.*, the expenses incurred by the parties in connection with the proceedings as well as the fees and expenses of the members of the Tribunal, shall form part of the award.

1812. Accordingly, the Tribunal has not yet rendered a decision on the costs incurred by the Parties in the first phase of the proceedings leading up to the Tribunal's Decision on Jurisdiction and Liability and the second phase leading up to the Tribunal's Decision on Respondent's Application to Dismiss the Claims. In both Decisions, it has reserved on the costs of the respective phase of the arbitration for this Award.

A. Claimant's Submission on Costs

1813. Claimant submits that the Tribunal should order Respondent to compensate Claimant for all of the costs it has incurred in connection with this arbitration, including arbitral costs, legal fees and expenses, on an indemnity basis, in order to restore Claimant to the position it would have been in but for Respondent's Treaty breaches.²²⁵³

1814. Claimant argues that this should follow not only from the general principle that it has prevailed on all of its claims but also from the fact that, according to Claimant, Respondent "*has gone to great length to frustrate TCCA's claims*" and "*to erect every conceivable obstacle to TCCA's efforts to obtain compensation*" in order to delay an award and increase Claimant's costs.²²⁵⁴

1815. Claimant points to Article 61(2) of the ICSID Convention and notes that tribunals have consistently held that this provision affords them wide discretion to assess costs as they see fit, as has also been acknowledged by Respondent. Claimant considers it agreed

²²⁵³ Claimant's Submission on Costs, ¶¶ 1, 3.

²²⁵⁴ Claimant's Submission on Costs, ¶ 2.

between the Parties that “*the Tribunal should consider the relative success of the Parties in pursuing their claims and defenses, as well as the conduct of the Parties in advancing those claims and defenses.*” In Claimant’s view, both aspects require that it be awarded all of its costs.²²⁵⁵

1816. Referring to the general principle in international arbitral practice that costs should follow the event, Claimant considers that its application must result in Respondent bearing Claimant’s costs because Claimant prevailed on “*virtually all legal and evidentiary issues considered by the Tribunal,*” in particular: (i) jurisdiction and admissibility; (ii) liability; (iii) Respondent’s counterclaim; (iv) Respondent’s Application to Dismiss the Claims; (v) Respondent’s Reconsideration Request; (vi) Respondent’s first Disqualification Request; (vii) Respondent’s second Disqualification Proposal; and (viii) Respondent’s Application for a Ruling *in Limine* and for Spoliation Sanctions.²²⁵⁶

1817. According to Claimant, it should be awarded all of its costs and expenses even if the Tribunal were to award it a lesser amount than sought as damages in the present phase. Claimant refers to the tribunal in *Bear Creek v. Peru*, which awarded the claimant only 3% of the requested amount but 75% of its costs, because it did not consider it relevant which proportion of damages was ultimately awarded but what caused the party to incur the costs for which it sought reimbursement and noted that “[t]he vast majority of the arbitration costs were caused by the issues on which Respondent did not prevail.” In Claimant’s view, the same applies in the present case.²²⁵⁷

1818. Claimant further argues that awarding its full costs and expenses is consistent with, and in fact required under, the customary international law standard of full reparation. It refers to the tribunal in *Gemplus v. Mexico*, which held that “*following the general principle expressed in Chorzow Factory, that ‘reparation must, as far as possible, wipe out all the consequences of the illegal act’, ... compensation should include a claimant’s reasonable costs, both reasonably incurred and reasonable in amount, in successfully and necessarily asserting its disputed legal rights in arbitration proceedings against an unsuccessful respondent,*” as well as to the tribunal in *ADC v. Hungary*, which considered that “[w]ere the Claimants not to be reimbursed their costs in justifying what they

²²⁵⁵ Claimant’s Submission on Costs, ¶¶ 4-6, referring to Respondent’s Counter-Memorial on Quantum, ¶¶ 448, 445.

²²⁵⁶ Claimant’s Submission on Costs, ¶¶ 7-8.

²²⁵⁷ Claimant’s Submission on Costs, ¶¶ 10-11, quoting from *Bear Creek Mining Corp. v. Peru*, ICSID Case No. ARB/14/21, Award of 30 November 2017 [CA-432], ¶ 730.

alleged to be egregious conduct on the part of Hungary it could not be said that they were being made whole."²²⁵⁸

1819. As an additional factor, Claimant considers it well-established that a tribunal "*should ... take into account the procedural conduct of the parties, and in particular whether such conduct delayed the proceedings or increased costs unnecessarily*" and claims that Respondent's conduct has caused both, *i.e.*, significant delays and unnecessary costs, through the manner in which it chose to argue its case.²²⁵⁹

1820. Claimant further contends that a cost award serves not only to compensate the injured party but also to sanction unlawful, dilatory or other improper conduct of the wrongful party. It specifically refers to the tribunal in *Karkey v. Pakistan*, which held that "*Pakistan did not cooperate in good faith in the arbitral proceedings and such behaviour must be taken into account by the Tribunal in the allocation of costs*" and placed emphasis on the fact that Pakistan "*made the Tribunal spend a large part of the Hearing on unfounded ... arguments of corruption*" and that "*Pakistan requested the introduction of additional evidence only at the end of the[] proceedings causing unnecessary disruption and expenses, in an attempt to uncover evidence to substantiate alleged 'red flags' or suspicions of corruption.*"²²⁶⁰

1821. Claimant argues that, likewise, Respondent's "*improper conduct*" in this case increased the duration and costs of this arbitration and also threatened the integrity of the proceedings, providing "*further and independent reason*" to award Claimant all of its costs and expenses. Specifically, Claimant refers to the following "*examples*": (i) Balochistan's reversal of its position in the Supreme Court proceedings regarding the CHEJVA; (ii) Respondent's "*abusive extension demands*" with regard to its Counter-Memorial on Jurisdiction and Liability, which forced the Tribunal to postpone the Hearing on Jurisdiction and Liability by ten months; (iii) Respondent's corruption claims which it raised in a letter eight months after the Hearing on Jurisdiction and Liability and which it continued to expand after its Application to Dismiss the Claims, especially through new and expanded witness statements; (iv) Respondent's reliance on "*false confessions and fabricated documentary evidence*" in support of its allegations which were "*deliberately designed to be difficult to disprove*" and caused Claimant to incur more than USD 25 million in costs to investigate and defend against these allegations; (v)

²²⁵⁸ Claimant's Submission on Costs, ¶¶ 12-13, quoting from *Gemplus v. Mexico*, ICSID Case No. ARB/04/3, Award of 16 June 2010 [CA-104], ¶¶ 17-21 and *Affiliate Limited and ADC & ADMC Management Limited v. The Republic of Hungary*, ICSID Case No. ARB/03/16, Award of 2 October 2006 [CA-61], ¶ 533.

²²⁵⁹ Claimant's Submission on Costs, ¶¶ 14-15, quoting from *Burlington Resources Inc. v. Republic of Ecuador*, ICSID Case No. ARB/08/5, Decision on Resconsideration and Award of 7 February 2017 ("Burlington Award") [CA-356], ¶ 620.

²²⁶⁰ Claimant's Submission on Costs, ¶¶ 18-20, quoting from *Karkey Karadeniz Elektrik Uretim A.S. v. Islamic Republic of Pakistan*, ICSID Case No. ARB/13/1, Award of 22 August 2017 [CA-486], ¶¶ 1063, 1069, 1066.

Respondent's demand for a separate hearing dedicated to hearing the Parties' forensic experts regarding the Aziz Diaries the originals of which Respondent refused to deliver to the Tribunal; (vi) Respondent's first Disqualification Request and its request for an independent and non-binding opinion from the Secretary-General of the PCA as well as Respondent's second Disqualification Proposal which was directed against all three members of the Tribunal and was rejected by the ICSID Chairman of the Administrative Council; (vii) Respondent's conduct in connection with the 2017 site visit which caused Claimant to incur more than USD 120,000 in direct expenses as well as "*hundreds of thousands of dollars of additional legal fees and costs in defending against the procedural applications Pakistan filed arising out of that visit,*" in particular regarding the review of Claimant's records at the offices of its Pakistani counsel; (viii) Respondent sought to introduce new witness evidence during the second round of written submissions in every phase of the arbitration; (ix) Respondent "willfully" failed to produce documents despite repeated orders from the Tribunal and redacted several documents despite the Tribunal's orders; and (x) in the quantum phase, Respondent submitted a valuation that its own expert acknowledged to be contrary to industry practice and launched "*unfounded attacks*" against the Feasibility study and Expansion Pre-Feasibility Study the defense against which caused more than USD 1.2 million in expert witness fees and expenses.²²⁶¹

1822. Finally, Claimant submits that in the circumstances of this arbitration, the costs it has incurred are "*entirely reasonable*" because "*the manner in which Pakistan has chosen to defend itself was enormously expensive for TCCA.*" In particular, Claimant argues that any disparity between the cost incurred by the Parties is "*the inescapable consequence of Pakistan's frivolous claims.*" It refers to several tribunals, which held that it is not unreasonable for claimants to incur greater costs than respondents as they bear the burden of proof on most issues. In addition, Claimant argues that there is a "*massive disparity in the Parties' respective disclosures of documents and the fact that TCCA had not only to investigate a wide range of vague and unfounded allegations of corruption but defend against scattershot attacks on virtually every aspect of its exploration and feasibility work*" and further points to "*Pakistan's consistent practice of introducing new claims and evidence on reply or rejoinder, and to file frivolous procedural applications.*"²²⁶²

1823. In any event, Claimant submits that tribunals have been reluctant to "second-guess" a party's decision to incur each component cost and refers to Judge Holtzmann quoted in *ADC v. Hungary*, who considered that "*legal bills are usually first submitted to businessmen. The pragmatic fact that a businessman has agreed to pay a bill, not knowing whether or not the Tribunal would reimburse the expenses, is a strong indication that the*

²²⁶¹ Claimant's Submission on Costs, ¶¶ 21-46.

²²⁶² Claimant's Submission on Costs, ¶¶ 47-48,

*amount billed was considered reasonable by a reasonable man spending his own money, or the money of the corporation he serves.*²²⁶³

1824. On that basis, Claimant requests that Respondent be ordered to pay, on an indemnity basis, all of Claimant's costs and expenses, including attorneys' and experts' fees, which it has summarized as follows:²²⁶⁴

1. ICSID Advances on Costs (<i>see p. 3</i>)	US\$ 2,600,000
2. Debevoise & Plimpton LLP (<i>see pp. 4–7</i>)	
<u>Stage 1</u> (Request for Arbitration and Provisional Measures)	US\$ 3,322,627.06
<u>Stage 2</u> (Jurisdiction and Liability)	US\$ 8,418,192.79
<u>Stage 3</u> (Pakistan's Application to Dismiss the Claims)	US\$ 21,738,366.50
<u>Stage 4</u> (Quantum)	US\$ 17,576,140.24
3. Pakistani Counsel (<i>see p. 8</i>)	
Khan & Associates	US\$ 508,612.67
Fazle Ghani Advocates	US\$ 83,296.43
HaidermotaBMR	US\$ 351,451.96
4. Fact Witness Expenses (<i>see p. 9</i>)	
<u>Stage 2</u> (Jurisdiction and Liability)	US\$ 82,392.45
<u>Stage 3</u> (Pakistan's Application to Dismiss the Claims)	US\$ 599,466.39
<u>Stage 4</u> (Quantum)	US\$ 18,337.86
Attorney's fees and expenses for individual counsel to witnesses	US\$ 968,287.79

²²⁶³ Claimant's Submission on Costs, ¶ 49, quoting from *Affiliate Limited and ADC & ADMC Management Limited v. The Republic of Hungary*, ICSID Case No. ARB/03/16, Award of 2 October 2006 [CA-61], ¶ 534.

²²⁶⁴ Claimant's Submission on Costs, ¶ 50 and Schedule A.

<p>5. Expert Witness Expenses (see p. 10)</p> <p style="padding-left: 40px;"><u>Stage 3</u> (Pakistan’s Application to Dismiss the Claims)</p> <p style="padding-left: 40px;"><u>Stage 4</u> (Quantum)</p>	<p style="text-align: right;">US\$ 237,219.61</p> <p style="text-align: right;">US\$ 4,537,285.40</p>
<p>6. Other Expenses (see p. 11)</p> <p style="padding-left: 40px;">Forensic accountants, external document review, and slide vendors</p> <p style="padding-left: 40px;">Travel expenses for client representatives to attend hearings on Respondent’s Application to Dismiss the Claims</p> <p style="padding-left: 40px;">Expenses associated with October 2017 Site Visit (not including legal fees)</p> <p style="padding-left: 40px;">TCCA’s share of the costs of the metallurgical test work ordered by Prof. Dagdelen</p>	<p style="text-align: right;">US\$ 774,448.03</p> <p style="text-align: right;">US\$ 75,542.55</p> <p style="text-align: right;">US\$ 124,428.87</p> <p style="text-align: right;">US\$ 31,500.00</p>
TOTAL	US\$ 62,047,596.83

B. Respondent’s Submission on Costs

1825. Respondent submits that Claimant should bear all costs and fees incurred by Respondent or, in the alternative, the Tribunal should allocate costs based on the proportion of success of Claimant’s damages claim.²²⁶⁵

1826. Respondent submits that pursuant to Article 61(2) of the ICSID Convention, the Tribunal has the power and discretion to determine and allocate the costs of this arbitration and argues that ICSID tribunals award costs against the other party “*where that party has acted in an unreasonable, unlawful, or frivolous manner.*”²²⁶⁶ According to Respondent, Claimant’s actions “*have demonstrated bad faith tactics, frivolous objections, and unlawful actions, particularly as it relates to Pakistan’s access to the project records and the site visit to the core shed*” which Claimant attempted to avoid and restrict. Respondent claims that Claimant employed “*guerilla tactics*” before and during the site visit and even compromised the integrity of the project’s physical records by paying a witness to remove samples from the core shed, demonstrating Claimant’s bad faith. By contrast, Respondent argues that it acted “*in an abundance of good faith,*” facilitating the site visit and ensuring the safety of Claimant’s personnel.²²⁶⁷

²²⁶⁵ Respondent’s Submission on Costs, Section II.

²²⁶⁶ Respondent’s Submission on Costs, ¶¶ 4-5, referring to *Ömer Dede v. Romania*, ¶¶ 268–270; *Siemens AG v. Argentine Republic*, ICSID Case No. ARB/02/8, Separate opinion by Professor Domingo Bello Janeiro of 30 January 2007, ¶ 6; *MCI Power Group L.C. & New Turbine Inc. v. Republic of Ecuador*, ICSID Case No. ARB/03/6, Award of 31 July 2007 [RLA-245], ¶ 372; *AES Summit Generation Ltd and AES-Tisza Erőmű Kft v. Republic of Hungary*, ICSID Case No. ARB/07/22, Award of 23 September 2010 [RLA-285], ¶ 15.3.3; *EDF Ltd. v. Romania*, ICSID Case No. ARB/05/13, Award of 8 October 2009 [CA-136], ¶ 322.

²²⁶⁷ Respondent’s Submission on Costs, ¶¶ 6-9.

1827. Respondent further argues that Claimant filed “*frivolous requests for interim relief*” before this Tribunal as well as the parallel tribunal in the ICC proceedings between Claimant and the Province of Balochistan, with the first of them being dismissed by both Tribunals and the second one being abandoned even though the court proceedings before the Islamabad High Court continue. Respondent also refers to Claimant’s submission of almost 70 new documents “*on the eve of the hearing*” even though they were mostly supportive of issues raised in its Quantum Reply and/or should have been disclosed pursuant to Respondent’s document production requests. According to Respondent, “*even more shocking*” was that Claimant disclosed only a few days before the closing arguments that the calculation of its expert had been “*off by USD 1 billion,*” which required Respondent to restructure its cross-examination and its experts to conduct a rushed review of these calculations. In Respondent’s view, “[t]his error cannot go unnoticed and should be given due consideration in any costs determination.”²²⁶⁸
1828. As for Claimant’s complaint about delays caused by Respondent in this arbitration, Respondent argues that an award of interest will compensate for the passage of time and emphasizes that “*any delay caused was necessary for Pakistan to fully exercise and protect its due process rights and do as much as possible to ensure a fair proceeding and maintain the equality of arms between the parties. Pakistan has otherwise acted appropriately in these proceedings. None of the objections or defenses raised by Pakistan were frivolous or offered in bad faith, but to the contrary were serious, based on solid grounds, and put forth to fully guard and defend Pakistan’s rights.*”²²⁶⁹
1829. Specifically, Respondent contends that its corruption allegations were based on newly discovered evidence “*that could not be ignored*” and brought to light Claimant’s engagement in improper payments to obtain visa approvals and the violation of anti-corruption policies by the all-expense trips for the GOB. Respondent also emphasizes that its first Disqualification Request was filed to defend its right to an impartial and independent tribunal and that its second Disqualification Proposal was based on newly discovered facts. According to Respondent, “*Pakistan should not be penalized for exercising its rights to ensure the integrity of the proceedings and the impartiality of the Tribunal.*”²²⁷⁰
1830. Respondent therefore requests that the allocation of costs take into account “*TCCA’s tactics to derail and prejudice Pakistan’s defense*” and ultimately be based on the apportionment of success of the damages that Claimant has claimed in order to “*balance against the current trend of claimants abusing the ICSID system to request exorbitant damages, which they are not able to prove, as a ruse to get the Tribunal to issue higher*

²²⁶⁸ Respondent’s Submission on Costs, ¶¶ 10-12.

²²⁶⁹ Respondent’s Submission on Costs, ¶ 13.

²²⁷⁰ Respondent’s Submission on Costs, ¶¶ 14-15.

damage awards.” According to Respondent, Claimant has advanced an “*unsubstantiated and outrageous damages claim against a developing State that has to struggle to find the resources to mount a meaningful defense.*” For that reason, Respondent argues that costs should not be awarded exclusively on the basis of who prevailed in a given phase of the proceedings but should rather also consider the overall success of Claimant’s damages claim in order to discourage claimants from seeking “*exaggerated and deceptive damages claims,*” while preserving the integrity and respectability of the ICSID system.²²⁷¹

1831. Respondent requests that the Tribunal award costs to Pakistan or, in the alternative, allocate costs based on the success of Claimant’s damages claim, and submits that it has incurred costs in the total amount of USD 25,456,790, which it has summarized as follows:²²⁷²

Description	Costs
Phase 1: Appointment of Arbitral Tribunal, provisional measures and jurisdiction	
Legal fees of ABS & Co and international counsel ²⁶	USD 1,083,525
Phase 2: Jurisdiction & Liability Phase (Counter-Memorial, Rejoinder, Hearing on Jurisdiction, Liability and Counter-Claim and Post-Hearing Submission)²⁷	
Legal Fees of ABS & Co, Omnia Strategy LLP and international counsel ²⁸	GBP 3,865,972.97
Disbursements (incl. travel, expenses and miscellaneous expenses)	GBP 265,636.75
Phase 3: Corruption Phase (June 2015-December 2016)	
Legal Fees of Allen & Overy LLP	GBP 5,213,640.28
Legal Fees of Mr. Ali Zahid Rahim & Mr. Usman Raza Jamil – Local Counsel	PKR 22,750,000
Expert Fees	GBP 157,119.72
Disbursements: Allen & Overy LLP (incl. travel expenses, incidental expenses, and some expert related expenses)	GBP 500,943.89
Expenses for GoB consultants, local counsel and witnesses (including international/domestic travel, lodging, food, and other incidental expenses related to attending meetings with counsel and hearings)	PKR 58,932,571
Expenses for international/domestic travel, lodging, food, etc. (costs of attending hearings).	PKR 18,485,352

²²⁷¹ Respondent’s Submission on Costs, ¶ 16.

²²⁷² Respondent’s Submission on Costs, ¶¶ 17-18.

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Phase 4: Quantum Phase (December 2016-September 2018)	
Legal Fees of GST LLP (June 2017-September 2018)	USD 2,192,162.50
Legal Fees of Allen & Overy LLP (December 2016-July 2018)	GBP 1,221,154.94
Legal Fees of local counsel of Mr. Ali Z. Rahim and Mr. Usman Raza Jamil	PKR 20,415,972
Legal fees for Consultant – Khawar Qureshi	GBP 75,000
Fees for experts (retained by Allen & Overy LLP)	GBP 54,473.61
Fees for experts, including expenses for travel, etc. (retained by GST LLP)	USD 3,913,147.10 PKR 9,467,500.00
Disbursement to GST LLP (incl. travel and miscellaneous expenses and some expert related expenses)	USD 420,337.58
Disbursement to Allen & Overy LLP (incl. travel and miscellaneous expenses).	GBP 173,406.52
Expenses for Local Counsel and Witnesses (including travel, lodging, food, and other incidental expenses including courier services, cargo services, photocopying and stationery)	PKR 71,985,783
Expenses for GoP and GoB delegations (including travel, lodging, etc incurred in attending meetings with counsel and hearings)	PKR 22,355,370
ICSID fees advanced by Pakistan	
Fourth advance to ICSID	USD 300,050
Fifth advance to ICSID	USD 300,000
Sixth advance to ICSID	USD 300,000
Total for all Phases	
Total Legal Fees	GBP 10,375,768.20 USD 3,275,687.5 PKR 43,165,972
Total Expert Fees	GBP 286,593.33 USD 3,913,147.10 PKR 9,467,500.00
Total Expenses	GBP 939,987.16 USD 420,337.58 PKR 171,759,076
Total Costs paid to ICSID	USD 900,050.00
Total	GBP 11,602,348.70 USD 8,509,222.18 PKR 224,392,548

C. Tribunal's Decision

1832. There is common ground between the Parties that the Tribunal's authority to render a decision on the allocation of costs is based on Article 61(2) of the ICSID Convention, which provides:

"In the case of arbitration proceedings the Tribunal shall, except as the parties otherwise agree, assess the expenses incurred by the parties in connection with the proceedings, and shall decide how and by whom those expenses, the fees and expenses of the members of the Tribunal and the charges for the use of the facilities of the Centre shall be paid. Such decision shall form part of the Award."

1833. There is further common ground that the Tribunal enjoys discretion to "*assess the expenses incurred by the parties,*" which extends to all costs incurred by the Parties in connection with this arbitration, *i.e.*, including legal and expert fees and expenses as well as other expenses.

1834. The Tribunal will thus exercise its discretion under Article 61(2) of the ICSID Convention and decide on the allocation of: (i) the costs of the arbitration, which includes the administrative fees charged by ICSID as well as the fees and expenses of the members of the Tribunal; and (ii) the fees and expenses incurred by the Parties in connection with this arbitration.

1. The Costs of the Arbitration

1835. First, the Tribunal will address the question of who shall bear the costs of the arbitration.

1836. There is common ground between the Parties to the extent that in its decision on the allocation of costs, the Tribunal should take into account the outcome of the arbitration. While Claimant explicitly refers to the principle of "*costs follow the event*" and places emphasis on the legal and evidentiary issues on which it has prevailed in the course of this arbitration, Respondent argues that the Tribunal should not only look at who prevailed in a given phase of the arbitration but also take into account the overall success of Claimant's damages claim, *i.e.*, the proportion of success specifically in the quantum phase.

1837. The Tribunal does not agree with the overarching significance that Respondents intends to attach to the result of this final phase of the proceedings. In support of its argument, Respondent invokes the necessity to discourage claimants from filing exaggerated damages claims and preserving the integrity of the ICSID system. The Tribunal does not agree with Respondent, however, that Claimant has filed an "*unsubstantiated and outrageous damages claim.*"²²⁷³ It further considers that the allocation of costs incurred

²²⁷³ Cf. Respondent's Submission on Costs, ¶ 16.

by the Parties for presenting their claims and defenses in this arbitration should not be based on considerations referring to “*other claimants*” and thus considerations unrelated to this arbitration. In the Tribunal’s view, it also does not impact either the integrity or the respectability of the ICSID system if costs are allocated by looking at the findings made in all phases of this arbitration.

1838. This arbitration has consisted of three separate phases involving separate written submissions, separate oral hearings and separate decisions by the Tribunal. In each of these phases, both Parties incurred significant amounts of costs for presenting their claims and defenses. Taking into account that only one of these phases concerned the amount of damages requested by Claimant, the Tribunal does not consider it appropriate to allocate the costs for all three phases, *i.e.*, including the phase addressing jurisdiction and liability as well as the phase addressing Respondent’s allegations of corruption, based on the proportion of success in the final quantum phase. The same applies to additional decisions rendered by the Tribunal on Claimant’s 2012 Provisional Measures Request as well as on Respondent’s Reconsideration Request.

1839. The Tribunal further notes that both Parties have criticized the procedural conduct of the other Party and argue that such conduct should be taken into account as an independent reason to award it the costs it has incurred in this arbitration. In the Tribunal’s view, the outcome of the proceedings should and will be the primary basis for allocating the costs of the arbitration. However, certain procedural conduct which resulted in a significant increase of costs on both sides, without there being a justification for such costs from an objective point of view, may also be taken into account in determining the final allocation of costs.

1840. At the outset of this arbitration, Claimant filed its 2012 Provisional Measures Request, which involved written submissions and an oral hearing following which the Tribunal decided not to recommend any provisional measures. The Tribunal did order Respondent, however, to inform the Tribunal and Claimant, on a regular basis, about its specific plans and activities with respect to deposit H-4 as well as of any change of its present intentions to implement the work plan for H-4, not to expand its mining activities to H-14 and H-15, and not to give any rights in this regard to any third party. No further decision was required on that matter.

1841. Claimant has fully prevailed on the matters of jurisdiction, admissibility, liability and the counterclaims raised by Respondent. More specifically, the Tribunal affirmed the general jurisdictional requirements under the ICSID Convention, in particular that Claimant has made a qualifying “*investment*,” it dismissed both of Respondent’s objections on jurisdiction and admissibility, and it made an affirmative finding on all three breaches of the Treaty that Claimant has alleged. It further dismissed the counterclaim raised by Respondent, in part on jurisdiction and in part on the merits.

1842. After the Hearing on Jurisdiction and Liability, Respondent raised allegations of corruption which led to a separate phase dealing with Respondent's Application to Dismiss the Claims on that basis. Following the Parties' written submissions, oral hearings involving a large number of witnesses as well as forensic experts from both sides, the Tribunal found that Respondent had failed to prove any of its factual allegations of corruption.
1843. Shortly after filing its Counter-Memorial on Quantum, Respondent filed a Reconsideration Request in which it requested that the Tribunal reconsider certain findings made on jurisdiction and liability. Following Claimant's Request for Summary Dismissal of the Reconsideration Request and further submissions from both Parties, the Tribunal rejected Respondent's Reconsideration Request.
1844. Finally, on quantum, the Tribunal found it appropriate to follow the valuation approach presented by Claimant and its expert. It further found that none of the risks and issues raised by Respondent and its various experts impacted the feasibility of the project and with regard to a large majority of these issues, the Tribunal was also not convinced that they had an impact on the value of Claimant's investment. The Tribunal did make certain adjustments to the value of Claimant's investment as calculated by Prof. Davis, in particular with regard to the security risks caused by political violence and the risk that the mining lease might not be renewed or might not be renewed on the same terms after its initial 30-year term. In addition, the Tribunal held that a further deduction had to be made to fully account for the systematic risks affecting a project with a 56-year life of operations. The Tribunal also notes, however, that Respondent's experts did not present an alternative income-based valuation on which the Tribunal could have relied to verify its conclusions or even an update of the calculations made in the Expansion Pre-Feasibility Study to the valuation date even though they relied on these calculations in support of their criticism of the valuation method proposed by Claimant. Moreover, while Respondent did present an alternative, market-based valuation, the Tribunal has determined above that this valuation could not be used as an indicator of the project's value as of the valuation date given that Respondent's expert had not assigned any value at all to the exploration work carried out by Claimant in the five years between the acquisition of Claimant by Barrick and Antofagasta and the valuation date.
1845. On balance, and while being aware that Claimant did not succeed on its 2012 Provisional Measures Request at the outset of this arbitration and did not fully prevail on its damages claim in the final phase the Tribunal considers it appropriate that Respondent shall bear the costs of the arbitration in full. In particular, the Tribunal recalls its finding on liability that none of the reasons invoked in the Notice of Intent to Reject and/or in this arbitration justified the Licensing Authority's decision to deny TCCP's Mining Lease Application. The Tribunal is convinced that the real motive for the denial of TCCP's Mining Lease Application was the fact that the GOB had decided to develop and implement its own

mining project rather than to collaborate with Claimant pursuant to the CHEJVA and that the grounds invoked by the Licensing Authority served only as a pretext to conceal this motive. The Tribunal concluded that by denying TCCP's Mining Lease Application in order to allow the GOB to implement its own project instead, Respondent has breached its obligations to accord Claimant fair and equitable treatment under Article 3(2) of the Treaty, carried out a measure having effect equivalent to expropriation that did not comply with the requirements for a lawful expropriation under Article 7(1) of the Treaty, and impaired the use of Claimant's investment in violation of Article 3(3) of the Treaty.

1846. In light of Respondent's conduct and the absence of any form of compensation, Claimant had to initiate this arbitration in order to obtain compensation for the loss of its investment caused by Respondent's breaches of its obligations under the Treaty. In the final phase of this arbitration, Claimant has further demonstrated that, contrary to Respondent's arguments, the project was technically and economically feasible and could have proceeded to construction and the operational stage if the mining lease had been granted. Claimant has further demonstrated that the project had substantial value.

1847. Against this background, the Tribunal considers it justified that Respondent shall bear in full the costs of the arbitration, which amount in USD to:

Arbitrators' fees and expenses	
Mr. John Beechey	6,072.06
Prof. Dr. Klaus Sachs	1,781,488.88
Rt. Hon. Lord Leonard Hoffmann	357,473.08
Dr. Stanimir A. Alexandrov	656,615.10
Tribunal Assistant's expenses	
Susanne Schwalb	22,038.67
ICSID's administrative fees	244,000.00
Direct expenses ²²⁷⁴	695,506.23
<u>Total</u>	<u>3,763,194.02</u>

1848. In accordance with Regulation 14(3)(d) of ICSID Administrative and Financial Regulations, ICSID requested the Parties to pay each of the respective advances on costs in equal shares. Respondent, however, has not paid its 50% share pursuant to the first three of the advance payment requests issued by ICSID but has only paid its share of the fourth, fifth, sixth and seventh advance payment requests. Upon request, Claimant has therefore paid its own share as well as Respondent's share of the first three advance

²²⁷⁴ This amount includes charges relating to the dispatch of the Award (courier, printing and copying).

payments on costs in the total amount of USD 2,900,000; Respondent has made payments in the total amount of USD 1,199,925.00.

1849. Accordingly, the Tribunal orders Respondent to pay to Claimant USD 2,533,277.08, which is the net amount after deducting from the full amount that Claimant has paid as advance on costs to ICSID, *i.e.*, USD 2,900,000.00, the refund of USD 366,722.92 to be made by ICSID to Claimant.

2. The Costs Incurred by the Parties in Connection with this Arbitration

1850. Second, the Tribunal will assess the question of who shall bear the fees and expenses incurred by the Parties in connection with this arbitration. The Tribunal notes that both Parties have incurred substantial amounts of costs in the arbitration. Neither Party has sought leave to file a response to the other Party's Submission on Costs and, in particular, no objections to the reasonableness of the other Party's costs have been raised. As reflected in the summaries of the procedural history included in the Tribunal's Decision on Jurisdiction and Liability, the Tribunal's Decision on Respondent's Application to Dismiss the Claims (with Reasons) and this Award, both Parties have employed substantial efforts to present their claims and defenses in each phase of this arbitration, each of which concerned a large number of highly complex factual and/or legal issues. Both Parties relied on a large number of factual and expert witnesses as well as a comprehensive amount of factual exhibits and legal authorities. Against this background and in the absence of any objection from either Party, the Tribunal sees no reason to question the reasonableness of the costs incurred by the Parties and/or to make deductions with regard to the amount of recoverable costs.

1851. Both Parties have separately presented the costs they have incurred in each of four stages of the arbitration: (i) Request for Arbitration, appointment of the Tribunal, Claimant's 2012 Provisional Measures Request; (ii) written submissions and Hearing on Jurisdiction & Liability; (iii) Respondent's Application to Dismiss the Claims based on allegations of corruption; and (iv) quantum.

1852. For the reasons set out above, the Tribunal considers it appropriate that Respondent shall also bear the costs incurred by Claimant in connection with this proceeding. While Claimant has not succeeded on its 2012 Provisional Measures Request at the first stage and certain deductions had to be made from the amount of compensation requested by Claimant at the final stage, the Tribunal considers that, on balance, these aspects are outweighed by the fact that: (i) Claimant has fully succeeded on jurisdiction and liability, including an affirmative finding on all three Treaty breaches alleged by Claimant, as well as in defending against Respondent's counterclaims; (ii) Claimant has successfully defended against each of Respondent's allegations of corruption, with the Tribunal having found no proven incident of Claimant exercising, or attempting to exercise, improper influence on Government officials aimed at obtaining rights or benefits relating to

Claimant's investment in Pakistan; and (iii) Claimant has proven that the project was technically and economically feasible and had substantial value. Furthermore, neither of the two aspects changes the fact that Claimant had to initiate this arbitration in order to receive the amount of compensation to which it is entitled as a result of Respondent's Treaty breaches.

1853. As an additional consideration, it must be noted that Respondent has raised various defenses in this arbitration which were found to be almost entirely meritless but nevertheless caused the proceedings to extend over a significant period of time and the Parties to incur large amounts of costs. In particular, in the quantum phase in which Claimant has succeeded to a considerable extent, albeit not in the full amount, Respondent chose to defend itself by presenting expert reports from an array of experts on the subjects of mineral resources, metallurgy, project execution, water supply, security, environmental and social impacts, permitting and approvals, as well as financing, but most of the criticisms raised by these experts turned out to be unconvincing and without any merit. As already expressed in its general remarks in Section VII.A.3 above, the Tribunal also recalls that none of these issues was raised by the Licensing Authority in its Notice of Intent to Reject and there is no evidence in the record that any other agency or official of the GOB or the GOP raised these issues during the time period in which the joint venture partners were still collaborating or even when the GOB had decided to take over the project and deny TCCP's Mining Lease Application in violation of Respondent's obligations under the Treaty. It was only during these arbitration proceedings that Respondent started to invoke additional grounds as allegedly critical issues that purportedly rendered the project unfeasible. In addition, Claimant was the only Party which presented the Tribunal with a valuation that could form the basis for the Tribunal's assessment of Claimant's damages, whereas the only valuation presented by Respondent and its experts did not serve to assist the Tribunal in the task at hand, *i.e.*, determining the value of Claimant's investment.

1854. While it is of course for each Party to decide on the strategy of how to defend against a claim brought forward against it, the Tribunal considers it appropriate that this Party also bear the consequences caused by that strategy. In this case, this applies in particular to the large amount of costs that Claimant had to incur in order to defend against the unproven allegations of corruption and the largely unfounded criticisms raised in the quantum phase. In the Tribunal's view, it is therefore justified that Respondent be ordered to bear the full costs incurred by Claimant in connection with this arbitration, *i.e.*, including the costs incurred by Claimant in the quantum phase. In addition, Respondent shall bear its own costs that it has incurred in connection with the arbitration.

1855. Consequently, Respondent shall reimburse to Claimant a total amount of USD 59,447,596.60, consisting of: (i) legal fees and costs for its international counsel in the amount of USD 51,055,326.59 and for its local counsel in the amount of

USD 943,361.06; (ii) fact witness expenses in the amount of USD 1,668,484.49; (iii) expert witness expenses in the amount of USD 4,774,505.01; and (iv) other expenses in the amount of USD 1,005,919.45.

3. Post-Award Interest on Costs

1856. Finally, Claimant requests that it be awarded post-award interest on any amount of costs awarded to it until full payment of those amounts is made.

1857. The Tribunal considers it appropriate to award interest on the amount of costs that Respondent is ordered to reimburse at the same post-award interest rate as on the principal amount of compensation, *i.e.*, at a rate corresponding to the US Prime Rate plus 1 percentage point, compounded annually. Such interest shall start to accrue from the date of this Award.

IX. DECISION BY THE TRIBUNAL

1858. The Tribunal therefore decides as follows:

- I. To the extent that the Tribunal has previously admitted evidence submitted by the Parties in the present phase of the proceeding *de bene esse*, such evidence is admitted into the record.**
- II. Respondent shall pay to Claimant USD 4,087 million as principal amount of compensation for the breaches, as determined in the Tribunal's Decision on Jurisdiction and Liability dated 10 November 2017, of Respondent's obligations under Articles 3(2), 7(1) and 3(3) of the *Agreement between Australia and the Islamic Republic of Pakistan on the Promotion and Protection of Investments* relating to Claimant's investment in Pakistan.**
- III. Respondent shall further pay to Claimant pre-award interest on the principal amount of compensation under II., as of 15 November 2011 until the date of this Award, at a rate corresponding to the US Prime Rate plus 1 percentage point, compounded annually.**
- IV. Respondent shall further pay to Claimant post-award interest on the principal amount of compensation under II., as from the date of this Award until the date of payment, at a rate corresponding to the US Prime Rate plus 1 percentage point, compounded annually.**
- V. Respondent shall bear the costs of the arbitration, *i.e.*, the fees and expenses of the members of the Tribunal, the expenses of the Tribunal's Assistant, as well as the charges for the use of the facilities of ICSID, in the total amount of**

USD 3,763,194.02, in full. Consequently, Respondent shall reimburse to Claimant an amount of USD 2,533,277.08.

- VI. Respondent shall further bear an amount of USD 59,447,596.60 of the costs incurred by Claimant in connection with this arbitration proceeding and thus reimburse to Claimant an amount of USD 59,447,596.60.**
- VII. Respondent shall pay to Claimant post-award interest on the amount of costs to be reimbursed under V. and VI. as from the date of this Award until the date of payment at a rate corresponding to the US Prime Rate plus 1 percentage point, compounded annually.**
- VIII. Respondent shall pay the amounts due under II. through VII. in US dollars, outside of Pakistan, without any reduction, claim or offset for taxes, other fiscal obligations or other reasons.**
- IX. All further requests and applications raised by the Parties in these proceedings are dismissed.**



Rt. Hon. Lord Leonard Hoffmann
Arbitrator

Date: 26 JUNE 2019



Dr. Stanimir A. Alexandrov
Arbitrator

Date: 3 July 2019



Professor Dr. Klaus Sachs
President of the Tribunal

Date: 11 July 2019