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南戈壁資源有限公司\*

(A company continued under the laws of British Columbia, Canada with limited liability)

(Hong Kong Stock Code: 1878)

(Toronto Stock Code: SGQ)

## Overseas Regulatory Announcement

This announcement is made by SouthGobi Resources Ltd. (**HK: 1878, TSX: SGQ**) (the “**Company**”) pursuant to Rule 13.10B of the Rules Governing the Listing of Securities on the Stock Exchange (the “**Listing Rules**”).

The following documents have published on the website of the SEDAR filing system in Canada ([www.sedar.com](http://www.sedar.com)) in relation to the Company and are enclosed hereto as overseas regulatory announcement.

By order of the Board  
**SouthGobi Resources Ltd.**  
**Mr. Ningqiao Li**  
*Chairman*

Hong Kong, May 16, 2017

*As at the date of this announcement, the executive directors of the Company are Messrs. Ningqiao Li, Aminbuhe and Yulan Guo; the independent non-executive directors are Messrs. Zhu Liu, Mao Sun, Joseph Belan and Ms. Jin Lan Quan; the non-executive director is Mr. Huiyi Wang.*

\* For identification purposes only



# **NI 43-101 TECHNICAL REPORT FOR THE OVOOT TOLGOI COAL MINE SOUTHGOBI PROVINCE MONGOLIA**



**Prepared for**

**SOUTHGOBI RESOURCES LTD**

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**Date: May 15, 2017**

**Report 05-072-RPT00253**

**Dragon Mining Consulting Limited  
One-Stop Mining Services**



May 15, 2017

Board of Directors  
Southgobi Resources Ltd  
Rm 3712-15, Tower Two, Times Square  
1 Matheson Street,  
Causeway Bay,  
Hong Kong

Dear Sirs,

Dragon Mining Consulting Limited (“DMCL”) herewith submits the Technical Report of the Ovoot Tolgoi Coal Mine of Southgobi Resources Limited (“Client”) located in southern part of Mongolia in accordance with the Canadian National Instrument 43-101 (“NI 43-101”).

DMCL has been engaged by the Client in November 2016 to prepare this updated Technical Report and has visited the property in December 2016 and April 2017. The purpose of this report is to provide an independent technical assessment of the Ovoot Tolgoi Coal Mine in relation to its various aspects, in particular, project geology, drilling, sampling preparation, resource estimate, mine planning, past production, reserve estimate, processing strategy, infrastructures, capital costs, operating costs and economic analysis with reference to the requirements of NI 43-101.

DMCL believes that this Technical Report adequately and appropriately describes the technical aspects of the projects, our analysis and view as well as addresses issues of significance and risk.

DMCL has not undertaken an audit of the Client’s data nor reviewed the tenement status with respect to any legal or statutory issues.

DMCL hereby certifies that neither DMCL, nor its directors, shareholders, staffs have any present or prospective interests in the Client or its mining properties. DMCL is to receive the professional fee for its services (the work product of which includes this report) at its normal



commercial rate and customary payment schedules. The payment of our professional fee is not contingent on the outcome of this report.

Yours faithfully,

For and on behalf of

DRAGON MINING CONSULTING LIMITED

---

Karfai Leung

Director

## TABLE OF CONTENTS

<b>1. EXECUTIVE SUMMARY</b>	<b>14</b>
1.1 INTRODUCTION.....	14
1.2 PROPERTY DESCRIPTION AND LOCATION .....	14
1.3 GEOLOGICAL SETTING AND MINERALIZATION.....	14
1.4 DEPOSIT TYPES .....	15
1.5 COAL QUALITY .....	16
1.6 RESOURCE MODEL .....	17
1.7 RESOURCE ESTIMATE .....	18
1.8 RESERVE ESTIMATE .....	20
1.9 MINING .....	22
1.10 COAL PROCESSING .....	23
1.11 ECONOMIC ANALYSIS .....	24
1.12 RECOMMENDATIONS .....	24
<b>2. INTRODUCTION</b>	<b>27</b>
2.1 GENERAL BACKGROUND AND SCOPE OF WORK .....	27
2.2 SOURCES OF INFORMATION .....	27
2.3 QUALIFIED PERSONS AND COMPETENCE .....	28
2.4 DISCLAIMER .....	30
<b>3. RELIANCE ON OTHER EXPERTS</b>	<b>31</b>
<b>4. PROPERTY DESCRIPTION AND LOCATION</b>	<b>32</b>
4.1 LOCATION.....	32
4.2 OWNERSHIP .....	33
4.3 ENVIRONMENTAL LIABILITY AND PERMITTING .....	36
<b>5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY</b>	<b>39</b>
5.1 LOCATION.....	39
5.2 CLIMATE AND PHYSIOGRAPHY .....	39
5.3 ACCESSIBILITY AND INFRASTRUCTURE .....	40
<b>6. HISTORY</b>	<b>42</b>
<b>7. GEOLOGICAL SETTING AND MINERALIZATION</b>	<b>44</b>

7.1 REGIONAL GEOLOGY .....	44
7.2 COAL-BEARING SEQUENCES .....	44
7.3 STRUCTURAL GEOLOGY .....	48
7.3.1 Sunrise Coalfield .....	48
7.3.2 Sunset Coalfield .....	49
7.4 MINERALIZATION .....	51
7.5 COAL QUALITY .....	52
<b>8. DEPOSIT TYPES</b> .....	<b>53</b>
8.1 GEOLOGY TYPE .....	53
8.2 UNDERGROUND RESOURCES .....	56
<b>9. EXPLORATION</b> .....	<b>57</b>
9.1 INTRODUCTION .....	57
9.2 SERVICE CONTRACTORS .....	57
9.3 GEOLOGICAL MAPPING .....	58
9.4 TRENCHING .....	58
9.5 SATELLITE IMAGERY .....	58
9.6 GEOPHYSICAL SURVEYS .....	59
9.7 DRILLING .....	59
9.8 COORDINATES AND DATUM .....	59
9.9 RESULTS .....	59
<b>10. DRILLING</b> .....	<b>60</b>
10.1 INTRODUCTION .....	60
10.2 DIAMOND DRILLING .....	62
10.3 CORE DRILLING PROCEDURES .....	62
10.4 COLLAR SURVEYS .....	62
10.5 DOWNHOLE SURVEYS .....	62
10.6 CORE RECOVERY .....	63
10.7 DENSITY .....	63
10.8 LOGGING .....	63
10.9 RC/CORE DRILLING .....	64
<b>11. SAMPLE PREPARATION, ANALYSES AND SECURITY</b> .....	<b>65</b>
11.1 INTRODUCTION .....	65

11.2 SAMPLING FOR CORE SAMPLES .....	65
11.3 SAMPLING FOR RC SAMPLES.....	66
<b>12. DATA VERIFICATION</b>	<b>68</b>
12.1 DATA COLLECTION PROTOCOLS.....	68
12.2 DATABASE MANAGEMENT .....	69
12.3 DATABASE VERIFICATION .....	70
<b>13. MINERAL PROCESSING AND METALLURGICAL TESTING</b>	<b>72</b>
13.1 INTRODUCTION.....	72
13.2 COAL QUALITY.....	72
13.3 SAMPLING .....	76
13.4 TESTING .....	76
13.5 TEST RESULTS .....	79
<b>14. MINERAL RESOURCE ESTIMATES</b>	<b>83</b>
14.1 INTRODUCTION.....	83
14.2 RESOURCE DEFINITIONS .....	83
14.3 RESOURCE MODEL .....	85
14.4 RESOURCE ESTIMATION.....	86
14.5 DISCUSSION.....	88
<b>15. MINERAL RESERVE ESTIMATES</b>	<b>90</b>
15.1 INTRODUCTION.....	90
15.2 RESERVE DEFINITIONS.....	90
15.3 RESOURCE MODEL .....	91
15.4 RESERVE ESTIMATION .....	91
15.5 DISCUSSION.....	93
<b>16. MINING METHODS</b>	<b>95</b>
16.1 INTRODUCTION.....	95
16.2 MINING METHODS.....	95
16.3 COAL PROCESSING .....	100
16.4 MINE PLANNING.....	101
16.5 GEOTECHNICAL ASSESSMENT.....	102
16.6 HYDROGEOLOGICAL ASSESSMENT.....	107
16.7 PIT OPTIMIZATION .....	110

16.8 ULTIMATE PIT DESIGN .....	111
16.9 PRODUCTION AND WASTE SCHEDULING .....	113
16.10 WASTE DUMP DESIGN AND SCHEDULE.....	119
16.11 FLEET ESTIMATION .....	119
<b>17. RECOVERY METHODS</b>	<b>122</b>
17.1 INTRODUCTION .....	122
17.2 COAL PROCESSING .....	122
17.2.1 Screening.....	123
17.2.2 Sorting .....	123
17.2.3 Wet Washing.....	124
17.2.4 Quality Control.....	125
17.2.5 Yield Estimation.....	128
17.3 FINISHED COAL PRODUCTS.....	130
<b>18. PROJECT INFRASTRUCTURES</b>	<b>131</b>
<b>19. MARKET STUDIES AND CONTRACTS</b>	<b>132</b>
19.1 MARKET STUDIES .....	132
19.1.1 General Overview Of Price Forecast .....	132
19.1.2 Methodology .....	134
19.1.3 Price Forecast From 2017 To 2030 .....	136
19.2 CONTRACTS.....	137
<b>20. ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT</b>	<b>138</b>
20.1 ENVIRONMENTAL STUDIES .....	138
20.2 WATER PERMIT .....	140
20.3 COMMUNITY INVOLVEMENT .....	140
<b>21. CAPITAL AND OPERATING COSTS</b>	<b>141</b>
21.1 CAPITAL COSTS .....	141
21.1.1 Mining Equipment .....	142
21.1.2 Coal Processing .....	144
21.1.3 Infrastructures.....	144
21.1.4 Sustaining Capital .....	144
21.1.5 Exploration.....	144



21.1.6 OPERATING COSTS.....	145
21.1.7 DISCUSSION.....	149
<b>22. ECONOMIC ANALYSIS</b>	<b>150</b>
22.1 INTRODUCTION.....	150
22.2 COAL PRICES.....	150
22.3 DISCOUNTED CASHFLOW PROJECTION.....	151
22.4 SENSITIVITY ANALYSIS.....	151
<b>23. ADJACENT PROPERTIES</b>	<b>153</b>
<b>24. OTHER RELEVANT DATA AND INFORMATION</b>	<b>155</b>
<b>25. INTERPRETATION AND CONCLUSIONS</b>	<b>156</b>
<b>26. RECOMMENDATIONS</b>	<b>158</b>
26.1 EXPLORATION.....	158
26.2 RESOURCE MODELLING.....	158
26.3 GEOTECHNICAL ENGINEERING.....	158
26.4 HYDROGEOLOGY.....	159
26.5 MINING.....	159
26.6 COAL PROCESSING.....	160
<b>27. REFERENCES</b>	<b>161</b>
<b>28. APPENDIX</b>	<b>165</b>
APPENDIX A – GLOSSARY AND DEFINITION.....	165
APPENDIX B – CERTIFICATE OF QUALIFIED PERSON.....	173
APPENDIX C – CONSENT OF QUALIFIED PERSONS.....	176
APPENDIX D – DETAILED CASHFLOW MODEL.....	178
APPENDIX E – DETAILED COAL SEAM RESOURCE CLASSIFICATION.....	187
APPENDIX F – DETAILED MINE PLAN ILLUSTRATIONS.....	199

## LIST OF TABLES

Table 1-1: Coal Quality by Seam Group – Sunset Pit and Sunrise Pit .....	17
Table 1-2: Surface Resource Estimate of the Ovoot Tolgol Coal Mine .....	19
Table 1-3: Underground Resource Estimate of the Ovoot Tolgol Coal Mine .....	20
Table 1-4: Reserve Estimate of the Ovoot Tolgoi Coal Mine.....	21
Table 1-5: Annual Production and Waste Schedule of the Sunset and Sunrise Pits.....	23
Table 4-1: SGS’s Mining License .....	36
Table 7-1: Coal Seam Thickness of the Sunset Coalfield .....	51
Table 7-2: Coal Seam Thickness of the Sunrise Coalfield.....	51
Table 7-3: Coal Quality by Seam Group – Sunset Pit and Sunrise Pit .....	52
Table 10-1: Summary of Historic Exploration Drilling.....	61
Table 13-1: Summary of Coal Quality of the Sunset Seam Group .....	73
Table 13-2: Summary of Coal Quality of the Sunrise Seam Group.....	73
Table 13-3: Summary of Coal Quality of Sold Coal Products in 2016 .....	74
Table 13-4: Summary of Washability Test Results of Major Seam Groups.....	75
Table 13-5: Summary of Coal Quality Holes (up to 2014).....	76
Table 13-6: Test Programs of Seam Coal Washability Samples .....	79
Table 13-7: Detailed Coal Quality of Major Seam Groups .....	80
Table 13-8: Metallurgical Properties of Major Seam Groups.....	81
Table 13-9: Coal Quality of Seam No 6 and Seam 7 of the Sunrise Pit .....	82
Table 14-1: Assurance Of Existence For Coals Of Complex Geology Type .....	85
Table 14-2: Surface Resource Estimate of the Ovoot Tolgol Coal Mine .....	87
Table 14-3: Underground Resource Estimate of the Ovoot Tolgol Coal Mine .....	88
Table 15-1: Reserve Estimate of the Ovoot Tolgoi Coal Mine.....	93
Table 16-1: Recommended Sunrise Ultimate Pit Wall Parameters .....	103
Table 16-2: Recommended Sunset Ultimate Pit Wall Parameters.....	104
Table 16-3: Annual Production and Waste Schedule of the Sunset and Sunrise Pits.....	115
Table 16-4: Annual ROM Coal Quantities by Ash Content for the Sunset Pit.....	116
Table 16-5: Annual ROM Coal Quantities by Ash Content for the Sunrise Pit .....	117
Table 16-6: Annual ROM Coal Quantities by Ash Content for Combined Sunset and Sunrise Pits.....	118

Table 16-7: Sunset and Sunrise Waste Dump Design Parameters .....	119
Table 16-8: Parameters of Excavator and Truck Fleets .....	120
Table 16-9: Recommended Fleet Type and its Capacity and Productivity .....	120
Table 16-10: Estimate of Annual Numbers of Excavator and Truck Required .....	121
Table 17-1: ROM Coal Sorting .....	124
Table 17-2: Estimated Processing Yield and Product Specifications .....	129
Table 17-3: Finished Coal Products of the Ovoot Tolgoi Coal Mine .....	130
Table 19-1: Product Specifications of Benchmark Coal and SQR Coal .....	135
Table 19-2: Price Forecast of Different Targeted Markets .....	136
Table 19-3: Price Forecast at Ceke Border .....	137
Table 19-4: Price Forecast at Mine Gate .....	137
Table 21-1: Historic and Forecasted Capital Costs for the Ovoot Tolgoi Coal Mine .....	141
Table 21-2: Annual Numbers of Excavators and Haul Trucks Required .....	142
Table 21-3: Equipment Leasing .....	143
Table 21-4: Historic and Forecasted Operating Costs for the Ovoot Tolgoi Coal Mine .....	145
Table 21-5: Breakdown of Base Mining Cost Per BCM of Material Moved .....	146
Table 21-6: Mining Cost Per BCM of Material Moved .....	147
Table 21-7: Cash Mining Cost Per Tonne of Coal .....	148
Table 22-1: Forecasted Weighted-Average Coal Prices of Finished Products of the Ovoot Toigol Coal Mine from 2017 to 2019 .....	150
Table 22-2: Sensitivity Analysis of the Ovoot Tolgoi Coal Mine .....	151

## LIST OF FIGURES

Figure 4-1: Location Map of the Ovoot Tolgoi Coal Mine.....	32
Figure 4-2: Site Layout Plan – Sunset and Sunrise Pits.....	35
Figure 7-1: Simplified Stratigraphy of the Sunrise Coalfield (extracted from 2016 Technical Report).....	46
Figure 7-2: Simplified Stratigraphy of the Sunset Coalfield (extracted from 2016 Technical Report).....	47
Figure 7-3: Coal Seam Exposure in the Sunrise Coalfield.....	48
Figure 7-4: Coal Seam Exposure in the Sunset Coalfield.....	50
Figure 8-1: The coal seams and stratigraphy are generally very continuous at the Sunset Pit. Extensive tight folds, steeply inclined and overturned beds and large displacement faults are not observed at the Sunset Pit. ....	54
Figure 8-2: The coal seams and stratigraphy generally do not show extensive tight folds, steeply inclined and overturned beds and large displacement faults at the Sunrise Main Pit..	55
Figure 8-3: The coal seams and stratigraphy generally do not show extensive tight folds, steeply inclined and overturned beds and large displacement faults at the Sunrise Extension Pit. ....	55
Figure 16-1: Sunset Main Pit (looking southeast).....	96
Figure 16-2: Sunset Extension (looking north).....	96
Figure 16-3: Sunrise Main Pit (looking east).....	97
Figure 16-4: Sunrise Main Pit (loading coal in northeast working face).....	97
Figure 16-5: Sunrise Main Pit (loading waste in northeast working face).....	98
Figure 16-6: Sunrise Main Pit (blasting in northeast working face, looking east).....	98
Figure 16-7: Sunrise Main Pit (trucking coal out pit access).....	99
Figure 16-8: Sunrise Main Pit (trucking waste towards waste dump in the south) .....	99
Figure 16-9: Mobile Screen at the Mine Gate.....	100
Figure 16-10: Coal Loading into customer’s truck for coal sales at the Mine Gate .....	101
Figure 16-11: Active Ex-Pit Waste Dump of the Sunrise Pit (looking west) .....	105
Figure 16-12: Active Ex-Pit Waste Dump of the Sunset Pit (looking southeast) .....	105
Figure 16-13: Active Ex-Pit Waste Dump of the Sunrise Pit (looking east) .....	106
Figure 16-14: Active Ex-Pit Waste Dump of the Sunrise Pit (looking west) .....	106

Figure 16-15: Frozen Seepage Through Pit Wall of the Sunrise Pit.....	108
Figure 16-16: Frozen Seepage Through Pit Wall of the Sunset Pit.....	109
Figure 16-17: Frozen Pit Pool at the bottom of the Sunset Pit.....	109
Figure 16-18: 3D View of Sunset Ultimate Pit Shell (not to scale).....	112
Figure 16-19: 3D View of Sunrise Ultimate Pit Shell (not to scale).....	113
Figure 17-1: Flowchart of the Proposed Coal Handling and Processing (SC, TC and J are the finished coal products) .....	126
Figure 17-2: Wet Washing Plant under Construction .....	126
Figure 17-3: Components are delivered to the Mine Site for Assembly.....	127
Figure 17-4: Installed Movable Screen Jigs of the Wet Washing Plant.....	127
Figure 22-1: Sensitivity Chart of Varying Coal Prices, Operating Costs and Capital Costs for the Ovoot Tolgoi Coal Mine .....	152
Figure 28-1: Plan-view map of the resource estimation and classification of Seam No 4 of the Sunrise Coalfield.....	188
Figure 28-2: Plan-view map of the resource estimation and classification of Seam No 5L of the Sunrise Coalfield.....	189
Figure 28-3: Plan-view map of the resource estimation and classification of Seam No 5U of the Sunrise Coalfield.....	190
Figure 28-4: Plan-view map of the resource estimation and classification of Seam No 6 of the Sunrise Coalfield.....	191
Figure 28-5: Plan-view map of the resource estimation and classification of Seam No 7 of the Sunrise Coalfield.....	192
Figure 28-6: Plan-view map of the resource estimation and classification of Seam No 5L of the Sunset Coalfield .....	193
Figure 28-7: Plan-view map of the resource estimation and classification of Seam No 5U of the Sunset Coalfield .....	194
Figure 28-8: Plan-view map of the resource estimation and classification of Seam No 8 of the Sunset Coalfield .....	195
Figure 28-9: Plan-view map of the resource estimation and classification of Seam No 9 of the Sunset Coalfield .....	196
Figure 28-10: Plan-view map of the resource estimation and classification of Seam No 10 of the Sunset Coalfield .....	197



Figure 28-11: Plan-view map of the resource estimation and classification of Seam No 11 of the Sunset Coalfield ..... 198



## **1. EXECUTIVE SUMMARY**

### **1.1 INTRODUCTION**

Dragon Mining Consulting Limited (“DMCL”) was commissioned by SouthGobi Resources Ltd. (“SQR”) in December 2016 to prepare this updated Technical Report on the Ovoot Tolgoi Coal Mine located in Mongolia in accordance with the Canadian National Instrument 43-101, Standards of Disclosure for Mineral Projects (“NI 43-101”). The purpose of this Technical Report is to disclose the updated Resource and Reserve estimates as of December 31, 2016, review of processing options, review of capital expenditure and operating costs, based on an updated long-term mine plan and production schedule with reference to SQR’s optimized mining strategy, coal processing strategy, sales strategy, updated coal prices and coal transaction conditions.

### **1.2 PROPERTY DESCRIPTION AND LOCATION**

The Ovoot Tolgoi Deposit (comprising the Ovoot Tolgoi Coal Mine and Ovoot Tolgoi Underground Deposit) is located in the southwest corner of the Umnugobi Aimag (South Gobi province), approximately 320 kilometres southwest of the provincial capital of Dalanzadgad and 950 km south of the nation's capital Ulaanbaatar. Ovoot Tolgoi Coal Mine is approximately 45 kilometres north of the Mongolia-China border and the Ceke border crossing. Ceke, in the People's Republic of China is the main distribution center for the Ovoot Tolgoi coal.

SQR holds its interest in the Ovoot Tolgoi Coal Mine through its wholly owned subsidiary, SouthGobi Sands LLC (“SGS”), the operating company under SQR, which is a company incorporated in Mongolia that holds the mining licenses of the Ovoot Tolgoi Coal Mine.

### **1.3 GEOLOGICAL SETTING AND MINERALIZATION**

The geological history of the southern part of Mongolia is characterized by the continental accretion and Basin-and-Range style crustal extension, followed by regional-scale

compressional folding and faulting. Elongated, east-west trending mountain ranges and intervening basins are therefore widely present in the region. Those structures are dominantly composed of Late Cretaceous to Permian-aged sedimentary sequences, overlain by Quaternary unconsolidated sediments. Mountain ranges between the basins comprise crystalline basement rocks dominated by intermediate to high angle faults that show evidence for both compressional and extensional movement. The most prominent structure in relation to the Ovoot Tolgoi Deposit is the arcuate, east-west-trending, moderately-dipping Nariin Sukhait fault where the Late Permian coal-bearing sequences are exposed. The Ovoot Tolgoi Coal Mine, which comprises of the Sunset Coalfield in the west and the Sunrise Coalfield in the east, is one of the three operating coal mines in the region of Nariin Sukhait.

The current geological understanding of the deposit has organized the coal seams into a number of Seam Groups including the Seam Nos. 4, 5L, 5U, 6, 7, 8, 9, 10 and 11. Each of the Seam Groups are further divided into a number of sub-layers or known as plies based on parting material within the Seam Groups.

The overall estimated thickness of the coal-bearing sedimentary sequence is 1,370 m with a cumulative thickness of the coal seams ranging from 68 to 250m. Interburden between the coal seams is dominated by sandstones and conglomerates, whereas partings within the seams are mostly mudstones and carbonaceous mudstones.

The main coal resources of the Ovoot Tolgoi Coal Mine are contributed by the Seam Nos. 5L and 5U which are identified in both the Sunset and Sunrise Coalfields. In the Sunrise Coalfield, the Seam No. 6 and 7 are identified which could potentially be related to Seam Groups 8, 9, and 10 identified at the Sunset Coalfield.

#### **1.4 DEPOSIT TYPES**

DMCL's technical review of drillhole data and the resource model, and its on-site assessment suggested the Ovoot Tolgoi Coal Mine has been subjected to a significant amount of tectonic deformation comprising an east-west-trending regional thrust fault with hanging wall strata





modified by different secondary folding. Coal seams are typically dipping in angle from 35° to 55° and are occasionally sub-vertically dipping.

DMCL's review further indicated that the previous Geology-Type classification in the 2016 Technical Report was not strongly justified by current technical findings. Tight folds, steeply inclined and overturned beds, were not widely present whereas large displacement faults are generally absent in both Sunrise and Sunset coalfields at the Ovoot Tolgoi Coal Mine. The different conclusions in Geology-Type between the 2016 Technical Report and DMCL's conclusion are likely attributable to DMCL's more recent site visit (February 2015 by RPM vs December 2016 by DMCL) and DMCL's benefit of being able to observe coal seams exposed by mining operations during 2015 and 2016, which seems generally retained normal stratigraphic sequences, thicknesses and continuity. As a result, DMCL concluded that the Geology Type of the Ovoot Tolgoi Coal Mine, including Sunrise Main, Sunrise Extension, Sunset Main and Sunset Extension, should be reverted to its prior categorization as "Complex".

## **1.5 COAL QUALITY**

Coal quality of each seam group, confined to the in-pit resource (depth within 300m below ground surface), and based on SGS's latest resource model, is presented in the Table 1-1 below. Coal quality of both the Sunrise and Sunset Pits are highly comparable.

**Table 1-1: Coal Quality by Seam Group – Sunset Pit and Sunrise Pit**

<i>Pit</i>	<i>Seam Group</i>	<i>Inherent Moisture</i> %	<i>Total Moisture</i> %	<i>Ash</i> %	<i>Volatile Matter</i> %	<i>Calorific Value</i> kcal/kg	<i>Total Sulphur</i> %	<i>CSN</i>	<i>Relative Density</i> g/cc
<b>Sunset Pit</b>	<b>10</b>	1.69	5.40	17.32	32.86	6455	1.20	3	1.42
	<b>9</b>	1.68	4.67	18.10	32.46	6429	1.63	3	1.44
	<b>8</b>	2.33	5.22	17.41	31.65	6513	1.38	3	1.43
	<b>5U</b>	1.34	4.39	9.75	32.22	7240	0.75	4	1.34
	<b>5L</b>	1.53	3.14	15.32	33.05	6780	1.03	5	1.42
<b>Sunrise Pit</b>	<b>7*</b>	1.35	9.63	8.15	39.63	6872	0.71	6	n/a
	<b>6*</b>	1.02	7.21	13.94	39.18	6384	0.52	5	n/a
	<b>5U</b>	1.01	9.32	17.96	31.74	6407	1.04	2	1.42
	<b>5L</b>	1.04	7.52	13.25	31.50	6774	1.11	3	1.37

Note: \* Based on ROM coal samples collected in the Sunrise Pit in December 2016, analyzed by SGS Lab, therefore indicative only.

## 1.6 RESOURCE MODEL

DMCL has verified the resource estimates and parameters of the geological model and its database prepared by SGS for both Sunset and Sunrise Coalfields. The update of the resource model includes the latest exploration drilling result, coal quality results and corrections made during validation of the geological database.

DMCL's commentaries in relation to the resource model are summarized as below.

- The latest database of the resource model indicated that all mined out resources of coal seams have been reasonably depleted from the resource estimate.

- DMCL's estimation result is highly comparable to that produced by SGS. We are of the opinion that the resource estimation in terms of tonnage estimation prepared by SGS is fair, reasonable and representative of the coal deposits.
- DMCL also reviewed the resource category classification and found out that the drillhole spacing for Measured, Indicated and Inferred Category are respectively 75m, 150m and 300m. Such drillhole spacing is conformable with the geology-type requirement specifically defined in the GSC 88-21. As a result, DMCL is of the opinion that the Measured and Indicated Resource classified in the SGS resource model is fair, reasonable and conformable with the industry practice.
- DMCL is of the opinion that the overall resource model prepared by SGS can be reasonably used for long-term mine planning purpose in accordance with the NI 43-101 requirements.

## 1.7 RESOURCE ESTIMATE

Resource has been estimated as of December 31, 2016 using the Minex™ models provided by SGS as shown in Table 1-2 and 1-3. The key assumptions used for the resource estimation are:

- Minimum coal seam thickness = 0.6m
- Maximum coal parting = 0.3m
- Surface resources are constrained to a depth of 300m, same as the pit design used in the Ovoot Tolgoi Technical Report 2012
- Volumes are converted to tonnages using laboratory relative density analytical results converted to an estimated in-situ basis
- Resource is constrained to the mining lease held by SGS only
- Resource is estimated on an in-situ basis (i.e. as an in-situ tonnage and not adjusted for mining recovery)
- Resource is depleted by mined out tonnage
- Resource is estimated based on the survey data made available as of December 20, 2016 for the Sunrise and Sunset coalfields

- Totals may not add up due to rounding

**Table 1-2: Surface Resource Estimate of the Ovoot Tolgol Coal Mine**

<i>Coalfield</i>	<i>Seam Group</i>	<i>Resource (Mt)</i>		
		<i>Measured</i>	<i>Indicated</i>	<i>Inferred</i>
<b>Sunrise (depth &lt;300m)</b>	<b>7</b>	2.18	2.94	1.96
	<b>6</b>	3.43	4.78	4.19
	<b>5U</b>	39.56	20.50	22.67
	<b>5L</b>	18.20	4.05	0.96
	<b>4</b>	0.45	0.68	0.60
	<b>Total</b>	63.83	32.96	30.38
<b>Sunset (depth &lt;300m)</b>	<b>11</b>	0.01	0.00	0.00
	<b>10</b>	8.78	2.07	0.07
	<b>9</b>	17.78	3.39	0.23
	<b>8</b>	16.46	3.18	0.31
	<b>5U</b>	25.60	6.35	0.28
	<b>5L</b>	11.81	2.30	0.86
	<b>Total</b>	80.43	17.29	1.75
<b>Grand Total</b>		<b>144.26</b>	<b>50.25</b>	<b>32.13</b>

**Table 1-3: Underground Resource Estimate of the Ovoot Tolgol Coal Mine**

<i>Coalfield</i>	<i>Seam Group</i>	<i>Resource (Mt)</i>		
		<i>Measured</i>	<i>Indicated</i>	<i>Inferred</i>
<b>Sunrise (depth 300m to 500m)</b>	<b>5U</b>	1.96	4.96	13.09
	<b>5L</b>	6.02	11.97	24.98
	<b>Total</b>	7.98	16.93	38.07
<b>Sunset (depth 300m to 500m)</b>	<b>10</b>	2.97	1.90	0.00
	<b>9</b>	6.22	4.60	0.37
	<b>8</b>	6.88	3.80	2.18
	<b>5U</b>	27.92	14.88	3.47
	<b>5L</b>	5.67	7.95	12.79
	<b>Total</b>	49.65	33.13	18.82
	<b>Grand Total</b>		<b>57.63</b>	<b>50.06</b>

## 1.8 RESERVE ESTIMATE

Reserve of the Ovoot Tolgoi Coal Mine has been estimated as of December 31, 2016 based on the resource model provided by SGS and the long-term mine plan completed for the Sunset and Sunrise Pits. The key assumptions used to for the reserve estimation are:

- Measured and Indicated Resources are inclusive of those Mineral Resources modified to produce the Reserves.
- Reserves do not include any Inferred Resources which has been treated as waste (i.e. its mining costs have been covered but no revenue has been assumed for the Inferred Resources).
- Mining method selected is a truck-and-shovel open pit terrace mining operation.
- Cut-off ash content for raw coal is assumed to be 50%.

- A mining recovery factor of 95% and a mining dilution factor of 2.5% are applied in the Reserve estimates.
- The pits and thus Reserves are designed to 300m below the original ground surface.
- Reserves are constrained to the mining lease held by SGS only although the open pit limits will extend across the lease boundary into the adjacent lease held by Mongolyn Alt Corporation (MAK). SGS and MAK have an agreement in place that allows SGS to strip off the overburden in MAK's lease. MAK will remove the coal within its lease area to allow development of the SGS's pits. Coal in the pits within the MAK's lease has been treated with no revenue and no cost whereas the waste within the pits and MAK's lease will be stripped off at the cost of SGS.
- Reserves are estimated to account for coal and waste that was mined as of December 31, 2016.
- Totals may not add up due to rounding.

**Table 1-4: Reserve Estimate of the Ovoot Tolgoi Coal Mine**

<i>Pit</i>	<i>Seam Group</i>	<i>Reserve (Mt)</i>		
		<i>Proven</i>	<i>Probable</i>	<i>Total</i>
<b>Sunrise Pit</b>	<b>7</b>	0.39	0.47	0.85
	<b>6</b>	1.74	1.37	3.11
	<b>5U</b>	29.28	6.25	35.53
	<b>5L</b>	12.44	1.73	14.17
	<b>4</b>	0.40	0.52	0.92
	<b>Sub-total</b>	44.25	10.34	54.59
	<b>Sunset Pit</b>	<b>11</b>	0.01	0.00
<b>10</b>		4.97	0.64	5.61
<b>9</b>		10.21	0.52	10.73
<b>8</b>		10.42	0.48	10.90
<b>5U</b>		21.06	1.80	22.86
<b>5L</b>		8.56	0.91	9.47
<b>Sub-total</b>		55.23	4.34	59.57
<b>Grand Total</b>		<b>99.49</b>	<b>14.68</b>	<b>114.17</b>

## 1.9 MINING

DMCL has been commissioned to prepare an updated long-term mine plan for the Ovoot Tolgoi Coal Mine based on SQR's latest mining, processing and sales strategies. The mining operation at the Ovoot Tolgoi Coal Mine will be performed using open pit terrace truck-and-shovel mining method utilizing hydraulic excavators, shovels and trucks, or known as conventional "truck/shovel" operations. The operation includes topsoil stripping, drilling and blasting of overburden and interburden, and stripping of waste and coal using a backhoe excavator. Waste and coal will be loaded onto a fleet of mining trucks for hauling to the spoil dumps or coal crusher, as appropriate.

The updated long-term mine plan for both the Sunrise and Sunset Pits aims to achieve an overall annual production target of 9 million tonnes of ROM coal starting from 2017 and mining in both pits at the same time. Mining is scheduled to be completed by 2030 with a total life-of-mine of 14 years.

DMCL estimated ROM coal from the Proven and Probable Reserve for the Sunset and Sunrise Pits. The key assumptions were: 1) a mining recovery of 95% and dilution of 2.5% by the weight of coal adopted to account for the mining losses and dilutions, and 2) statistics of raw coal ash content ranges from coal sample data is applied to estimate annual ROM coal quantities based on ash content categories. Long-term mine plan is confined within the ultimate pit shells. The production target is to deliver approximately 9 million tonnes per annum of ROM coal starting from 2017. The peak production is approximately 9.3 million tonnes of ROM coal during the fifth year (2021). Table 1-5 shows the annual production and waste schedule of the Sunset and Sunrise Pits.

**Table 1-5: Annual Production and Waste Schedule of the Sunset and Sunrise Pits**

Year	<i>Sunset Pit</i>			<i>Sunrise Pit</i>			<i>Combined</i>			
	<i>ROM</i>	<i>Waste</i>	<i>Strip Ratio</i>	<i>ROM</i>	<i>Waste</i>	<i>Strip Ratio</i>	<i>ROM</i>	<i>Waste</i>	<i>Strip Ratio</i>	
	<i>kt</i>	<i>k BCM</i>	<i>BCM/tonne</i>	<i>kt</i>	<i>k BCM</i>	<i>BCM/tonne</i>	<i>kt</i>	<i>k BCM</i>	<i>BCM/tonne</i>	
1	2017	3,054	8,806	2.9	1,634	22,173	13.6	4,688	30,979	6.6
2	2018	4,039	19,214	4.8	4,251	19,534	4.6	8,290	38,748	4.7
3	2019	4,163	15,715	3.8	4,325	14,919	3.5	8,488	30,634	3.6
4	2020	4,454	15,999	3.6	4,415	15,855	3.6	8,869	31,854	3.6
5	2021	4,552	17,047	3.7	4,750	18,107	3.8	9,302	35,154	3.8
6	2022	4,477	12,144	2.7	4,403	17,184	3.9	8,880	29,328	3.3
7	2023	4,578	20,272	4.4	4,264	19,554	4.6	8,842	39,826	4.5
8	2024	4,154	11,720	2.8	4,535	12,833	2.8	8,689	24,553	2.8
9	2025	4,533	14,380	3.2	4,539	6,796	1.5	9,072	21,175	2.3
10	2026	4,625	16,161	3.5	4,416	25,482	5.8	9,041	41,643	4.6
11	2027	4,112	14,169	3.5	4,672	11,198	2.4	8,784	25,366	2.9
12	2028	4,386	17,346	4.0	4,466	12,626	2.8	8,852	29,972	3.4
13	2029	4,277	12,472	2.9	3,023	12,347	4.1	7,300	24,819	3.4
14	2030	4,905	8,544	1.7	-	-	n/a	4,905	8,544	1.7
<b>Total</b>		<b>60,309</b>	<b>203,987</b>	<b>3.4</b>	<b>53,693</b>	<b>208,608</b>	<b>3.9</b>	<b>114,002</b>	<b>412,595</b>	<b>3.6</b>

### 1.10 COAL PROCESSING

In early 2016, SQR and SGS have formulated optimized mining, coal processing and sales strategies for the Ovoot Tolgoi Coal Mine such that SQR is determined to haul the run-of-mine (ROM) to the coal processing facilities to be constructed at the mine site for complete processing before sales.

The proposed coal handling and processing consists of four stages, namely, screening, sorting, wet washing and quality control, delivering three types of finished coal products including 1/3 coking coal, thermal coal with a calorific value of 6200 kcal/kg and thermal coal with a





calorific value of 5800 kcal/kg. Such multiple coal products are expected to maximize the value of the Ovoot Tolgoi Coal Mine.

### **1.11 ECONOMIC ANALYSIS**

Based on the estimated coal prices and revenue, operating costs, capital costs, taxes and government charges, the Net Present Value (NPV) of the Ovoot Tolgoi Coal Mine is estimated to be about US\$360 million at a discount rate of 15% for the base case. Similar to the majority of mining projects in the world, the NPV estimate is the most sensitive to commodity prices.

### **1.12 RECOMMENDATIONS**

- Downhole survey of verticality should be carried out for future drilling programs to enhance the accuracy of the resource model and hence resource estimation. This will be an ongoing annual cost of approximately US\$ 10,000.
- As further exploration program and coal quality sampling programs proceed, the resource model should be updated on an on-going basis so as to develop a better understanding of the geology and coal quality for refining the mine plan in the future. This will be an ongoing annual cost of approximately US\$ 10,000.
- Routine data validation and verification should be continued for additional exploration data as an integral part of the database management system. No cost impact.
- Detailed geotechnical assessment of pit wall stability is recommended to be an integral part of a short-term mine plan and detailed mine design. This will be an ongoing annual cost of approximately US\$ 50,000.
- Long-term and continuous monitoring, analysis, review and reporting of the pit wall stability should be considered as a routine practice to ensure production and also safety of the workers. No cost impact.

- Hydrogeological data should be reviewed on an on-going basis and is recommended to be an integral part a short-term mine plan and detailed mine design. This will be an ongoing annual cost of approximately US\$ 20,000.
- Groundwater model should be updated by integrating the data collected from historical and existing groundwater monitoring wells. This will be approximately US\$ 40,000.
- The routine monitoring will be conducted for employment of pit dewatering system as appropriate to enhance pit wall stability and reduce pit seepage, if necessary, with the pit development. No cost impact.
- The mining operation should implement the updated mine plan to achieve the goals set out by the latest mining strategy, processing strategy and sales strategy. No cost impact.
- A more detailed reserve model is recommended to be developed, to address the need of a more detailed monthly production schedule and short-term mine plan with the integration of, such as, pit wall stability analysis and hydrogeology assessment. This will be an ongoing annual cost of approximately US\$ 30,000.
- The resource model should be updated by integrating additional validated coal sample analysis data, geological and geotechnical findings from exposures of mine pits in order to enhance the development of a detailed monthly production schedule and reserve database. No cost impact.
- A study should be commenced to evaluate the procurement of mining equipment from neighboring countries like China for a lower transport cost and steady and timely supply of spare parts. No cost impact if implemented by SGS's personnel.
- With the cooperation agreement in place with MAK in relation to stripping within MAK's property, it is recommended that SGS should establish an effective communication channel and relationship with MAK such that SGS can regularly update MAK of the details of the mine plan in order to carry out stripping within the MAK's property in a timely manner. No cost impact.
- Reconciliation between planned and actual production should be continued as a good mining practice. This will be an ongoing annual cost of approximately US\$ 20,000.

- Characterization and assessment of the coal quality of individual coal seam should be continued on an ongoing basis in order to develop a better understanding of the spatial distribution of coal quality of the pit and within individual seams. Ongoing coal quality characterization may also benefit the processing strategy and hence a better product mix for SGS. No cost impact.
- Further coal quality characterization and washability tests should be executed for individual coal seam, particularly Seam No 5, which offers the best quality of coal products and the contribute to the majority of production. This will be an ongoing annual cost of approximately US\$ 20,000.
- SGS should establish fair and reasonable terms and conditions with the washing plant operator in relation to feeding, washing cost, product specifications, throughput capacity, penalty and bonus. No cost impact other than legal expenses.
- DMCL understands that the proposed washing plant is to commission by in the second half of 2017, a performance test should be performed in relation to its throughput capacity, separation efficiency, feeding size limits, ultra-fines treatment. No cost impact.
- Given that the new wet washing plant can only process 2.4 million tonnes feed per year, further feasibility study of expansion of the washing capacity to 4-5 million tonnes per annum (phase 2) and to 6-7 million tonnes per annum capacity (phase 3 if need) should be proceeded as early as possible in order to meet the washing demand of the updated mine plan. This will be approximately US\$ 50,000.



## 2. INTRODUCTION

### 2.1 GENERAL BACKGROUND AND SCOPE OF WORK

Dragon Mining Consulting Limited (“DMCL”) was commissioned by SouthGobi Resources Ltd. (“SQR”) in December 2016 to prepare this updated Technical Report on the Ovoot Tolgoi Coal Mine located in Mongolia owned 100% by SQR through SouthGobi Sands LLC (“SGS”) in accordance with the Canadian National Instrument 43-101, Standards of Disclosure for Mineral Projects (“NI 43-101”).

The scope of work of DMCL’s engagement is as follows

- Review of all the available technical information provided by SGS
- Visit to the Ovoot Tolgoi Coal Mine in Mongolia
- Prepare an updated resource estimate
- Develop an updated long-term mine plan and production schedule based on the optimized mining strategy, coal processing strategy, sales strategy, updated coal prices and coal transaction conditions
- Prepare an updated reserve estimate
- Review of processing and recovery operations
- Review of capital expenditure and operating costs
- Prepare an updated Technical Report for public disclosure

### 2.2 SOURCES OF INFORMATION

This Technical Report has no reasons not to rely on data collected for the property, save and except where we have made different conclusions based on updated data, through to December 2016 by the following entities:

- SouthGobi Sands LLC (“SGS”), the 100% owned Mongolian-registered subsidiary that holds the licenses and permits to the Project as well as operating the mine, in conjunction with Sapphire Geo Ltd (“Sapphire”);
- Norwest Corporation (“Norwest”) of Salt Lake City, USA;



- Ivanhoe Mines Ltd (“IVN”)
- McElroy-Bryan Geological Services (“MBGS”)
- RungePincockMinarco Ltd (“RPM”) or formerly MinarcoMineConsult
- Seegmiller International (“Seegmiller”)
- RPS Aquaterra (“Aquaterra”)
- SRK Consulting (“SRK”)

Additional data has been gathered from previous Government of Mongolia studies for information purposes only for the Nariin Sukhait area which includes the Ovoot Tolgoi deposit as well as adjacent operations.

Norwest was present during 2005 to 2006 exploration programs and has provided QP verification of the data collected at the time. The Americas Group (“TAG”) was present during the 2007 to 2008 exploration programs and has provided QP verification of the data. RPM was present during the exploration programs from 2010 to 2016 and has provided QP verification of the data collected as of to date.

DMCL has reviewed and evaluated all technical information, including geological, geotechnical, hydrogeological, coal quality data and previous technical reports prepared by Norwest, TAG, SGS and RPM, currently made available to us by SQR and summarized the information within this technical report in accordance with NI 43-101. Portions of this report have been extracted from technical reports prepared previously by Norwest and SGS as well as RPM in March 2011, March 2012 (“2012 Technical Report”) and May 2016 (“2016 Technical Report”).

### **2.3 QUALIFIED PERSONS AND COMPETENCE**

This Technical Report is prepared by a team of DMCL’s mining professionals who have extensive experience in high-level technical assessment, exploration, resource definition, mine planning, production scheduling, mining operation for a wide range of commodities, including coal, in China, Canada, Mongolia and other countries, and also possesses the



requisite professional accreditation to qualify as "qualified persons" under NI 43-101 and "competent persons" under Australia's JORC code.

Dr Weiliang Wang, as the Qualified Person (“QP”) responsible for the resource estimate in this report, is the registered Member of the Association of Professional Geoscientists of Ontario and Australasian Institute of Mining & Metallurgy. Dr Wang has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and the work they have undertaken, being qualified as Qualified Person as defined by NI 43-101.

Mr Vincent Li, as the Qualified Person (“QP”) responsible for the reserve estimate, is the registered Professional Engineer and Geologist of the Association of Professional Engineers and Geoscientists of Alberta and Association of Professional Engineers and Geoscientists of British Columbia. Mr Li has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and the work they have undertaken, being qualified as Qualified Person as defined by NI 43-101.

Mr Larry Li, as the Qualified Person (“QP”) responsible for coal processing, is the registered Professional Engineer of the Association of Professional Engineers and Geoscientists of British Columbia. Mr Li has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and the work they have undertaken, being qualified as Qualified Person as defined by NI 43-101.

Assistance in the preparation of this report was also provided by Mr Karfai Leung and Ms Angel Chan.

Mr Karfai Leung, as the Project Manager responsible for the overall project management, is the registered member of the Australasian Institute of Mining and Metallurgy. Mr Leung has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and the work they have undertaken.



Ms Angel Chan, as the Assistant Project Manager and Environmental Expert, is qualified in Global Reporting Initiatives. Ms Chan has sufficient experience which is relevant to the work required for the style of mineralization and type of deposit under consideration.

## **2.4 DISCLAIMER**

The opinions expressed in this report have been based on the information supplied to DMCL by SQR. DMCL has exercised all due care in reviewing the supplied information. DMCL has compared key supplied data with expected values and has no reason not to rely on supplied data. Opinions presented in this Technical Report apply to the site conditions and features as they existed at the time of DMCL investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Technical Report, about which DMCL had no prior knowledge nor had the opportunity to evaluate.

### 3. RELIANCE ON OTHER EXPERTS

DMCL in the preparation of this Technical Report has relied on information provided by other experts who are specialized in legal, political, environmental, tax matters, market analysis and price forecast in relation to SGS's operation in Mongolia.

Those sections that have been relied on information provided by other experts are listed as below.

- Ownership
- Environmental Liability and Permitting
- Accessibility, Climate, Local Resources, Infrastructure and Physiography
- History
- Market Studies
- Adjacent Properties

DMCL considers that the information presented in the above sections is generally reasonable and has no reason not to rely upon them.



## 4. PROPERTY DESCRIPTION AND LOCATION

### 4.1 LOCATION

The Ovoot Tolgoi Deposit (comprising the Ovoot Tolgoi Coal Mine and Ovoot Tolgoi Underground Deposit) is located in the southwest corner of the Umnugobi Aimag (South Gobi province), approximately 320 kilometres southwest of the provincial capital of Dalanzadgad and 950 km south of the nation's capital Ulaanbaatar (Figure 4-1). The Ovoot Tolgoi Coal Mine is approximately 45 kilometres north of the Mongolia-China border and the Ceke border crossing. Ceke, in the People's Republic of China is the main distribution centre for the Ovoot Tolgoi coal.

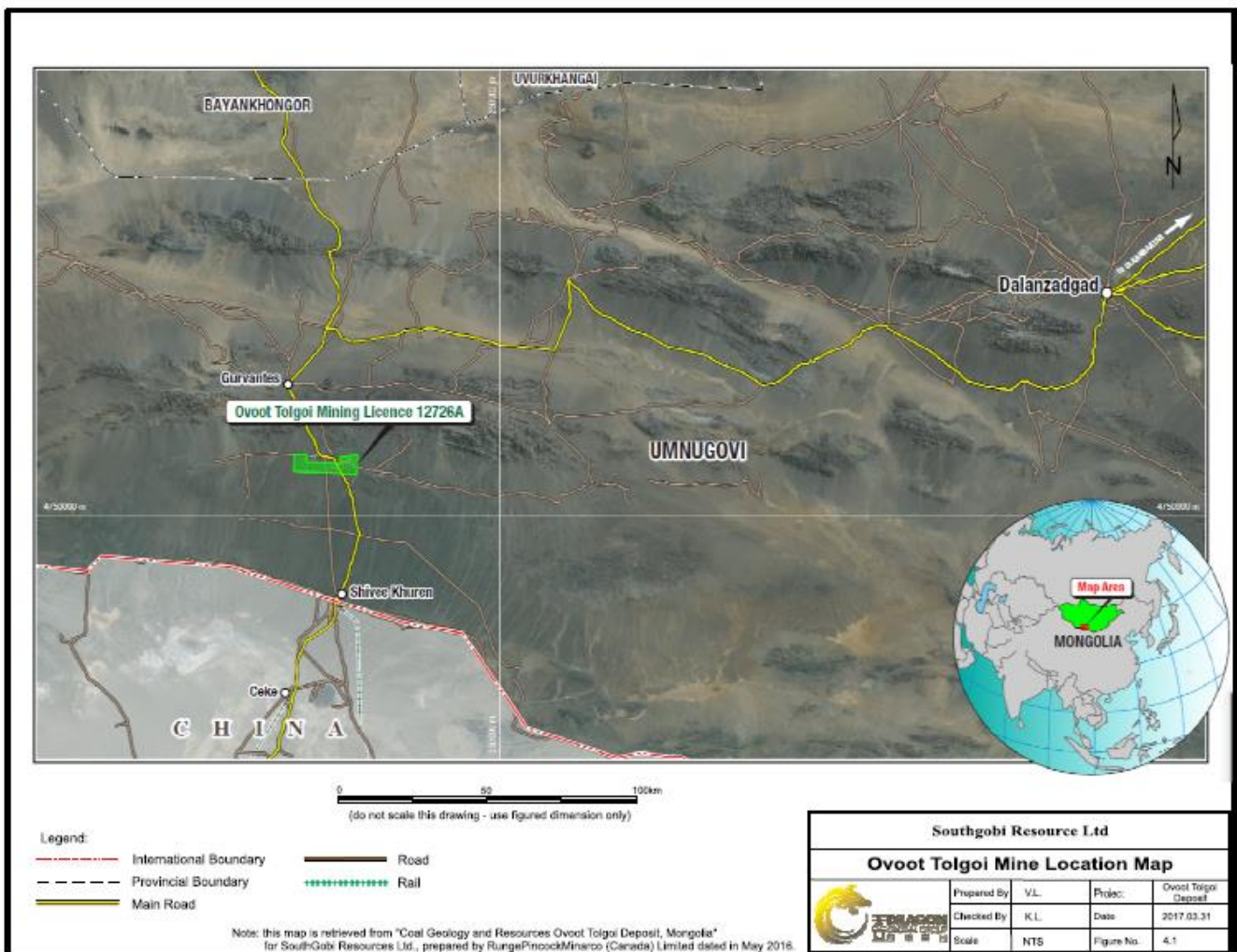


Figure 4-1: Location Map of the Ovoot Tolgoi Coal Mine



## 4.2 OWNERSHIP

Previous work at Ovoot Tolgoi was conducted by IVN. The coal division of IVN and all its coal exploration licenses (including the exploration licenses at Ovoot Tolgoi) were sold to SouthGobi Resources Ltd (SQR) (formerly Asia Gold Corp. (Asia Gold)) in 2007.

SQR holds its interest in the Ovoot Tolgoi Coal Mine through its 100% owned subsidiary SGS, the operating company under SQR, which is a Mongolian-registered company.

The Mongolian government grants Exploration Licenses for a period of three years with the right to extend the period twice for two additional years each. Exploration license holders are subject to various environmental protection obligations. Following a successful exploration program, an exploration license holder can apply for a mining license over any portion of the exploration license. A mining license is granted for a period of 30 years, with the right to extend the period twice for 20 additional years with each extension. The mining license covers both mineral and surface lease rights.

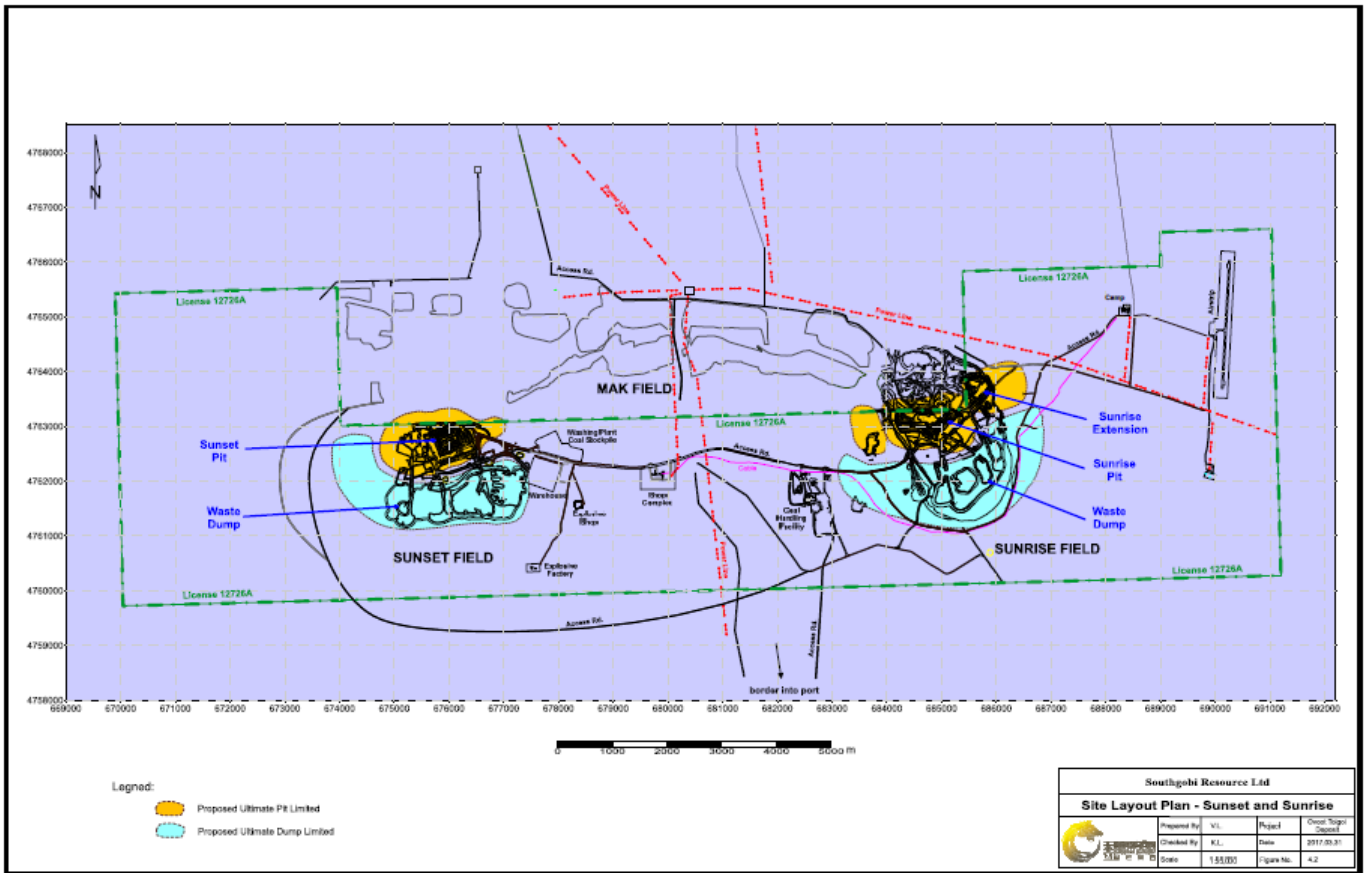
SGS's Mine License 12726A was granted on September 20, 2007 for the development of an openpit coal mine. The SGS's property is adjacent to another mining license currently held by Mongolyn Alt Corporation (MAK). The coal deposits extend across the lease boundary. The Resource and Reserve estimates are limited to the SGS's property, even though the open pits are assumed to develop across the lease boundaries in order to extract all economic coal within the SGS lease. SGS and MAK have entered a cooperation agreement on February 20, 2014 which allows SGS to strip off the overburden in MAK's property at SGS's own cost. MAK will remove the coal within its lease area to allow development of the SGS's pits. The coal within the pits and within the MAK's property has been treated as generating no revenue and having no associated cost. Such an agreement is material to SGS's life-of-mine (LOM) operation and long-term mine planning. DMCL understands that the agreement has been properly honoured by both parties since establishment. It is worth to note that the current Resource and Reserve estimates documented in this Technical Report do not contain any coal within the MAK's property.



The primary requirements, which SGS has current fulfilled with, to maintain a mining license in Mongolia are:

- Pay annual renewal fee of \$5.00/ha;
- Submit and have approved an Annual Mine Plan;
- Report mining quantities and pay appropriate royalties;
- Submit and have approved annual Environmental Protection Plan for mining activities; and
- Submit annual report on mining activities by February 15 of following year.

The Sunset (formerly named West) Field occupies the area southwest of the MAK license boundary and encompasses the Sunset Pit of SGS's operation (Figure 4-2), whilst the underground resource represents the down dip extension. The Sunrise (formerly named South-East) Coalfield occupies the area southeast of the MAK license area (Figure 4-2). All resource set out in this Technical Report are within the SGS's lease.



**Figure 4-2: Site Layout Plan – Sunset and Sunrise Pits**

The Government of Mongolia approved the coordinates obtained from the survey. Coordinates of the SGS’s license 12726A are presented in Table 4-1.

**Table 4-1: SGS’s Mining License**

License No	Licensee	Inception Date	Expiry Date	License Coordinates			Area Hectares	Mineral Interest
				Vertices	Easting	Northing		
12726A	SouthGobi Sands, LLC	Sept. 11, 2007	2037	1	101°05'6.65"	43°01'21.29"	9312.27	100% Coal
				2	101°08'5.64"	43°01'21.29"		
				3	101°08'5.74"	42°59'59.27"		
				4	101°16'30.74"	42°59'59.24"		
				5	101°16'30.64"	43°01'21.31"		
				6	101°19'10.65"	43°01'21.31"		
				7	101°19'10.65"	43°01'41.31"		
				8	101°20'40.64"	43°01'41.31"		
				9	101°20'40.75"	42°58'16.23"		
				10	101°05'6.73"	42°58'16 .25"		

#### 4.3 ENVIRONMENTAL LIABILITY AND PERMITTING

The Mongolian Minerals Law (2006) and Mongolian Land Law (2002) govern SGS's exploration, mining, and land use rights for the Ovoot Tolgoi Deposit. Water rights are governed by the Mongolian Water Law and Mongolian Minerals Law. These laws allow license holders to use the land and water in connection with exploration and mining operations, subject to the discretionary authority of Mongolian national, provincial, and regional governmental authorities as granted under Mongolian law.

The key environmental reports are titled *Detailed Environmental Impact Assessment for the Nariin Sukhait Coal Deposit Mining Project*, prepared by Environmental Consulting Company (ENCO), Ltc, 2006, and the *Addendum*, prepared in 2006. DMCL has sighted a copy of the signed Addendum, which was recognized by the Governor, Gurvan Tes soum (B Dabaatseren).

Currently, DMCL is not aware of any environmental, permitting, legal, title, taxation, socioeconomic, marketing, political, or other relevant issues that may materially affect the potential mining of coal that exist within the confines of the SGS's property.

Mineral law regulates licensing, minerals exploration and mining issues in Mongolia and clearly shows initial environmental obligations for exploration and mining activities. Initial environmental obligations relevant to the exploration and mining activities are summarized below. Note that environmental obligations include but are not limited to the points below.

### **Exploration Environmental Obligations**

Article 38 has a specific section for environmental protection obligations for exploration activities. However, Article 35.2.2 and Article 37 describe the environmental protection activities during minerals exploration. Explorers should submit an Environmental Protection Plan (EPP) for exploration activity to the Soum Governor for its approval, once the Exploration Plan has been approved by MRAM and SSIA. The EPP should be inclusive of environmental impact assessment and mitigation and implementation of the measures in terms of protection. Once the EPP has been approved by the Soum Governor, Explorer should submit the EPP for Aimag SSIA and deposit 50% of budget on the EPP to the relevant Soum Bank Account as a guarantee. This is refunded upon 100 percent fulfillment of the environmental obligations on EPP, including disturbed site rehabilitation. In addition, Article 40 regulates the termination date and extension of exploration license, and an updated/renewed EPP is required to extend after the termination date of the exploration license.

### **Mining Environmental Obligations**

Article 39 of Minerals Law describes environmental obligations for mining activities. To commence mining activity, the company should undertake a Detailed Environmental Impact Assessment (DEIA) according to the EIA law of Mongolia. The DEIA should include impact assessment, mitigation and implementation of measures in terms of mine activities. The company should deposit 50% of the annual environmental protection budget to the MNET Bank Account within the first month of each year. If the company does not deposit the Bond to the MNET bank account, the Soum Governor has the right to shut down the annual mining



activity of the company. If the company does not perform the environmental obligations of the year, the Soum Governor and SSIA inspectors have the right to stop mining activity of the upcoming year. According to the EIA and Minerals law, the company has to amend the DEIA upon alteration of the T & E study report in terms of an increase of mineral reserves proved by additional exploration, modification of mine equipment and increase or changes of mine infrastructure etc. Additionally, Article 45 of Minerals Law regulates mine closure issue.



## **5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY**

### **5.1 LOCATION**

The Ovoot Tolgoi Coal Mine is located in south-central Mongolia, approximately 45 km north of the Mongolia - China border. The coal mine is within the administrative territory of Gurvantes Soum, Umnugobi Aimag (South Gobi Province). The location of the coal mine is displayed in Figure 4-1.

Population of The Umnugobi Aimag spare with less than one person/km<sup>2</sup>. Population centres and transportation infrastructure in proximity to Ovoot Tolgoi are illustrated in Figure 4-2.

### **5.2 CLIMATE AND PHYSIOGRAPHY**

The region experiences a continental desert climate. Temperatures range from 0° to -30°C in the winter and from 30° to 35°C in the summer. High winds frequently occur throughout the spring. Average rainfall is 133mm, ranging from 100mm to 200mm, with most precipitation (70%-80%) occurring during July and August. The weather is acceptable for exploration activities from mid-March through October. The climate allows year-round mining operations.

The Umnugobi Aimag is within the physiographic region of the Gobi Desert. The topography of the deposit varies from flat, gravel-covered desert plains to moderately hilly terrain. Surface elevation ranges from 1,515 to 1,555m above sea level.

Vegetation is sparse, consisting primarily of small shrubs and grasses. The area currently supports a traditional subsistence economy focused on raising sheep, goats, and camels.





### 5.3 ACCESSIBILITY AND INFRASTRUCTURE

The property are generally accessible with four-wheel-drive vehicles.

A regular air service is available from Ulaanbaatar to Dalanzadgad and to Ovoot Tolgoi. Travel from Dalanzadgad to the property takes approximately seven hours over unpaved roads. In September 2006, SGS acquired a permit for an on-site airport which was constructed and completed in 2007. Ovoot Tolgoi is now accessible via weekly chartered aircraft from Ulaanbaatar for crew rotation and bringing in supplies.

There are two primary sources of mining labour - Ulaanbaatar and the local soum. Currently, approximately 57% of SGS employees are local. The remaining employees are flown to and from Ulaanbaatar. Employees generally work on a two-week on, one-week off rotation.

A rail line connects the Ovoot Tolgoi area with the interior of China. The railroad terminus is situated at Ceke, approximately 45 km south to the Ovoot Tolgoi Coal Mine. In 2010, a two lane paved road was constructed from the mine site to Ceke, which is being used by coal trucks.

Electrical power for the camp and shop complexes was initially supplied by diesel generators. The camp and shop complexes are now connected to a powerline that runs from China to Gurvantes Saum, supplying electrical power to the area (Figure 4-2). DMCL understands that SGS plans to connect the coal handling facility to the power grid which is currently under construction by the Mongolian Government.

No surface water is immediately available in the immediate area of the Ovoot Tolgoi Coal Mine. Water for the camp and shop complexes is being supplied from water supply wells drilled nearby. The infrastructure plans include water treatment to allow well water to be used for potable purposes. Water for dust suppression is available from the pit dewatering. SGS has commissioned a hydrogeological survey in 2012 (Aquaterra 2012) and has successfully identified a water source located around 30km away from the mine site. The survey suggested that the ground water is suitable for industrial use and is capable of supporting a wet coal



processing plant for steady coal washing. DMCL understands that SGS is currently planning to construct water pipes to transport the groundwater from the identified source to the mine site. SGS has been granted with the water permit for water use.

Waste disposal areas have been identified and approved in the mining permit.

On September 20, 2007, SGS received a mining license for the development of surface coal mining at Ovoot Tolgoi. The mine began operation in April, 2008 in the Sunset Pit after receiving a permit to mine from the Mongolian Government.

## 6. HISTORY

V.S. Volkhonina (1952) first carried out a geological investigation in the Nariin Sukhait area in 1951 and 1952, including a geological mapping at a scale of 1:500,000.

A Mongolian exploration survey led by D. Dashtseren (1971) first identified coal in the Nariin Sukhait area in 1971.

Subsequently, a further study of the Nariin Sukhait coal deposit was further undertaken by Exploration Unit No.15 of Ulaanbaatar Geological Research Group in 1991, including field mapping, trenching, 34 boreholes, coal quality test, and resource estimation for the two most promising resource areas, now controlled by MAK, which are outside the SGS's property. Based on standards from the former Soviet Union, Inferred Resource (categories A+B+C1+C2+P1) were reported to the +1,450m level, corresponding to 75 to 90m depth. Total Inferred Resource was reported to be 125,519,900 tonnes. SGS did not rely on this historical estimate, as the estimate was not done in compliance with the NI 43-101 standard and the boundaries of the coal resource were not clearly defined. SGS has conducted their own exploration, geological modelling and resource estimation, which did not include any of the earlier Nariin Sukhait exploration work. SGS did not plan to undertake any work to upgrade the historical estimate to the NI 43-101 standard.

The Russian resource classification differs from the NI 43-101 categories, and thus cannot be directly compared to the current NI 43-101 resource estimates. NI 43-101 criteria applied to coal deposits for the purposes of determination of coal resources and reserves include both "Geology Type" as well as "Deposit Type". Such classification of a coal deposit as a particular type determines the range-limiting criteria that may be applied during the estimation of resources and reserves.

The Mongolian State Geological Centre has documented the history of the deposit in public report which is accessible by the public (Dashkhoral et al, 1992). This study defined the seam nomenclature currently employed at Nariin Sukhait.



Norwest completed and updated comprehensive studies of the deposit area based upon their management of exploration programs executed from 2005 through 2006, and mine planning studies through to 2009.

RPM completed NI 43-101 Technical Reports in March 2011, March 2012, and May 2016 and a technical review of the mine plan in April 2016.

## **7. GEOLOGICAL SETTING AND MINERALIZATION**

### **7.1 REGIONAL GEOLOGY**

The geological history of the southern part of Mongolia is characterized by the continental accretion and Basin-and-Range style crustal extension, followed by regional-scale compressional folding and faulting. Elongated, east-west trending mountain ranges and intervening basins are therefore widely present in the region. Those structures are dominantly composed of Late Cretaceous to Permian-aged sedimentary sequences, overlain by Quaternary unconsolidated sediments. Mountain ranges between the basins comprise crystalline basement rocks dominated by intermediate to high angle faults that show evidence for both compressional and extensional movement. The most prominent structure in relation to the Ovoot Tolgoi Deposit is the arcuate, east-west-trending, moderately-dipping Nariin Sukhait fault where the Late Permian coal-bearing sequences are exposed.

The Ovoot Tolgoi Coal Mine, which comprises of the Sunset Coalfield in the west and the Sunrise Coalfield in the east, is one of the three operating coal mines in the region of Nariin Sukhait.

### **7.2 COAL-BEARING SEQUENCES**

The Exploration Unit No.15 of Ulaanbaatar Geological Research Group undertook initial geological exploration program in the region of Nariin Sukhait in 1991. Mongolian State Geological Centre also undertook the exploration work and reported the existence of 10 coal seams (Dashkhoral et. al., 1992).

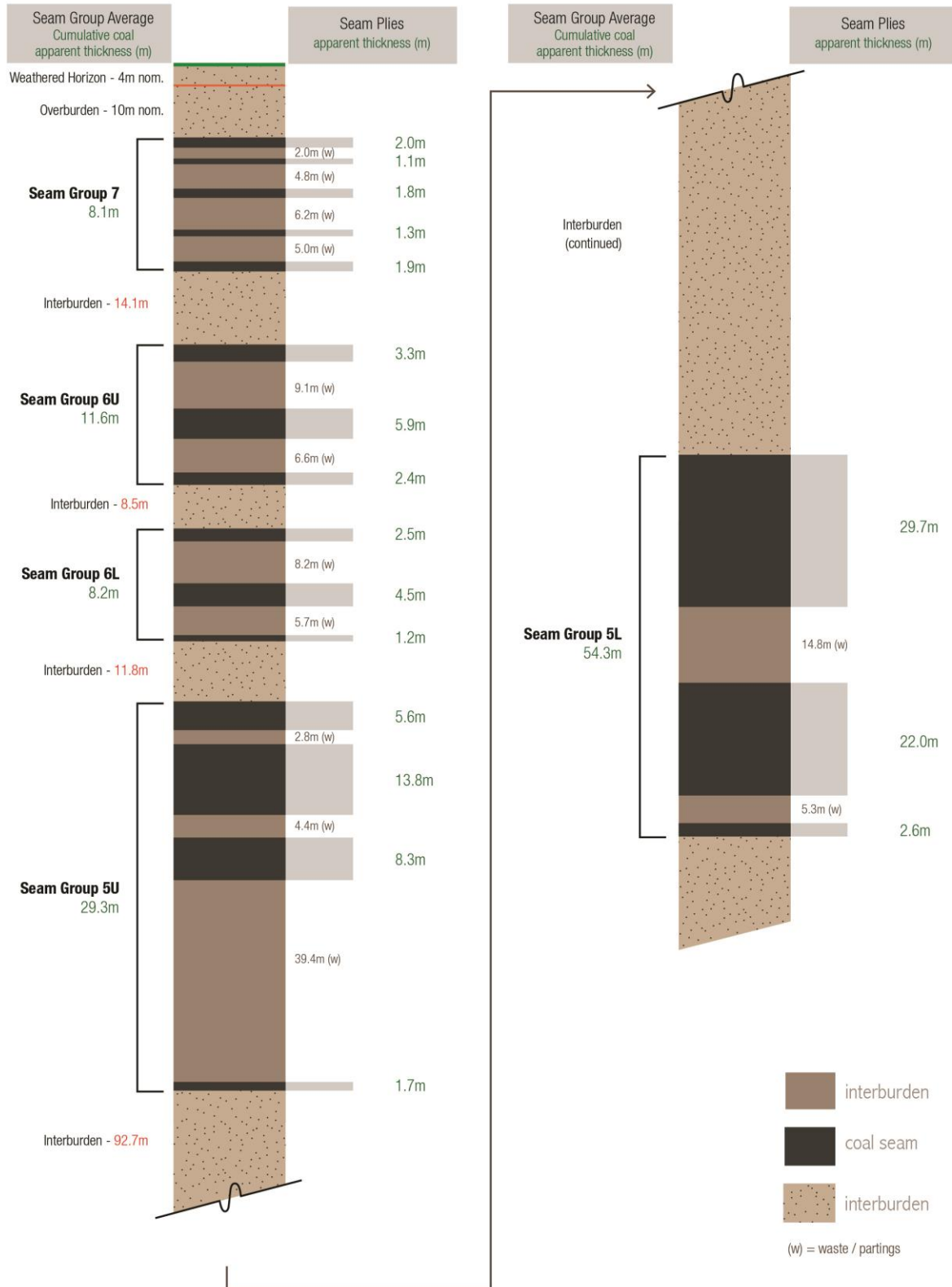
The current geological understanding of the deposit has organized the coal seams into a number of Seam Groups including the Seam Nos. 4, 5L, 5U, 6, 7, 8, 9, 10 and 11. Each of the Seam Groups are further divided into a number of sub-layers or known as plies based on parting material within the Seam Groups. The simplified stratigraphy is shown in Figure 7-1 and 7-2.



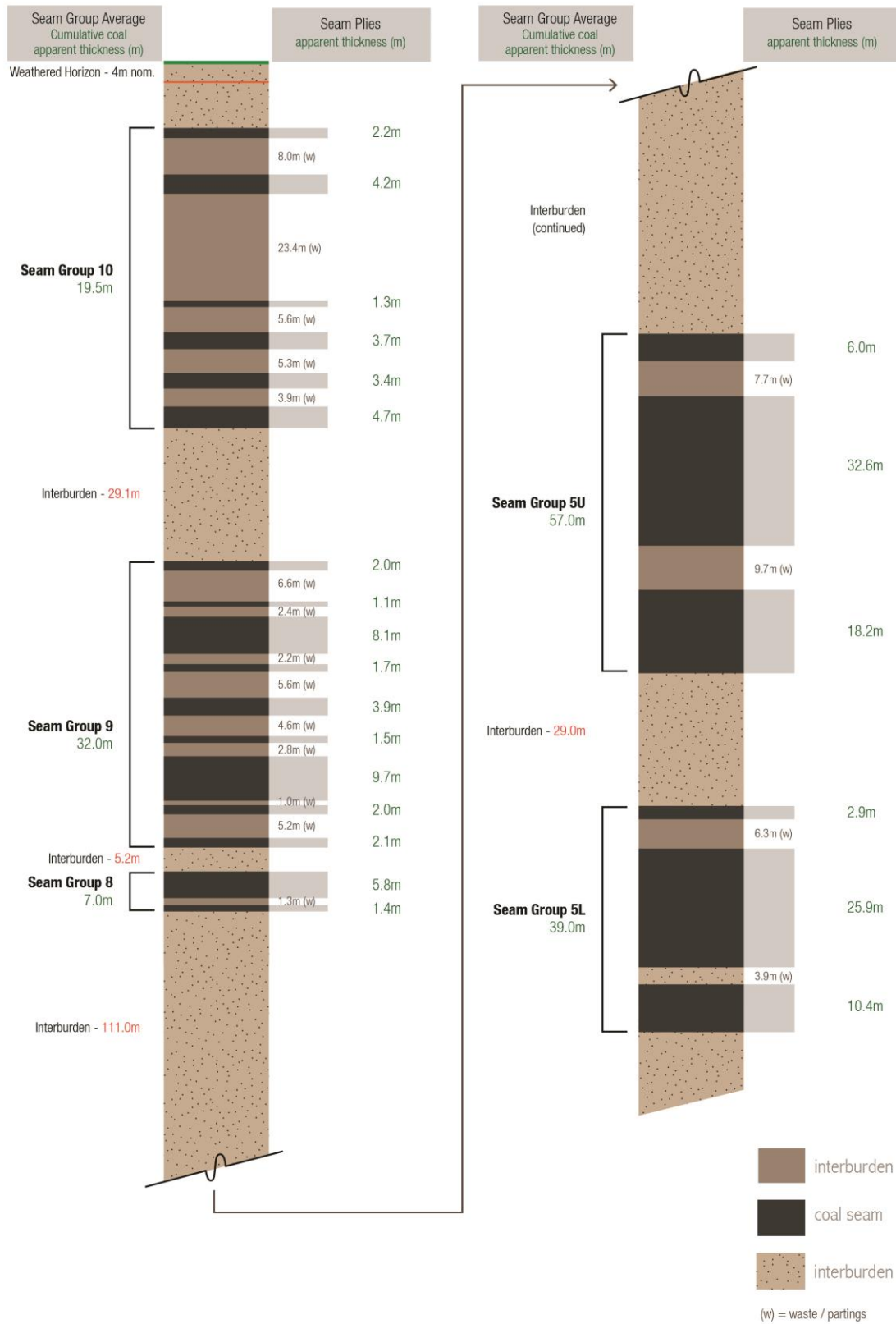
The overall estimated thickness of the coal-bearing sedimentary sequence is 1,370 m with a cumulative thickness of the coal seams ranging from 68m to 250m. Interburden between the coal seams is dominated by sandstones and conglomerates, whereas partings within the seams are mostly mudstones and carbonaceous mudstones.

The main coal resources of the Ovoot Tolgoi Coal Mine are contributed by the Seam Nos. 5L and 5U which are identified in both the Sunset and Sunrise Coalfields. In the Sunrise Coalfield, the Seam No. 6 and 7 are identified which could potentially be related to Seam Groups 8, 9, and 10 identified at the Sunset Coalfield.

The remainder of the Resource in the Sunset Coalfield is found in the Seam Nos. 4, 8, 9, 10 and 11 that contain multiple discrete seams. In the Sunrise Coalfield, the Seam Nos. 1, 2 and 3 that were described in the early work at Nariin Sukhait, have not been identified in the SGS's property.



**Figure 7-1: Simplified Stratigraphy of the Sunrise Coalfield (extracted from 2016 Technical Report)**



**Figure 7-2: Simplified Stratigraphy of the Sunset Coalfield (extracted from 2016 Technical Report)**



### 7.3 STRUCTURAL GEOLOGY

#### 7.3.1 Sunrise Coalfield

The Sunrise Coalfield is located on the southeast corner of the MAK’s mining license. The Seam No. 5 is currently mined by MAK and MAK-Qinghua and is in this area along the axis of a regional-scale antiform as shown in Figure 7-3. This structure trends to the southwest from the MAK East Pit and forms the basis for the SGS’s resources at the Sunrise Coalfield.

The coal-bearing section is a southeast-dipping with an average dip of around 35 degrees. Minor Seam Nos. 6 and 7 occur above the Seam No. 5 and Seam No.4 occurs beneath the Seam Nos. 5. Seams No. 6 and 7 are probably equivalent to the Seams Nos. 8, 9 and 10 at Sunset Coalfield, but correlation has not been undertaken. Coal resources estimated for the Sunrise Coalfield is largely contributed by Seam No. 5.

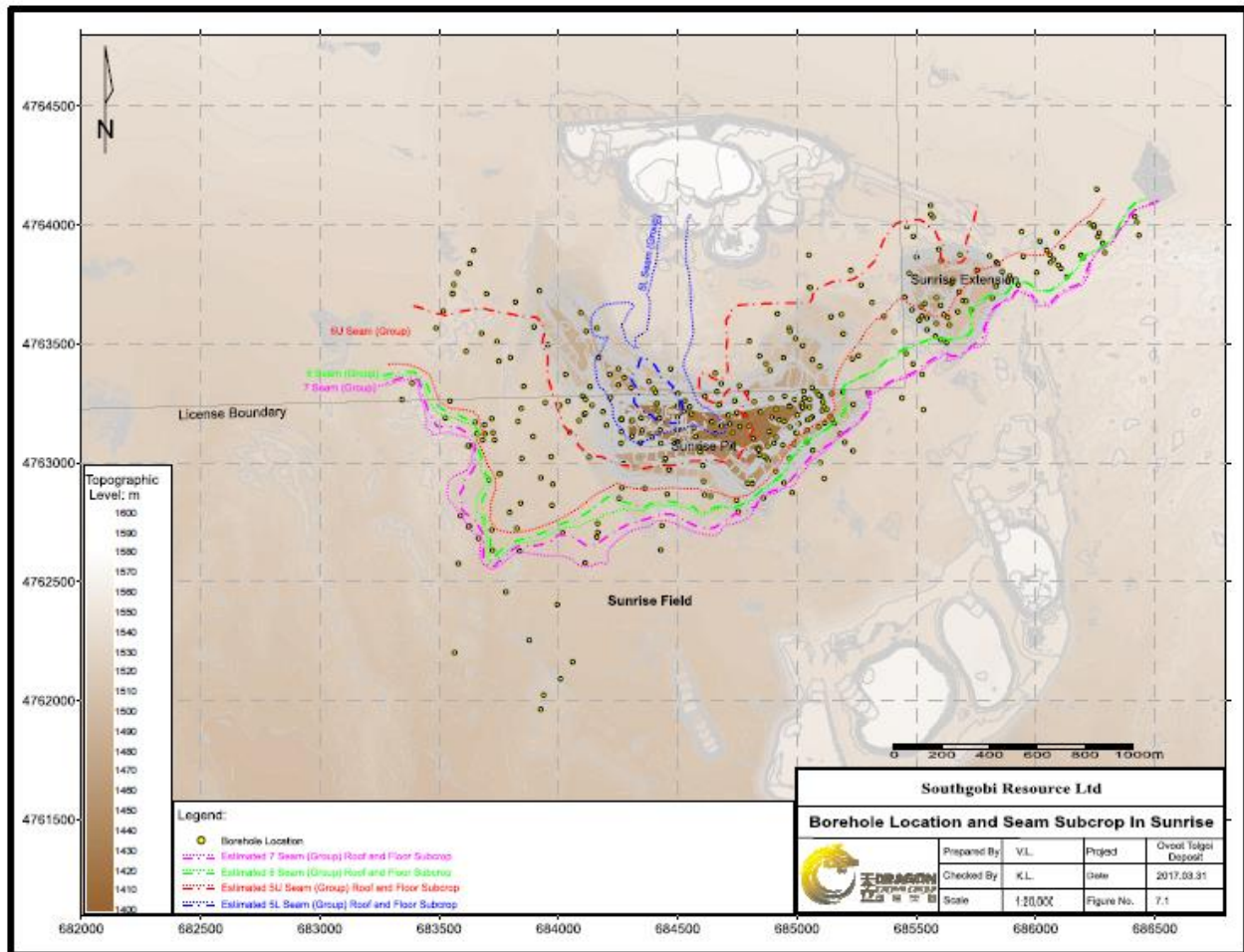


Figure 7-3: Coal Seam Exposure in the Sunrise Coalfield

### 7.3.2 Sunset Coalfield

The Sunset Coalfield is located on the southwest corner of the MAK's mining license. Coal resources occur along a southeasterly-dipping monocline, which could represent a preserved limb of a southwest plunging antiform extending in a north-east/south-west direction from the exposure in the north-west of the Sunset Pit, through to the MAK pit (Figure 7-4).

Norwest suggested that a thrust fault system controls the distribution of coal, dividing the Sunset Coalfield into a southern and a northern resource block. The more steeply dipping rocks of the southern block have moved over the northern block, which contains a repetition of the upper seams (Seam Nos. 8, 9, and 10). As a result of further drilling in 2010, seams were re-correlated in 2010 by MGBS, and the fault repeat of the upper seams has been re-correlated as No. 5 Seam. Faults were not included in MBGS's geological model in 2010 or 2011.

In the north of Sunset, the seams dip towards south-east at around 20 degrees, however further south the dip increases to around 45 degrees. To the west, the seams dip towards south-west.

The majority of resources are contributed by the Seam Nos. 5L and 5U within a southeast dipping coal-bearing sequence. Additionally, a considerable proportion of resources occur in the upper coal-forming Seam Nos 8, 9, and 10.

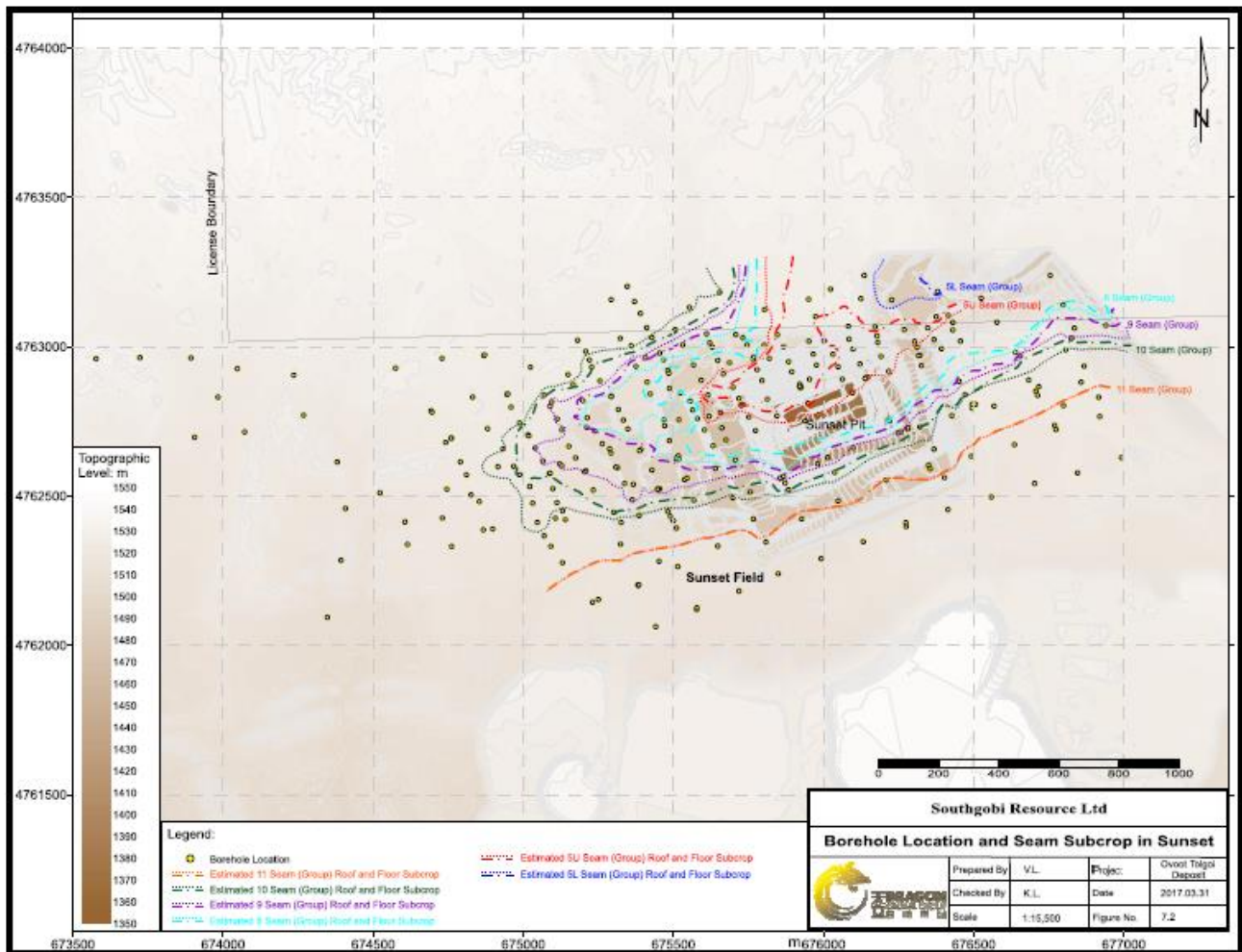


Figure 7-4: Coal Seam Exposure in the Sunset Coalfield

## 7.4 MINERALIZATION

The coal-bearing formations occur primarily within a zone of upper Permian sediments exposed in the hanging wall of the Nariin Sukhait Fault. Early work adopted the seam nomenclature presented by Dashkhoral et al (1992), with the thickest seam in the middle of the sequence designated the Seam No. 5, and upper seams named in ascending order. As exploration work progressed, numerous additional seams and splits were discovered within the overall packages of coal previously described.

Thicknesses reported are based on drill intercepts and represent apparent thickness. Thickness of each seam group is presented in Table 7-1 below.

**Table 7-1: Coal Seam Thickness of the Sunset Coalfield**

<i>Seam Group</i>	<i>Average Cumulative Coal Apparent Thickness (m)</i>	<i>Maximum Cumulative Coal Apparent Thickness (m)</i>
11	0.06	2.97
10	11.5	34.2
9	25.3	56.8
8	6.5	29.9
5U	45.1	204.3
5L	36.7	140.4

**Table 7-2: Coal Seam Thickness of the Sunrise Coalfield**

<i>Seam Group</i>	<i>Average Cumulative Coal Apparent Thickness (m)</i>	<i>Maximum Cumulative Coal Apparent Thickness (m)</i>
7	8.1	20.3
6	19.8	57.3
5U	29.3	100.0
5L	54.3	144.3
4	6.45	24.92

## 7.5 COAL QUALITY

Coal quality of each seam group, confined to the in-pit resource (depth within 300m below ground surface), and based on SGS’s latest resource model, is presented in the Table 7-3 below. Coal quality of both the Sunrise and Sunset Pits are highly comparable.

**Table 7-3: Coal Quality by Seam Group – Sunset Pit and Sunrise Pit**

<i>Pit</i>	<i>Seam Group</i>	<i>Inherent Moisture</i> %	<i>Total Moisture</i> %	<i>Ash</i> %	<i>Volatile Matter</i> %	<i>Calorific Value</i> kcal/kg	<i>Total Sulphur</i> %	<i>CSN</i>	<i>Relative Density</i> g/cc
<b>Sunset Pit</b>	<b>10</b>	1.69	5.40	17.32	32.86	6455	1.20	3	1.42
	<b>9</b>	1.68	4.67	18.10	32.46	6429	1.63	3	1.44
	<b>8</b>	2.33	5.22	17.41	31.65	6513	1.38	3	1.43
	<b>5U</b>	1.34	4.39	9.75	32.22	7240	0.75	4	1.34
	<b>5L</b>	1.53	3.14	15.32	33.05	6780	1.03	5	1.42
<b>Sunrise Pit</b>	<b>7*</b>	1.35	9.63	8.15	39.63	6872	0.71	6	
	<b>6*</b>	1.02	7.21	13.94	39.18	6384	0.52	5	
	<b>5U</b>	1.01	9.32	17.96	31.74	6407	1.04	2	1.42
	<b>5L</b>	1.04	7.52	13.25	31.50	6774	1.11	3	1.37

\* Based on ROM coal samples collected in the Sunrise Pit in December 2016, analyzed by SGS Lab, therefore indicative only.

## **8. DEPOSIT TYPES**

### **8.1 GEOLOGY TYPE**

The definition of Deposit and Geology Types for coal properties is different from that applied to other types of mineral deposits and is outlined by the Geological Survey of Canada ("GSC") Paper 88-21. There are two general criteria: Geology Type (the degree of geological complexity) and Deposit Type (probable extraction method). These determine the approach to be used for the Resource estimation procedures and define the confidence that can be placed in the extrapolation of data values.

In accordance with GSC 88-21, Geology Type can be divided into four categories: Low (with further subdivision into A, B and C types), Moderate, Complex and Severe.

#### **Complex Category**

Deposits in the “Complex” category have been subjected to relatively high levels of tectonic deformation. Tight folds, some with steeply inclined or overturned limbs, may be present, and offsets by faults are common. Individual fault-bounded plates do, however, generally retain normal stratigraphic sequences, and seam thicknesses have only rarely been substantially modified from their pre-deformational thickness.

#### **Severe Category**

Deposits in the “Severe” category have been subjected to extreme levels of tectonic deformation. Tight folds, steeply inclined and overturned beds and large displacement faults are common. The stratigraphic succession between faults may be difficult to ascertain owing to the level of deformation, and coal seams are commonly structurally thickened and thinned from their pre-deformational thicknesses.

In 2012, RPM concluded that the Geology Type of the Ovoot Tolgoi Deposit was “Complex”, consistent with the categorization in prior reports prepared and filed by SQR in compliance with the requirements of NI 43-101 (2012 Technical Report). However, in 2016, RPM concluded that the Geology Type should be re-categorized as “Severe”, based on observations made during a site visit in 2015 (2016 Technical Report).

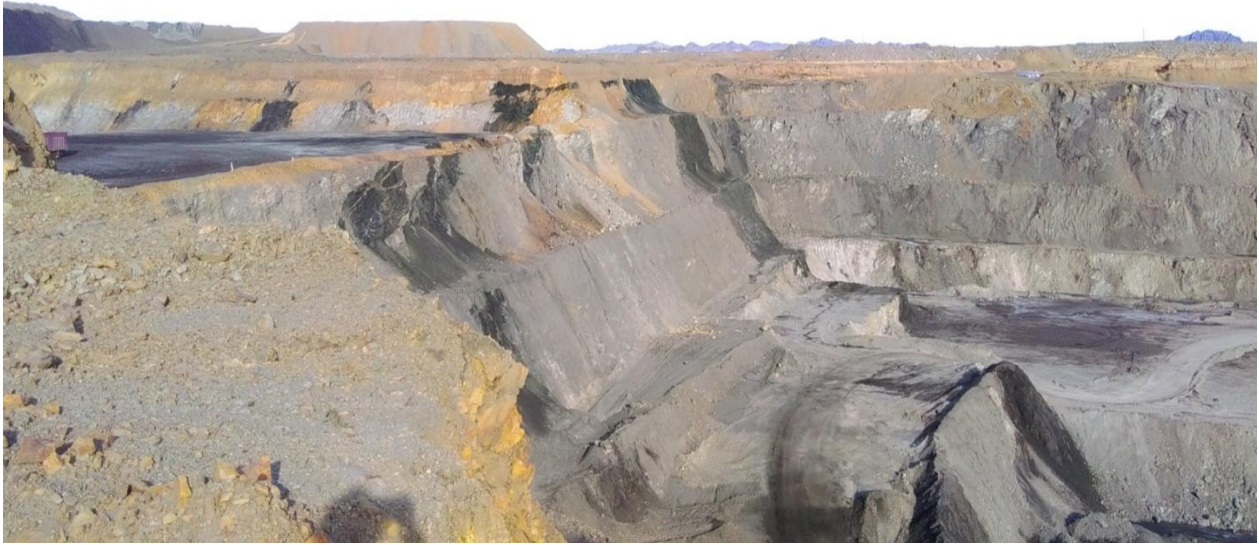
In late 2016, SQR engaged DMCL to perform another independent technical review to prepare an updated mine plan and to address the issue of the Geology Type, based on current information and mining operation, including the results of additional drilling that had taken place subsequent to the 2015 site visit by the authors of the 2016 Technical Report.

DMCL's technical review of drillhole data and the resource model, and its on-site assessment suggested the Ovoot Tolgoi Coal Mine has been subjected to a significant amount of tectonic deformation comprising an east-west-trending regional thrust fault with hanging wall strata modified by different secondary folding. Coal seams are typically dipping in angle from 35° to 55° and are occasionally sub-vertically dipping.

DMCL's review further indicated that the previous Geology-Type classification in the 2016 Technical Report was not strongly justified by current technical findings. Tight folds, steeply inclined and overturned beds, were not widely present whereas large displacement faults are generally absent in both Sunrise and Sunset coalfields at the Ovoot Tolgoi Coal Mine (Figure 8-1 to 8-3).



**Figure 8-1: The coal seams and stratigraphy are generally very continuous at the Sunset Pit. Extensive tight folds, steeply inclined and overturned beds and large displacement faults are not observed at the Sunset Pit.**



**Figure 8-2: The coal seams and stratigraphy generally do not show extensive tight folds, steeply inclined and overturned beds and large displacement faults at the Sunrise Main Pit.**



**Figure 8-3: The coal seams and stratigraphy generally do not show extensive tight folds, steeply inclined and overturned beds and large displacement faults at the Sunrise Extension Pit.**

The different conclusions in Geology-Type between the 2016 Technical Report and DMCL's conclusion are likely attributable to DMCL's more recent site visit (February 2015 by RPM vs December 2016 by DMCL) and DMCL's benefit of being able to observe coal seams exposed





by mining operations during 2015 and 2016, which appears to generally retain normal stratigraphic sequences, thicknesses and continuity. As a result, DMCL concluded that the Geology Type of the Ovoot Tolgoi Deposit, including Sunrise Main, Sunrise Extension, Sunset Main and Sunset Extension, should be reverted to its prior categorization as “Complex”.

## **8.2 UNDERGROUND RESOURCES**

Coal seams which are present from the original ground surface to a depth of 300m are considered to be “Surface” minable resources through the open-pit mining method. In 2012 Technical Report, the depth limit for surface mining was assumed to be 300m below the original ground surface. In the Company's updated mine plan, pit shells are confined to a depth of 300m, which is consistent with the previous pit shell design.

In 2012 Technical Report, coal resources between 300m and 600m from the ground surface were considered as Underground Resources. However, in 2016 Technical Report, this part of coal resources was considered to be of no reasonable prospects for eventual economic extraction by underground mining and hence the mineral resource estimate contained in that Report did not include any Underground Resources. DMCL has concluded, however, that reasonable prospects for coal resources between 300m and 500m are now considered to be justified for eventual economic extraction by underground mining methods given that 1) Chinese coal market conditions have improved significantly since the issuance of 2016 Technical Report, 2) coal prices have returned to a level significantly higher than those in 2015 and 2016, and 3) a thermal power plant planned by the Company for a location near the mine-site is expected to generate substantial demand of thermal coal for electricity generation.



## **9. EXPLORATION**

### **9.1 INTRODUCTION**

Modern systematic exploration was first commenced in late 2004 by IVN with the completion of five boreholes in the Ovoot Tolgoi Deposit area now within the mine license controlled by SGS. Exploration drilling continued in 2005 and in 2006 with the emphasis on delineating surface resource, but also included general exploration along the entire Nariin Sukhait trend. Exploration drilling in 2008 at Ovoot Tolgoi focused on expanding the underground resource in the Sunset Field.

The 2010 exploration drilling program included infill drilling and extended drillhole coverage in the western part of the Sunrise Field. The 2011 exploration program included infill drilling and increased drillhole coverage in the Sunset Extension. The 2014 drilling program was completed exclusively in the Sunrise Field with 14 drillholes in the Sunrise Extension and 3 drillholes toward the western part of the Sunrise Main Pit. In 2016, 22 drillholes were completed with the majority of exploration drilling planned to test the further extension of coal resources extending from the current operation area.

In addition to drilling, exploration activities included:

- Field reconnaissance mapping
- Satellite Imagery
- Lineament studies from aerial photographs
- Surface-resistivity geophysical surveying
- Trenching

### **9.2 SERVICE CONTRACTORS**

Exploration geology fieldwork, including reconnaissance mapping, trenching, descriptions of drilling returns, geotechnical data field logs, and database development, was contracted primarily to Sapphire, supervised initially by IVN, then later by SGS. Norwest provided



assistance in the review of activities and interpretation of results in 2005 and 2006, while Sapphire directly supervised and provided assistance to SGS in the review of activities and interpretation of results in 2007, 2008 and 2011. McElroy Bryan supervised the 2010 exploration program.

Sapphire has been hired for six years for providing competent exploration geologists for mapping, drilled lithology description records, rock quality determination (RQD), fracture frequency, field point-load testing records, field free swelling index (FSI) tests, sampling, sample preparation, and sample security in accordance with quality assurance procedures implemented in 2005. Standardized log forms for recording all geologic data and laboratory instruction forms are in English and have been employed since 2005.

### **9.3 GEOLOGICAL MAPPING**

Reconnaissance geological mapping has been carried out to locate surface exposures of coal resources and identify structures.

### **9.4 TRENCHING**

Back hoe trenching has been carried out across the interpreted trend of the coal seams. Trenching has been useful in exploring for coal seams in areas of shallow cover and has aided the placement of exploratory drill holes. Coal seam thickness and structures observed in the trenches are generally greatly affected by near-surface erosion, alteration, and deformation. Therefore, trenching intercepts have been found to be unreliable sources of seam characteristics and structure, and are not used in Resource estimation.

### **9.5 SATELLITE IMAGERY**

Satellite imagery has been used to identify coal seam outcroppings and interpret the trend of the coal seams.



## **9.6 GEOPHYSICAL SURVEYS**

3-D and 2-D surface resistivity surveys have been used to locate mineralization in areas of thin surficial cover. The area was also covered by BHP's Falcon combined gravity, magnetic and radiometric survey.

## **9.7 DRILLING**

Exploratory drilling was conducted as a follow up to trenching and geophysical surveys, and is detailed in Section 10.

## **9.8 COORDINATES AND DATUM**

Ovoot Tolgoi lies in UTM Zone 48, Northern Hemisphere, (WGS 48). Drillhole collars are surveyed by the UTM grid whereas license co-ordinates are surveyed by longitude and latitude.

## **9.9 RESULTS**

Geological mappings, analysis of satellite imagery, 3-D and 2-D surface resistivity surveys were used to define the trend of the coal seams and interpret structure and geology. Potential targets identified with these techniques were tested with trenches running perpendicular to the apparent strike, exposing coal seams near the surface. Coal seams were subsequently tested by drilling.



## **10. DRILLING**

### **10.1 INTRODUCTION**

During the Soviet/Mongolian government-sponsored exploration programs, there is only limited drilling completed. From 2004 to 2006, an exploration program was carried out by IVN over both the Sunset and Sunrise Fields. A section line spacing of approximately 150 m to 200 m was generally employed with a drillhole spacing along a section line of approximately 50 m. From 2007 to 2011, drilling was further conducted by SGS to expand the coverage. In 2008, drilling focused on the deeper areas of the Sunset Field, with the aim of proving up the underground resource. Similarly, deeper areas of the Sunrise Field were drilled in 2010, as well as areas outside the initial target zone, in order to upgrade the classification of resource category. In 2014 drilling was conducted in the Sunrise Field with the majority of the drilling concentrating on the Sunrise Extension. In 2016, 22 drillholes were completed with the majority of exploration drilling planned to test the further extension of coal resources outside the current operation area.

All holes have been geophysically logged except where holes have caved. Depending on the equipment used, logs were either examined visually, or interpreted using the geophysical logging software. The depths for drilled seam intersections were then incorporated into the geologic model. A drilling summary by method and area is presented in Table 10-1 below.

**Table 10-1: Summary of Historic Exploration Drilling**

<i>Field</i>	<i>Year</i>	<i>Core</i>		<i>Open</i>		<i>Total</i>		<i>Management Company</i>
		<i>No. of Holes</i>	<i>Metres drilled</i>	<i>No. of Holes</i>	<i>Metres drilled</i>	<i>No. of Holes</i>	<i>Metres drilled</i>	
Sunrise	2004	5	687	-	-	5	687	IVN
	2005	38	6,248	93	16,700	131	22,948	IVN
	2006	3	1,273	27	6,089	30	7,362	SGS/Sapphire
	2007	1	254	17	3,438	18	3,692	SGS/Sapphire
	2010	6	993	53	10,459	59	11,453	McElroy Bryan/Tanan Impex
	2014	17	2,446	-	-	17	2,446	SGS
	2016	2	350	-	-	2	350	SGS
	Sub-total	72	12,251	190	36,687	262	48,938	
Sunset	2005	13	2,034	87	15,080	100	17,114	Norwest/Sapphire
	2006	24	5,187	47	10,738	71	15,925	Norwest/Sapphire
	2007	7	2,797	23	5,333	30	8,130	SGS/Sapphire
	2008	40	22,792	-	-	40	22,792	SGS/Sapphire
	2011	37	9,110	20	6,660	57	15,770	SGS/Sapphire
	2016	20	3,015	-	-	20	3,015	SGS
	Sub-total	141	44,935	177	37,811	318	82,746	
<b>Total</b>		<b>213</b>	<b>57,186</b>	<b>367</b>	<b>74,497</b>	<b>580</b>	<b>131,684</b>	

Note: 7 water bores drilled in the Sunrise Field and 13 drill-holes located on the adjacent MAK license are incorporated into the geological database for modelling purposes but not included above.



## **10.2 DIAMOND DRILLING**

Core drilling was utilized to collect complete representative coal samples for the Sunset and Sunrise Coalfields for quality testing and to measure more accurately the depths of lithological contacts. The number of cored holes completed at the mine site is shown in Table 10-1.

## **10.3 CORE DRILLING PROCEDURES**

Some of the initial core holes at Nariin Sukhait were drilled with single-tube Russian made core equipment. The bulk of the core drilling at Nariin Sukhait has been done with wireline drilling systems and modern, triple-tube core barrels. All of the triple-tube coring during the 2005 and 2006 drill programs was performed under Norwest supervision. Core logging and sample handling was performed by Sapphire under Norwest supervision. Triple-tube coring completed during 2007, 2008, and 2011 was performed by Sapphire under SGS supervision, whilst MBGS supervised the 2010 drilling program. The 2014 exploration program utilised triple-tube coring methods and samples were collected by SGS personnel.

## **10.4 COLLAR SURVEYS**

Drillhole collars are positioned using GPS.

## **10.5 DOWNHOLE SURVEYS**

Downhole geophysical surveys have been completed on most drillholes. Geophysical surveys have generally included Caliper, Gamma, and Density which are suitable for accurately defining coal intervals.

There were only a limited number of downhole verticality surveys conducted on the drillholes. Downhole verticality survey is recommended for future drilling program as some of the holes are quite deep (in the order of 300 m to 400 m).

## **10.6 CORE RECOVERY**

Core recovery is logged after comparing the recovered core length with the core run length recorded by the driller. Recovered core is then also measured and compared to the coal interval thickness determined from the geophysical log suite.

## **10.7 DENSITY**

Relative Density (“RD”) was performed on a significant number of coal samples. A number of samples which did not have RD values determined were estimated by using the relationship with between Ash and RD based on sample data available. RD values were converted to RD in-situ values using the Preston-Sanders equation. RD in-situ values were used to determine the tonnage of coal resources. Apparent Relative Density (“ARD”) values were also collected for a large number of samples but were not used in this assessment.

## **10.8 LOGGING**

Core logging and sample handling was performed by Sapphire under Norwest supervision during the 2005 and 2006 drilling program, under SGS supervision for the 2007, 2008 and 2011 drilling programs, and by Tanan Impex under MBGS supervision for the 2010 drilling program.

Core was retrieved, logged, and sealed according to Norwest conventions established in 2005. Each core run was measured for total core cut versus core recovered. Photographs were taken at 0.5 m intervals. Coal showing distinct lithological variation was sampled separately, as were partings over 0.05 m. Otherwise, coal intervals with a uniform appearance were bagged in 0.6 m sample increments as per the core box length. When zones of core loss greater than 0.1 m were encountered, separate samples were collected both above and below the zone. Intercept depths and seam thickness are reported in apparent thickness.



In the 2005 to 2008 programs, the majority of holes were geophysically logged except where holes caved. Depending on the equipment used, logs were either examined visually or interpreted using the Elogger software developed by Norwest. All holes in the 2010 and 2011 programs were geophysically logged, except where holes have caved. Drillhole depths were then incorporated into the geologic model.

SGS personnel completed basic lithological logging and sampling of coal intervals at 1 m interval during the 2014 exploration program. Downhole geophysical surveys were completed on all drillholes during the program. Core recovery was recorded and core photographs taken. Lithological logs and sample intervals have been corrected based on the interval depths interpreted from the downhole geophysical surveys.

## **10.9 RC/CORE DRILLING**

In 2005 and 2006, reverse circulation (“RC”) drilling provided cuttings samples of good integrity. Samples were collected at 1 m interval and cuttings were laid out in rows on the ground for examination and logging by the Sapphire on-site geologist. A number of holes were drilled with a conventional air-rotary system. Cuttings were laid out and logged in a similar fashion as for RC drilling. In 2007, 2008 and 2010 all holes were drilled with conventional air-rotary or were cored, whilst in 2011 all holes were drilled either by PCD conventional drilling or core. In 2014 and 2016, the holes were diamond drilling.

## **11. SAMPLE PREPARATION, ANALYSES AND SECURITY**

### **11.1 INTRODUCTION**

Throughout the exploration programs at the Ovoot Tolgoi Coal Mine, the majority of coal quality data was generally acquired from core samples and few RC samples were collected. All quality analyses used for modelling were taken from core samples, which were obtained using triple-tube coring equipment. There is a total of 558 drillholes among of which 151 drillholes are coal quality holes.

### **11.2 SAMPLING FOR CORE SAMPLES**

The sampling procedure of core samples adopted by SGS is summarized as below.

- Coal samples are broken out based on lithological changes.
- Core recovery is recorded after comparing the recovered core length with the core run length recorded by the driller.
- The geophysical log suite thickness is compared to the recovered core measurement.
- In zones of uniform coal appearance, samples are bagged about every 0.6 m to 1 m as per the capacity of the core boxes.
- In-seam partings up to 0.1 m are included in a coal sample where the thickness of the adjacent coal beds above and below the parting are both a minimum of twice the parting thickness.
- A parting is sampled separately if it is a non-coal lithology type >0.1 m in thickness, carbonaceous shale, bone or interbedded coal/mudstone, or comprises >50% coal.
- Samples are cleaned of any contaminants.
- Core is placed in individual, core-sleeve style plastic bags.
- Bags are sealed with plastic tape to prevent excessive moisture loss and labelled on the outside with drillhole and sample number.
- Samples are placed in-sequence into waxed-cardboard core boxes.

- Core boxes are sealed with tape.
- Core is transported to the company's offices in Ulaanbaatar.
- Core is shipped for coal quality or rock strength analyses to a certified and accredited laboratory
- Laboratory instructions and shipment manifests are forwarded to the SGS's office and compared with contents upon arrival at the accredited laboratory.
- Samples are submitted for analysis using methods that are standard for the coal industry.
- Laboratories used are SGS Mineral Labs in Denver, Colorado (ISO-9000 certified, accredited by NQA in the United States of America), and SGS Laboratories in Tianjin, China (currently holds ISO-17025 certification, accredited by the CNAS, China National Accreditation Service for Conformity Assessment), and the SGS laboratory located on site.
- Core samples are sent for a full suite of coal quality testing including short proximate, full proximate, thermal tests, ash analysis, washability testing, and metallurgical testing.

### **11.3 SAMPLING FOR RC SAMPLES**

The sampling procedure of RC samples adopted by SGS is summarized as below.

- Samples are collected at 1.0 m intervals and placed into plastic bags.
- Bags are sealed with plastic tape to prevent excessive moisture loss and labelled on the outside with drillhole and sample number.
- Samples are grouped by holes into larger bags, packaged, and transported to the SGS's office in Ulaanbaatar.
- Samples are submitted for proximate and thermal analysis.
- The remainder of the samples have been stored at the SGS's facilities.



DMCL was not able to verify if the logging and sampling procedures, initially set up by Norwest were being followed in any of the field season 2005 to 2016 as DMCL was not present while logging and drilling were in progress. However the qualified persons involved in the previous technical reports made statements that they were satisfied that the logging and sampling procedures were reasonable and being followed. This practice is currently being maintained throughout SGS's exploration.



## **12. DATA VERIFICATION**

### **12.1 DATA COLLECTION PROTOCOLS**

Since the initial setup of the exploration camp in 2005, data collection verification and storage at Ovoot Tolgoi has been managed by various independent consultants employed by SGS.

Between 2005 and 2006, Norwest directly managed the exploration program from conceptual planning of exploration targets, through data collection, to interpretation and analysis. Norwest provided on-site management throughout the majority of the exploration project during this period. All data collection was completed in accordance with defined protocols established in 2005 by Qualified Persons including Patrick P. Riley, and Richard Tiffit, consultant/ Qualified Persons for Norwest at Ovoot Tolgoi. The protocols were described in the preceding sections under drilling, coring, sampling methodology and sample preparation. Patrick P. Riley is the owner and operator of TAG, an independent geological consulting company based in Lakewood, Colorado. Norwest on-site geologists were responsible for training and administration of data collection procedures and were responsible for data review. Norwest maintained oversight of all data collection throughout the exploration program, and the QP visited these operations and reviewed these procedures.

During 2007, 2008, 2010 and 2011, although Norwest was no longer involved at Ovoot Tolgoi, those data collection protocols established by Norwest were continued, supervised by SGS and McElroy Bryan geological personnel. During the 2010 field season, data was managed at site by MBGS. From 2011 to 2016, data was managed at site by SGS whereas RPM was actively involved in the management of sampling protocols, geological database and resource models together with SGS.

DMCL was not able to verify if the protocols initially set up by Norwest for the logging of rotary and percussion holes were being followed in any of the field season 2005 to 2016 as DMCL was not present while logging and drilling were in progress. However, the qualified persons involved in the previous technical reports made statements that they were satisfied that data collection protocols were adequate and were being followed. DMCL has reviewed



the protocols set up by Norwest for the collection of geological data and considers them fair and reasonable for this style of deposit.

## **12.2 DATABASE MANAGEMENT**

The database management protocols actively employed by SGS currently were originally developed by Norwest, TAG, Sapphire and MBGS throughout their exploration programs in different times. The management protocols are summarized as below.

- All mapping was entered and maintained in electronic format on a CAD-based system.
- All field geological data was electronically forwarded to the relevant office on a daily basis
- The geological and geophysical logs were reviewed by geologists
- Exploration management comments and procedural instructions were electronically managed and reported on a daily basis
- Data entry of all geological data is compiled and managed on site
- All geological, geophysical, and sampling data forwarded was reviewed and verified by geologists
- Verified data was entered and maintained in an electronic database and geological modeling software
- Periodic cross-section and digital modelling development were employed for in-progress analyses
- Results from the coal quality testing were added into the database in the office
- All mapping was entered and maintained in CAD system formats
- Intercept depths and seam thickness reported are based on the apparent thickness of the beds as seen in the drillhole data.

Ongoing effort of a good practice of database management is recommended, as mining operation continues, to compile the latest geological data into a comprehensive database to ensure all data is stored effectively and provenance is maintained.

### 12.3 DATABASE VERIFICATION

The geological database is actively managed by SGS and has also been verified against original drillhole records by different qualified persons involved in previous technical reports.

2016 Technical Report stated that “the drillhole collar co-ordinates in the database were reviewed against drillhole survey reports and co-ordinates of the drillholes recorded on original lithological logs. During the review, significant differences were observed between survey records for a number of drillholes. The drillholes with issues identified, were ‘ground truthed’ during the site visit by locating the actual drillhole collars. Randomly selected drillholes were also selected from the database and ‘ground truthed’ during the site visit. The drillhole collar coordinates in the current database are considered to be accurate”. DMCL has further verified part of the drillhole collars against original survey records and elevations in the Digital Terrain Model (“DTM”), considering that the current database is accurate and representative.

The seam picks recorded in the database were reviewed against the original lithological logs, core photos and geophysical logs by previous Qualified Persons to confirm that the seam picks identified in the database are an accurate reflection of the coal intersections in the drillholes. Minor corrections were made to the database based on the review. Parting lithologies greater than 0.3 m thick are not identified as part of a seam ply, while parting lithologies less than 0.3 m thick can be included within the seam ply. The minimum coal ply thickness identified is generally 0.5 m. There are thin intersections of coal recorded in the drillhole records which have not been identified in the database, as seam picks and seam interpretation was not possible and will not have a material impact on the geological model.

Scanned field lithology logs and geophysical logs were provided to DMCL for review. The seam picks depths of part of the drillholes were corrected to the corresponding depths in the geophysical logs. The actual lithological logs are not contained in the database.

DMCL has reviewed the coal quality data in the database for a representative sample of drillholes against original laboratory results. The moisture basis of the coal quality data



recorded in the database was reviewed and changed where required so that the values recorded in the database are on an air dried (“ad”) basis where appropriate. Relative Density (“RD”) and Apparent Relative Density (“ARD”) data recorded in the database was differentiated based on reviewing original laboratory reports. Basic statistical analysis and regression analysis of key coal qualities was completed and anomalous values identified were reviewed against the original laboratory records. DMCL has also requested SGS to implement additional sampling for a number of coal seams for coal quality test. The results are generally consistent with the coal quality used in the current database.

DMCL is of the opinion that the geological database maintained by SGS is fair, reasonable and appropriate for resource estimation.



## **13. MINERAL PROCESSING AND METALLURGICAL TESTING**

### **13.1 INTRODUCTION**

Coal quality has been one of the major subjects for the exploration programs carried out in the region of Nariin Sukhait. The earlier exploration program driven by the former Soviet-Mongolian government (Dashkhoral et al., 1992) suggested that the coal was of the GJO and IGJO groups, based on the Soviet standards, equivalent to high-volatile bituminous coals. The exploration programs in 2005 and 2006 for the Ovoot Tolgoi Coal Mine indicated that the coal rank is high volatile B to high volatile A bituminous, based on the ASTM 0388 standard. The 2007 and 2008 exploration programs continue to indicate that the coal are potentially of coking coal quality at the Sunset Coalfield. Subsequently, detailed sample analysis by RPM 2012 suggested that the coal resource should be of a mixture of thermal and metallurgical grade.

The coal in the region of Nariin Sukhait is generally low ash (less than 20%, air-dried basis) approximately 1% Sulphur, less than 2% inherent moisture, with Free Swelling Index ranging from non-coking (less than 2) to coking (greater than 4).

Since the Ovoot Tolgoi Coal Mine has been put into production in 2008 in the Sunset Pit and then in 2011 in the Sunrise Pit, the historic production and sales data showed that the coal is generally low-ash coking coal in nature. In 2016, the sales data demonstrated that the coal has 13.09% (ad) ash content, with approximately 1% sulphur and 4.5 Free Swelling Index (FSI).

### **13.2 COAL QUALITY**

To date, raw coal and clean coal quality of the Ovoot Tolgoi Coal Mine has been analysed through core, sold coal and washability samples. Coal quality from core sample of the Sunset Pit is shown in Table 13-1 whereas that of the Sunrise Pit is shown in Table 13-2 below.

**Table 13-1: Summary of Coal Quality of the Sunset Seam Group**

<i>Seam</i>	<i>Total Moisture</i>	<i>Inherent Moisture</i>	<i>Ash</i>	<i>Volatile Matter</i>	<i>Total Sulphur</i>	<i>Gross Calorific Value</i>	<i>FSI</i>	<i>Relative Density</i>
	<i>ar, %</i>	<i>ad, %</i>	<i>ad, %</i>	<i>ad, %</i>	<i>ad, %</i>	<i>ad, kcal/kg</i>		
10	5.2	1.2	19.7	31.8	1.25	6273	2.8	1.46
9	5.3	1.2	20.5	31.1	1.28	6290	3.5	1.45
8	6.1	1.1	19.7	30.3	1.09	6451	4.2	1.44
5U	4.1	1.0	12.1	31	0.78	7100	3.6	1.38
5L	3.0	0.7	13.3	32	1.01	7060	4.6	1.38

**Table 13-2: Summary of Coal Quality of the Sunrise Seam Group**

<i>Seam</i>	<i>Total Moisture</i>	<i>Inherent Moisture</i>	<i>Ash</i>	<i>Volatile Matter</i>	<i>Total Sulphur</i>	<i>Gross Calorific Value</i>	<i>FSI</i>	<i>Relative Density</i>
	<i>ar, %</i>	<i>ad, %</i>	<i>ad, %</i>	<i>ad, %</i>	<i>ad, %</i>	<i>ad, kcal/kg</i>		
7*	11.4	1.1	31.1	42.8	0.85	6242	-	1.58
6U*	10.0	1.4	30.6	43.8	0.86	5206	-	1.55
6L*	5.1	1.8	19.0	36.3	0.79	5976	-	1.30
5U	8.8	1.0	14.7	32.2	1.15	6724	2.5	1.38
5L	8.0	1.0	13.4	31.6	0.99	6803	3	1.37

\*Based on reverse circulation (RC) samples, therefore indicative only.

Prior to 2017, SGS classified and named the finished coal products as A, B and F. The coal quality of SGS's sold coal product in 2016 is shown in Table 13-3.

**Table 13-3: Summary of Coal Quality of Sold Coal Products in 2016**

	<i>Sold Coal Products</i>		
	<b>A</b>	<b>B</b>	<b>F</b>
<b>As-Received (AR) Basis</b>			
Moisture % (inherent)	3.81	3.76	4.61
Ash %	6.79	10.45	22.22
Volatile Matter %	31.71	31.27	27.52
Fixed Carbon %	57.69	54.52	45.66
Sulfur %	0.68	1.01	1.07
Gross Calorific Value, btu/lb	13072	12470	10505
Gross Calorific Value, kcal/kg	7262	6928	5836
<b>Other Parameters</b>			
Free Swelling Index (FSI)	5.5	4.9	2.2
Mineral Matter, Parr % (SFA, AR basis)	7.54	11.58	24.01
FC (SFA, AR basis)	56.94	53.39	43.86
Sales Proportion (%)	3.58	76.67	19.75

Based on the washability test result for samples in 2016, at 1.40 SG, clean coal obtained from Seam No. 5 and No. 8 of the Sunset Pit, Seam No. 5U of the Sunrise Pit and Seam No. 5U of the Sunrise Extension can be classified to be metallurgical coking coals. In general, Seam No. 5 and No. 8 of Sunset and No. 5L of Sunrise have an ultra-low ash content (<5.0% ad), >4.0 FSI and <1.0% total sulphur (ad). These characteristics indicate the washed coals are an ultra-low ash clean coking coal product and are suitable for metallurgical use. The washability test result of the major seam groups was summarized in Table 13-4.

**Table 13-4: Summary of Washability Test Results of Major Seam Groups**

Seam Group	Specific Gravity	Mass Basis		Air-Dried Basis				Dry Basis			FSI
		Yield Sample Base	Yield Seam Base	Moisture	Ash	Total Sulphur	Gross Calorific Value	Ash	Total Sulphur	Gross Calorific Value	
		g/cc	%	%	%	%	%	kcal/kg	%	%	
Sunset 5	1.3	66.78	53.92	1.11	2.02	0.65	8,074	2.04	0.65	8,165	7.0
	1.4	89.19	72.01	1.08	2.84	0.72	7,992	2.88	0.72	8,080	5.8
Sunset 8	1.3	46.40	42.83	1.66	3.07	1.17	7,839	3.12	1.19	7,971	5.0
	1.4	81.58	75.30	1.66	4.95	1.20	7,631	5.03	1.22	7,760	4.1
Average	<1.4	85.39	73.66	1.37	3.90	0.96	7,812	3.95	0.97	7,920	5.0
Sunrise 5U	1.3	35.07	23.30	0.82	3.96	0.65	8,015	3.99	0.66	8,081	7.1
	1.4	65.15	43.29	0.88	6.16	0.81	7,791	6.46	0.84	8,036	5.2
Sunrise 5L	1.3	54.22	41.99	1.08	2.71	1.07	8,020	2.74	1.08	8,107	3.9
	1.4	81.20	62.88	1.21	3.91	1.12	7,882	4.90	1.13	9,118	3.8
Sunrise East 5U	1.3	32.61	16.44	0.88	3.93	0.38	7,885	3.97	0.38	7,954	5.4
	1.4	64.50	32.51	0.94	5.90	0.50	7,597	6.12	0.52	7,784	5.0
Average	<1.4	70.28	46.23	1.01	5.33	0.81	7,757	5.83	0.89	8,312	4.7
Overall Average	<1.4	76.32	57.20	1.16	4.75	0.87	7,779	5.08	0.92	8,155	4.8

### 13.3 SAMPLING

The majority of coal quality data was generally acquired from core samples and few RC samples were collected during the exploration programs. There is a total of 558 drillholes in the Ovoot Tolgoi Coal Mine among of which 151 drillholes are coal quality holes as summarized in Table 13-5 below.

**Table 13-5: Summary of Coal Quality Holes (up to 2014)**

<i>Coalfields</i>	<i>Total Number of Drillholes</i>	<i>Total Number of Cored Holes</i>	<i>Number of Coal Quality Holes</i>	<i>Percentage of Coal Quality Holes</i>
Sunrise	260	70	49	19
Sunset	298	121	102	34
<b>Total</b>	<b>558</b>	<b>191</b>	<b>151</b>	<b>27</b>

RC samples were taken from Seam No. 7, No. 6U and No. 6L of the Sunrise Pit. These seam groups are presumably related to Seam No. 8, No. 9 and No.10 of the Sunset Pit respectively.

In addition, ROM coal samples were collected from current working faces at the mine site. DMCL has requested SGS to collect seven samples of such kind from selected seam groups. The collected samples were then sent to ALS Mongolia located in Ulaanbaatar for washability test which comprises of determination of coal quality, sizing, float-sink and flotation. ALS Mongolia has demonstrated to DMCL that the analytical protocols adopted by ALS Mongolia are essentially the same as other SGS laboratories globally.

### 13.4 TESTING

The collected coal samples were submitted to accredited laboratories for standard analytical package that is compatible with the coal mining industry. Laboratories used during the past exploration programs include SGS Denver located in the US which is ISO-9000 certified and accredited by NQA, SGS China located in Tianjin which currently holds ISO-17025



certification and is accredited by China National Accreditation Service for Conformity Assessment, and SGS laboratory on site which is accredited with ISO/IEC 17025.

Coal samples were submitted for the proximate analysis, ultimate analysis, ash analysis, thermal analysis, sulphur analysis and metallurgical test. The detail of each test is described below.

Test items of proximate analysis include:

- Moisture
- Ash
- Volatile matter
- Fixed carbon
- Thermal value

Test items of ultimate analysis include:

- Carbon
- Hydrogen
- Nitrogen
- Sulphur
- Oxygen

Ash analysis is used to assess and describe the properties of coal ash residues by determining inorganic and minerals residues remaining after complete combustion. The test items of ash analysis include:

- Ash fusion
- Al<sub>2</sub>O<sub>3</sub>
- BaO
- CaO
- Fe<sub>2</sub>O<sub>3</sub>
- K<sub>2</sub>O
- MgO
- MnO

- NaO
- SO<sub>3</sub>
- SiO<sub>3</sub>
- SrO
- TiO<sub>2</sub>
- ZnO

Test items of sulphur analysis include:

- Sulphate
- Pyrite
- Organic

Test items of metallurgical test include:

- Gieseler plastometer
- Audibert – Arnu dilatometer
- Reactive maceral analysis (petrography)
- Phosphorous content (P %)
- Free Swelling Index (FSI) or Crucible Swelling Number (CSN)
- Caking Index (G Index)
- Trace element analyses (ppm)
- Hardgrove grindability index (HGI)
- Sapozhnikov Plastometer

Hardgrove Grindability index (HGI) determination has been conducted in order to describe the coal handling characteristics. Trace element analyses expressed as parts per million (ppm) is to ascertain the potential for release of deleterious elements following combustion of coal.

### 13.5 TEST RESULTS

The washability test programs of major seam groups are summarized in Table 13-6.

**Table 13-6: Test Programs of Seam Coal Washability Samples**

<i>Seam Group</i>	<i>Mass (Kg)</i>		<i>Flow-Sink Fractions</i>		<i>Flotation</i>	<i>Sample Batch</i>
	<i>Raw</i>	<i>Air Dried</i>	<i>Size (mm)</i>	<i>SG (t/m )</i>	<i>Size (mm)</i>	
SRE 5U	204.4	200.7			< 0.25	Batch-1
Sunrise 5U	201.3	198.4	50, 19, 9, 2, 0.5, 0.25	1.3, 1.4, 1.5, 1.6, 1.8, 2.0	< 0.25	
5L	204.3	203.3			< 0.25	
Subtotal	610.0	602.4				
5	50.7	49.3			n/a	Batch-2
8	53.2	52.7		n/a		
Sunset 9	61.8	61.1	50, 9, 2, 0.5	n/a		
10	57.3	56.9		n/a		
Subtotal	223.00	220.00		n/a		
Total	833.00	822.4				

The detailed coal quality of the major seam groups was presented in Table 13-7 below. The test results suggest that the coal quality of ROM coal samples is generally consistent with that of the core coal samples.



**Table 13-7: Detailed Coal Quality of Major Seam Groups**

<i>Parameter</i>	<i>Basis</i>	<i>Unit</i>	<i>Sunrise Seam Group</i>			<i>Sunset Seam Group</i>			
			<i>SRE5U</i>	<i>5L</i>	<i>5U</i>	<i>5</i>	<i>8</i>	<i>9</i>	<i>10</i>
<b>Proximate Analysis</b>									
Moisture	ad	%	1.25	1.10	1.12	1.25	1.72	1.73	1.88
Ash	ad	%	10.94	5.39	9.33	3.60	7.32	7.61	7.53
Volatile Matter	ad	%	37.47	33.09	33.21	33.40	36.27	34.08	35.88
Volatile Matter	dmmf	%	37.94	33.45	33.58	33.82	36.90	34.68	36.57
Fixed Carbon	ad	%	50.35	60.43	56.34	61.75	54.69	56.58	54.71
Sulphur (total)	ad	%	1.08	1.18	0.93	0.77	1.18	1.35	1.05
Sulphate Form	ad	%	0.04	0.07	0.01	0.02	0.05	0.03	0.03
Pyrite Form	ad	%	0.72	0.30	0.45	0.22	0.19	0.23	0.06
Organic Form	ad	%	0.31	0.81	0.47	0.53	0.93	1.08	0.95
Phosphorus	ad	%	0.003	0.011	0.011	0.001	0.005	0.009	0.005
Gross Calorific Value	ad	kcal/kg	6934	7732	7458	7869	7298	7313	7336
<b>Ultimate Analysis</b>									
Carbon	ad	%	71.20	79.50	77.23	80.67	74.50	74.70	74.58
Hydrogen	ad	%	4.61	5.01	5.04	4.92	4.80	4.73	4.97
Nitrogen	ad	%	1.30	1.29	1.31	1.33	1.55	1.50	1.60
Sulphur	ad	%	1.08	1.14	0.93	0.77	1.18	1.35	1.05
Oxygen	ad	%	9.63	6.58	5.04	7.46	8.94	8.39	8.39
<b>Ash Analysis</b>									
Al <sub>2</sub> O <sub>3</sub>	ad	%	6.11	12.42	18.8	14.37	8.75	9.63	15.29
SiO <sub>2</sub>	ad	%	12.34	13.6	33.49	24.44	23.57	37.17	41.02
TiO <sub>2</sub>	ad	%	0.24	0.36	0.77	0.66	0.32	0.33	0.54
CaO	ad	%	32.3	33.1	15.4	23.30	23.50	14.95	12.25
MgO	ad	%	17.85	6.42	3.96	6.43	12.70	10.25	5.19
K <sub>2</sub> O	ad	%	0.4	0.28	1.2	0.29	0.62	0.71	1.06
Na <sub>2</sub> O	ad	%	0.15	0.07	2.14	0.12	0.23	0.36	0.27
Fe <sub>2</sub> O <sub>3</sub>	ad	%	13.08	9.05	9.22	10.72	9.11	8.13	10.74
MnO	ad	%	0.41	0.18	0.13	0.19	0.12	0.07	0.10
P <sub>2</sub> O <sub>5</sub>	ad	%	0.06	0.45	0.27	0.03	0.17	0.26	0.16
SO <sub>3</sub>	ad	%	16.8	21.2	12.55	17.50	20.30	16.80	11.25
BaO	ad	%	0.11	0.05	0.06	0.19	0.12	0.09	0.08
SrO	ad	%	0.2	0.25	0.14	0.23	0.39	0.21	0.16
ZnO	ad	%	0.01	0.01	0.01	0.01	0.02	0.05	0.05
Base/Acid Ratio of Ash			3.41	1.85	0.60	1.04	1.41	0.73	0.52

The metallurgical test results are shown in Table 13-8 below.

**Table 13-8: Metallurgical Properties of Major Seam Groups**

	<i>Unit</i>	<i>Sunrise Seam Group</i>			<i>Sunset Seam Group</i>			
		<i>SRE5U</i>	<i>5L</i>	<i>5U</i>	<i>5</i>	<i>8</i>	<i>9</i>	<i>10</i>
FSI (CSN)		5.0	3.0	4.0	6.0	4.0	3.0	2.0
Gieseler Plastometer Test								
Max fluidity	ddpm	9	2	13	13	5	3	1
Dilatometer Test (Ruhr)								
Max contraction	%	22	23	20	21	25	30	34
Max dilation	%	-15	-23	-20	-20	-24	-30	-34
Caking Index								
GRI		73	38	57	72	67	38	18
Sapozhnikov Plastometer	%							
X	mm	39	40	43	38	36	37	41
Y	mm	12	6	10	14	11	8	5

Since RC samples are not representative of the coal quality of a coal seam, DMCL requested additional sampling of ROM coal samples from Seam No. 6 and No. 7 of the Sunrise Pit for coal quality test. The results, as shown in Table 13-9 below, generally indicated that Seam No. 6 and No. 7 appear to have coking coal properties.

**Table 13-9: Coal Quality of Seam No 6 and Seam 7 of the Sunrise Pit**

Seam Group	Sample ID	Total Moisture	Inherent Moisture	Ash	Volatile Matter	Fixed Carbon	Cross Calorific Value	Carbon	Nitrogen	Total Sulphur	FSI	Caking Index	Plastometrics	
		<i>Mt</i>	<i>Mi</i>	<i>Ash</i>	<i>V</i>	<i>FC</i>	<i>Q<sub>gr,v</sub></i>	<i>C</i>	<i>N</i>	<i>St</i>		<i>GRI</i>	<i>X</i>	<i>Y</i>
		ar, %	ad, %	ad, %	daf, %	ad, %	kcal/kg	ad, %	ad, %	ad, %			mm	mm
6	1	7.58	1.47	13.18	45.88	46.20	6664	70.44	1.33	0.42	6.5	84.0	37.5	14.0
	2	7.41	0.93	11.25	44.85	48.43	6887	73.22	1.31	0.43	6.0	91.5	36.0	16.0
	3	6.95	0.88	9.65	44.33	49.81	7082	74.88	1.29	0.70	7.0	96.0	37.0	17.0
	4	6.91	0.80	21.66	49.67	39.03	5838	62.83	1.35	0.52	6.0	74.0	38.0	12.0
7	1	9.60	1.56	6.43	43.27	52.19	7256	77.14	1.33	0.73	5.0	62.5	37.0	11.0
	2	9.87	1.31	7.82	43.61	51.24	7145	76.14	1.32	0.68	5.5	68.0	37.5	11.5
	3	8.99	1.11	8.37	43.76	50.91	7090	75.88	1.31	0.62	5.0	58.5	39.0	10.5
	4	10.04	1.41	9.99	44.53	49.14	6982	73.77	1.37	0.77	4.5	53.0	37.0	9.0



## 14. MINERAL RESOURCE ESTIMATES

### 14.1 INTRODUCTION

From 2011 to 2016, the coal resource of the Ovoot Tolgoi Coal Mine has been classified and estimated by SGS as well as further independently verified and estimated by RPM in accordance with the requirements set out by the NI 43-101 and the applicable portions of the Geological Survey of Canada Paper 88-21 “A Standardized Coal Resource/Reserve Reporting System for Canada” (GSC 88-21). Resource and Reserve estimate was previously reported in “Coal Geology and Resources and Reserves, Ovoot Tolgoi Deposit, Mongolia”, prepared by RPM (formerly as MMC) in March 2012 (2012 Technical Report). Subsequently, RPM updated the resource estimate substantially for the Sunset and Sunrise Coalfields in “Coal Geology and Resources, Ovoot Tolgoi Deposit, Mongolia” in May 2016 (2016 Technical Report).

The classification, reporting and estimation of Resource for the Ovoot Tolgoi Coal Mine presented in this Technical Report are also made in conformity with the requirements of the NI 43-101.

### 14.2 RESOURCE DEFINITIONS

In accordance with the requirements of NI 43-101, the definition of Resource is referenced to the Canadian Institute of Mining, Metallurgy and Petroleum's “CIM Definition Standards on Mineral Resources and Reserves” adopted by CIM Council on May 10, 2014. Their definitions are summarized as below.

- *Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource. An Indicated Mineral Resource has a higher level of confidence than an Inferred Mineral Resource but has a lower level of confidence than a Measured Mineral Resource.*

- *A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.*
- *An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.*
- *An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.*
- *A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit.*

Framework of the resource estimation is guided by GSC 88-21 as to the assurance of their existence into one of three categories, Measured, Indicated or Inferred categories, using the criteria for coals found in Geology Type "Complex" conditions, as shown in Table 14-1 below.

**Table 14-1: Assurance Of Existence For Coals Of Complex Geology Type**

Criteria	<i>Assurance of Existence Category</i>		
	Measured	Indicated	Inferred
Cross-section spacing (m)	150	300	600
Minimum # data points per section	3	3	3
Mean data point spacing (m)	100	200	400
Maximum data point spacing (m)	200	400	800

### 14.3 RESOURCE MODEL

DMCL has verified the resource estimates and parameters of the geological model and its database prepared by SGS for both Sunset and Sunrise Coalfields. These models were originally created by MBGS in 2011 using Minex software and were updated by SGS in 2015 under the supervision of RPM. The update of the resource model includes the latest exploration drilling result, coal quality results and corrections made during validation of the geological database.

DMCL’s commentaries in relation to the resource model are summarized as below.

- The latest database of the resource model indicated that all mined out resources of coal seams have been reasonably depleted from the resource estimate.
- DMCL’s estimation result is highly comparable to that produced by SGS. We are of the opinion that the resource estimation in terms of tonnage estimation prepared by SGS is fair, reasonable and representative of the coal deposits.
- DMCL also reviewed the resource category classification and found out that the drillhole spacing for Measured, Indicated and Inferred Categories are respectively 75m, 150m and 300m. Such drillhole spacing is conformable with the geology-type requirement specifically defined in the GSC 88-21. As a result, DMCL is of the

opinion that the Measured and Indicated Resource classified in the SGS resource model is fair, reasonable and conformable with the industry practice.

- DMCL is of the opinion that the overall resource model prepared by SGS can be reasonably used for long-term mine planning purpose in accordance with the NI 43-101 requirements.

#### 14.4 RESOURCE ESTIMATION

Resource of the Ovoot Tologi Coal Mine has been estimated as of December 31, 2016 using the Minex™ models provided by SGS as shown in Table 14-2 and 14-3. The key assumptions used for the resource estimation are:

- Minimum coal seam thickness = 0.6m
- Maximum coal parting = 0.3m
- Surface resources are constrained to a depth of 300m, same as the pit design used in the 2012 Technical Report
- Volumes are converted to tonnages using laboratory relative density analytical results converted to an estimated in-situ basis
- Resource is constrained to the mining lease held by SGS only
- Resource is estimated on an in-situ basis (i.e. as an in-situ tonnage and not adjusted for mining recovery)
- Resource is depleted by mined out tonnage
- Resource is estimated based on the survey data made available as of December 20, 2016 for the Sunrise and Sunset coalfields.
- Totals may not add up due to rounding.

Measured and Indicated Resources are estimated to be 302.2 million tonnes, comprising 194.5 million tonnes of surface resource and 107.7 million tonnes of underground resource. Measured Resource totals 201.9 million tonnes, of which 144.3 million tonnes of surface resource and 57.6 million tonnes of underground resource respectively. Indicated Resource totals 100.3 million tonnes, of which 50.2 million tonnes of surface resource and 50.1 million

tonnes of underground resource respectively. Inferred Resource totals 89 million tonnes, of which 32.1 million tonnes of surface resource and 56.9 million tonnes of underground resource respectively.

**Table 14-2: Surface Resource Estimate of the Ovoot Tolgol Coal Mine**

<i>Coalfield</i>	<i>Seam Group</i>	<i>Resource (Mt)</i>		
		<i>Measured</i>	<i>Indicated</i>	<i>Inferred</i>
<b>Sunrise (depth &lt;300m)</b>	<b>7</b>	2.18	2.94	1.96
	<b>6</b>	3.43	4.78	4.19
	<b>5U</b>	39.56	20.50	22.67
	<b>5L</b>	18.20	4.05	0.96
	<b>4</b>	0.45	0.68	0.60
	<b>Total</b>	63.83	32.96	30.38
<b>Sunset (depth &lt;300m)</b>	<b>11</b>	0.01	0.00	0.00
	<b>10</b>	8.78	2.07	0.07
	<b>9</b>	17.78	3.39	0.23
	<b>8</b>	16.46	3.18	0.31
	<b>5U</b>	25.60	6.35	0.28
	<b>5L</b>	11.81	2.30	0.86
	<b>Total</b>	80.43	17.29	1.75
<b>Grand Total</b>		<b>144.26</b>	<b>50.25</b>	<b>32.13</b>



**Table 14-3: Underground Resource Estimate of the Ovoot Tolgol Coal Mine**

<i>Coalfield</i>	<i>Seam Group</i>	<i>Resource (Mt)</i>		
		<i>Measured</i>	<i>Indicated</i>	<i>Inferred</i>
<b>Sunrise (depth 300m to 500m)</b>	<b>5U</b>	1.96	4.96	13.09
	<b>5L</b>	6.02	11.97	24.98
	<b>Total</b>	7.98	16.93	38.07
<b>Sunset (depth 300m to 500m)</b>	<b>10</b>	2.97	1.90	0.00
	<b>9</b>	6.22	4.60	0.37
	<b>8</b>	6.88	3.80	2.18
	<b>5U</b>	27.92	14.88	3.47
	<b>5L</b>	5.67	7.95	12.79
	<b>Total</b>	49.65	33.13	18.82
	<b>Grand Total</b>		<b>57.63</b>	<b>50.06</b>

The plan-view maps of resource estimation and classification of Seam Nos 4, 5L, 5U, 6 and 7 of the Sunrise Coalfield are shown in Figure 28-1 to Figure 28-5 in Appendix E.

The plan-view maps of the resource estimation and classification of Seam Nos 5L, 5U, 8, 9, 10 and 11 of the Sunset Coalfield are shown in Figure 28-6 to Figure 28-11 in Appendix E.

## 14.5 DISCUSSION

The resource estimate presented here is materially different from the previous estimate made by RPM in 2016 Technical Report because:

- The Geology Type classification has been downgraded from previously “Severe” to “Complex” which led to a different requirement of spatial distribution of geological data and thus resource categorization according to GSC 88-21. Resource categories are re-classified accordingly, resulted in the regain of the Measured Resource in the overall SGS resource portfolio.
- In-pit (surface) resources are more conservatively constrained to the depth of 300m from the ground surface, compared to the depth of 350m used in the 2016 Technical Report.
- Underground resources have been re-established due to recovering coal market conditions in China and SGS’s long-term plan of fire-power plant near to the mine site which will require a substantial supply of thermal coal nearby.
- A more conservative approach is adopted, compared to the 2012 Technical Report, such that only underground resources constrained to the depth 500m is considered to be of reasonable prospects for eventual economic extraction.



## 15. MINERAL RESERVE ESTIMATES

### 15.1 INTRODUCTION

From 2011 to 2016, the reserve of the Ovoot Tolgoi Coal Mine has been classified and estimated independently by RPM in accordance with the requirements set out by the NI 43-101 and the Geological Survey of Canada Paper 88-21 “A Standardized Coal Resource/Reserve Reporting System for Canada” (GSC 88-21). Resource and Reserve estimate was previously reported in “Coal Geology and Resources and Reserves, Ovoot Tolgoi Deposit, Mongolia”, prepared by RPM (formerly as MMC) on March 19, 2012, following the completion of a Preliminary Feasibility Study (PFS) for the Sunset and Sunrise Coalfields. Subsequently in 2016, RPM revised the Resource and Reserve estimates because of the declining coal prices.

The classification, reporting and estimation of Reserve for the Ovoot Tolgoi Coal Mine presented in this Technical Report are also made in conformity with the requirements of the NI 43-101 and applicable portions of the GSC 88-21.

### 15.2 RESERVE DEFINITIONS

In accordance with the requirements of NI 43-101, the definition of Reserve is referenced to the Canadian Institute of Mining, Metallurgy and Petroleum's “CIM Definition Standards on Mineral Resources and Reserves” adopted by CIM Council on May 10, 2014. Their definitions are summarized as below.

- *Mineral Reserves are sub-divided in order of increasing confidence into Probable Mineral Reserves and Proven Mineral Reserves. A Probable Mineral Reserve has a lower level of confidence than a Proven Mineral Reserve.*
- *A Mineral Reserve is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by*

*studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.*

- *A Probable Mineral Reserve is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource.*
- *A Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource and Inferred Mineral Resources are always additional to Mineral Reserves.*

Except as stated herein, DMCL is not aware of any modifying factors exogenous to mining engineering considerations (i.e. competing interests, environmental concerns, socio-economic issues, legal issues, etc.) that would be of sufficient magnitude to warrant excluding reserve tonnage below design limitations or reducing reserve classification (confidence) levels from proven to probable or otherwise.

### **15.3 RESOURCE MODEL**

The same Minex resource models, as used for the resource estimate, were used for the long-term mine planning and reserve estimate. The complex nature of the coal geology was modelled from exploration drillhole data. Detailed in pit mapping of mining faces is recommended to provide suitable information for short term mine planning.

### **15.4 RESERVE ESTIMATION**

Reserve of the Ovoot Tolgoi Coal Mine has been estimated as of December 31, 2016 based on the resource model provided by SGS and the long-term mine plan completed for the Sunset and Sunrise Pits. The key assumptions used to for the reserve estimation are:

- Measured and Indicated Resources are inclusive of those Mineral Resources modified to produce the Reserves.

- Reserves do not include any Inferred Resources which has been treated as waste (i.e. its mining costs have been covered but no revenue has been assumed for the Inferred Resources).
- Mining method selected is a truck-and-shovel open pit terrace mining operation.
- Cut-off ash content for raw coal is assumed to be 50%.
- A mining recovery factor of 95% and a mining dilution factor of 2.5% are applied in the Reserve estimates.
- The pits and thus Reserves are designed to 300m below the original ground surface.
- Reserves are constrained to the mining lease held by SGS only although the open pit limits will extend across the lease boundary into the adjacent lease held by Mongolyn Alt Corporation (MAK). SGS and MAK have an agreement in place that allows SGS to strip off the overburden in MAK's lease. Coal within the pits within the MAK's lease has been treated with no revenue and no cost whereas the waste within the pits and MAK's lease will be stripped off at the cost of SGS.
- Reserves are estimated to account for coal and waste that was mined as of December 31, 2016
- Totals may not add up due to rounding

Reserve was estimated to total 114.17 million tonnes, comprising 59.57 million tonnes at Sunset and 54.59 million tonnes at Sunrise. Proven Reserve, comprising of the Measured Resource only, totals 99.49 million tonnes, of which 55.23 million tonnes at Sunset and 44.25 million tonnes at Sunrise respectively. Probable Reserve, comprising of the Indicated Resource only, totals 14.68 million tonnes, of which 4.34 million tonnes at Sunset and 10.34 million tonnes at Sunrise respectively.

**Table 15-1: Reserve Estimate of the Ovoot Tolgoi Coal Mine**

<i>Pit</i>	<i>Seam Group</i>	<i>Reserve (Mt)</i>		
		<i>Proven</i>	<i>Probable</i>	<i>Total</i>
<b>Sunrise Pit</b>	<b>7</b>	0.39	0.47	0.85
	<b>6</b>	1.74	1.37	3.11
	<b>5U</b>	29.28	6.25	35.53
	<b>5L</b>	12.44	1.73	14.17
	<b>4</b>	0.40	0.52	0.92
	<b>Sub-total</b>	44.25	10.34	54.59
<b>Sunset Pit</b>	<b>11</b>	0.01	0.00	0.01
	<b>10</b>	4.97	0.64	5.61
	<b>9</b>	10.21	0.52	10.73
	<b>8</b>	10.42	0.48	10.90
	<b>5U</b>	21.06	1.80	22.86
	<b>5L</b>	8.56	0.91	9.47
<b>Sub-total</b>	55.23	4.34	59.57	
<b>Grand Total</b>		<b>99.49</b>	<b>14.68</b>	<b>114.17</b>

## 15.5 DISCUSSION

SQR previously reported 175.7 million tonnes of Proven and Probable Reserves of the Ovoot Tolgoi Coal Mine prepared by RPM in the 2012 Technical Report. Subsequently, the total resources estimated for the Ovoot Tolgoi Coal Mine in the 2016 Technical Report had significantly decreased from the previous estimate in the 2012 Technical Report, principally due to 1) the exclusion of previously estimated underground resources, which were assessed as not having reasonable prospects for eventual economic extraction, and 2) most previous Measured category downgraded to Indicated category as well as most previous Indicated category downgraded to Inferred category. In response to the declining coal prices and weak coal transaction conditions in China, the Resource at the Ovoot Tolgoi Coal Mine was not considerably to be reasonably economically viable in the 2016 Technical Report and thus SQR was not in the position to disclose Reserve in the 2016 Technical Report.

In late 2016, SQR commissioned DMCL to commence a comprehensive review of all relevant information including technical data, mining strategy, pit optimization, mine plan, production scheduling, coal processing strategy, sales strategy, coal prices and recovering coal transaction conditions, in order to update its reserve estimate and prepare an updated long-term mine plan. The reserve estimate presented in this technical report is materially different from the previous estimate made in the 2016 Technical Report because:

- The Geology Type classification has been downgraded from previously “Severe” to “Complex” which led to a different requirement of spatial distribution of geological data and thus resource categorization according to GSC 88-21. Resource categories are re-classified accordingly such that portion of the Indicated and Inferred Resources can be reclassified as Measured and Indicated Resources respectively. Such resource reclassification further results in the fact the overall resource estimation and classification can be used in mine planning in conformable with the industry practice and NI 43-101 requirements.
- In-pit (surface) resources are more conservatively constrained to the depth of 300m from the ground surface, compared to the depth of 350m used in the 2016 Technical Report.

## **16. MINING METHODS**

### **16.1 INTRODUCTION**

The Ovoot Tolgoi Coal Mine started production in 2008 in the Sunset Pit and then in 2011 in the Sunrise Pit. Subsequently, SGS commissioned an updated PFS in 2012 to address an increased production target. In general, the current operation is engaging the mining method of an open pit terrace truck-and-shovel mining, where coal seams dip steeply and operating machinery on the coal seam roof and floor is not possible, due to the steep seam dips. Terraces, or benches, are excavated along fixed horizontal horizons and these benches intersect both coal and waste. Coal and waste are mined separately on each bench with dozers, as needed, to push coal or waste down to the excavator for loading onto haul trucks. This mining method allows large scale open pit mining to occur productively in steeply dipping coal seam environments. Waste is being dumped ex-pit, as the steep dips preclude in pit dumping.

### **16.2 MINING METHODS**

DMCL has been commissioned to prepare an updated long-term mine plan for the Ovoot Tolgoi Coal Mine based on SQR's latest mining, processing and sales strategies. The mining operation at the Ovoot Tolgoi Coal Mine will be performed using open pit terrace truck-and-shovel mining method, similar to the current mining methods employed, which could be described as open pit terrace mining utilizing hydraulic excavators, shovels and trucks, or known as conventional "truck/shovel" operations. The operation includes topsoil stripping, drilling and blasting of overburden and interburden, and stripping of waste and coal using a backhoe excavator. Waste and coal will be loaded onto a fleet of mining trucks for hauling to the spoil dumps or coal crusher, as appropriate.

Figure 16-1 to 16-8 are the photos taken during the site inspections by DMCL personnel who are qualified in the expertise of Coal Geology, Resource, Reserve, Mining Engineering, Geotechnical Engineering and Coal Processing.





**Figure 16-1: Sunset Main Pit (looking southeast)**



**Figure 16-2: Sunset Extension (looking north)**



**Figure 16-3: Sunrise Main Pit (looking east)**



**Figure 16-4: Sunrise Main Pit (loading coal in northeast working face)**



**Figure 16-5: Sunrise Main Pit (loading waste in northeast working face)**



**Figure 16-6: Sunrise Main Pit (blasting in northeast working face, looking east)**



**Figure 16-7: Sunrise Main Pit (trucking coal out pit access)**



**Figure 16-8: Sunrise Main Pit (trucking waste towards waste dump in the south)**

### 16.3 COAL PROCESSING

The run of mine (ROM) coal will be hauled to the coal processing facilities, comprising mobile screens, rotary breaker, and a new wet washing plant (under construction, to be commissioned in second half of 2017). The mobile screens and rotary breaker will remove some of the stones within the ROM coal whereas the wet washing plant will recover the coal with an ash content of 10% to 18% to less than 10% for sales. Figure 16-9 and Figure 16-10 show photos taken during the site inspections by DMCL in relation to the coal processing facilities. More details of the proposed coal processing strategy are available in Section 13 and 17.



**Figure 16-9: Mobile Screen at the Mine Gate**



**Figure 16-10: Coal Loading into customer's truck for coal sales at the Mine Gate**

#### **16.4 MINE PLANNING**

Throughout the previous production, much of coal was mined from Seam Nos. 5L and 5U of Sunset and Sunrise Pits, with approximately 20.20 million tonnes of ROM coal and approximately 18.43 million tonnes of coal exported.

DMCL, commissioned by SGS in late 2016, has prepared an updated mine plan for both the Sunrise and Sunset Pits with an overall annual production target of 9 million tonnes of ROM coal starting from 2017 and mining in both pits at the same time. Mining is scheduled to be completed by 2030 with a total life-of-mine of 14 years. DMCL understands that SQR plans to use the parameters of the mine plan and cost estimates as basis for commercial decision of contract-mining services.

DMCL's mine planning process comprises of the following procedures:

- Using the Minex mine planning software "Pit Optimiser" module to configure the initial pit shell with input of economic parameters
- Configuration of a practical pit shell, based on the Optimiser results and consideration of practical mining issues, such as geotechnical assessment results
- Production and waste dumps scheduling within the practical pit shell to achieve the annual production target
- Estimation of waste and coal haulage distances on an annual basis based on the production and waste dumps scheduling
- Assessment and cost estimation of mining fleet equipment to achieve the annual production target
- Estimation of coal processing parameters, qualities and quantities of finished coal products based on ROM qualities and quantities
- Estimation of capital and operating costs required for the annual production target
- Economic modelling with input of ROM production, coal prices, operating costs, capital costs, processing parameters, tax and government charges to assess Net Present Value (NPV)

The procedures are further explained in the Sections 16.7 to 16.11.

## **16.5 GEOTECHNICAL ASSESSMENT**

DMCL has undertaken a geotechnical review of all available geotechnical data from the SGS archived files and previous geotechnical work completed by other parties for both the Sunset and Sunrise Pits. DMCL has not performed any new pit slope stability analysis at this time when this technical report is prepared.

Geotechnical assessment reports which were collected and reviewed during the site visit include:

- Memorandum – Ovoot Tolgoi Project Slope Stability Assessment and Pit Slope Design Guidelines, by Sean Ennis, Steve Bundrock, and Jay Horton of Norwest, dated May 25, 2007;
- Report (Volume I and Volume II)-Evaluation/Analysis West Pit Slope Stability Ovoot Tolgoi Coal Mine Nariin Sukhait Coal Deposits, by Ben L. Seegmiller of Seegmiller International, dated December 2008;
- Memorandum – Ovoot Tolgoi Mine Pit Wall Stability Update, by Sean Ennis of Norwest, dated September 24, 2009;
- Report - South Gobi Sands Geotechnical Assessment, by Ross Seedsman of Minarco-Mine Consult (MMC), dated March 2011; and
- Report - Geotechnical Assessment of the Sunrise and Sunset Pits, by Debbie Oliver, Alan Naismith of SRK, dated March 2014.
- Geological cross-sections showing the interpreted geological structure in the pit areas, prepared by SGS geologist and engineer during the site visit.

Based on the review of completed geotechnical works above, DMCL summarizes the ultimate pit wall parameters for the purpose of mine planning as below.

**Table 16-1: Recommended Sunrise Ultimate Pit Wall Parameters**

<i>Ultimate Pit Wall</i>		<i>Bench Height (m)</i>	<i>Bench Face Angle (°)</i>	<i>Safety Berm Width (m)</i>	<i>Overall Slope Angle (°)</i>
Footwall - North Wall	Zone 1	No bench, following bedding dip direction			35
	Zone 2	18	55	12	36
Highwall - South Wall	Zone 3	12	55	12	30.5
	Zone 4	18	55	6	44
End wall - West Wall		18	55	6	44
End wall - East Wall		18	55	6	44



**Table 16-2: Recommended Sunset Ultimate Pit Wall Parameters**

<i>Ultimate Pit Wall</i>		<i>Bench Height (m)</i>	<i>Bench Face Angle (°)</i>	<i>Safety Berm Width (m)</i>	<i>Overall Slope Angle (°)</i>
	Zone 1	18	55	6	44
Footwall - North Wall	Zone 2	12	55	24	20.5
	Zone 3	No bench, following bedding dip direction			25
	Zone 4	18	55	12	36
Highwall - South Wall	Zone 5	18	55	6	44
End wall - West Wall		18	55	6	44
End wall - East Wall		18	55	6	44

DMCL visited the active ex-pit dumps of the Sunset and Sunrise Pits during December 2016. Figure 16-11 to 16-14 show the active ex-pit dumps at the Sunset and Sunrise Pits. The dump bench height varied from 16m to 25m, and dump bench face angle varied from 33° to 37° in general.



**Figure 16-11: Active Ex-Pit Waste Dump of the Sunrise Pit (looking west)**



**Figure 16-12: Active Ex-Pit Waste Dump of the Sunset Pit (looking southeast)**



**Figure 16-13: Active Ex-Pit Waste Dump of the Sunrise Pit (looking east)**



**Figure 16-14: Active Ex-Pit Waste Dump of the Sunrise Pit (looking west)**

## 16.6 HYDROGEOLOGICAL ASSESSMENT

SGS commissioned RPS Aquterra to carry out hydrogeological surveys for the Sunset and Sunrise Pits, including “Sunset Pit Depressurization Field Investigation Report” dated December 7, 2011 and “Sunrise Pit Mine Water Management Feasibility Assessment” dated February 24, 2012.

DMCL observed that a pit pool was formed at the bottom of the Sunset Pit where water level is approximately 150m below ground surface, due to low production in the Sunset Pit in 2016 (SGS production focused in the Sunrise Pit in 2016). Frozen seepage through the pit wall in the Sunset Pit was also visible. Figure 16-15 and Figure 16-16 show frozen seepage through pit wall in the Sunrise and Sunset Pits respectively. Figure 16-17 shows the frozen pit pool at the bottom of the Sunset Pit.

DMCL understands that RPS Aquterra conducted boreholes, test and monitoring wells as part of their hydrogeological investigation. Piezometers have also been installed for long term monitoring of groundwater variation when the Sunset and Sunrise Pits are in operation. However, due to the property ownership exchanges, the historical groundwater monitoring records are not archived in the current SGS database. DMCL recommends that SGS should develop and implement the investigation and monitoring of hydrogeology and surface water to determine impacts on pit slope stability, and to determine advanced dewatering through ex-pit bores, if necessary, with the pit development.

According to the previous hydrogeological work, DMCL considers that the hydrogeological characteristics of the Sunset Pit and Sunrise Pit are generally low yield, low permeability and fracture-flow. Passive in-pit-sump is adopted for dewatering at the Sunset Pit and Sunrise Pit in this technical report.



**Figure 16-15: Frozen Seepage Through Pit Wall of the Sunrise Pit**



**Figure 16-16: Frozen Seepage Through Pit Wall of the Sunset Pit**



**Figure 16-17: Frozen Pit Pool at the bottom of the Sunset Pit**

## 16.7 PIT OPTIMIZATION

DMCL uses "Pit Optimiser" module of the Minex software to determine the optimum ultimate pit shell for the Ovoot Tolgoi Coal Mine, which is achieved by sub-dividing the resource model into blocks of certain dimensions with an assigned value for each block. The assigned value is the result of the revenue generated from extracting the volume of material after operating costs and other costs required to generating the revenue.

In order to assign the value of each block within the three-dimensional pit shells, the pit optimization software generally runs many scans through the resource model, attempting to expand the pit shell by identifying and thus incorporating more positively-valued blocks while maintaining the pit shape. The final pit shell is defined when no additional blocks with positive value are identified. The resulting three-dimensional pit shell is considered the "optimal" economic shell for generating the assumed revenue. The process is repeated for increments of revenue, starting below the assumed revenue and continuing above, to identify not only the optimal pit shell for the assumed revenue but also to indicate the preferred starting location and mining direction.

Key parameters and assumptions engaged in the pit optimization process for the Sunset and Sunrise Pits are summarized as below:

- Minimum coal thickness: 0.6m
- Maximum coal parting: 0.3m
- Pit recovery: 95%
- Pit optimisation limited to the depth: 300m
- Unit mining cost of coal and waste based on 2016 SGS operation: US\$3.14/BCM (coal and waste)
- Coal sale prices was estimated based on the coal processing parameters and assumption: US\$40.31/t for product coal ash <10%, US\$25.91/t for product coal ash 10% - 18% and US\$10.08/t for product coal ash 18% - 22%
- Pit optimisation is not confined to SGS mining lease boundary. However coal outside the mining lease held by SGS is assigned with zero revenue

- Only Measured and Indicated Resource are assigned with revenue during pit optimisation
- Mined out surface was based on the topographic survey as of December 2016
- Weathering horizon was assumed within 4m below the original ground surface
- Pit wall slope angles used in the software was in eight octants, based on the recommendation by the geotechnical engineer of DMCL after review

The pit optimisation ran at a range of base coal sale prices starting from 50% to 150%. The pit shell at 100% and 110% base sale prices was the optimal pit shells for both Sunset and Sunrise Pits respectively, directing the design of the final pit shells for both the Sunset and Sunrise Pits.

## 16.8 ULTIMATE PIT DESIGN

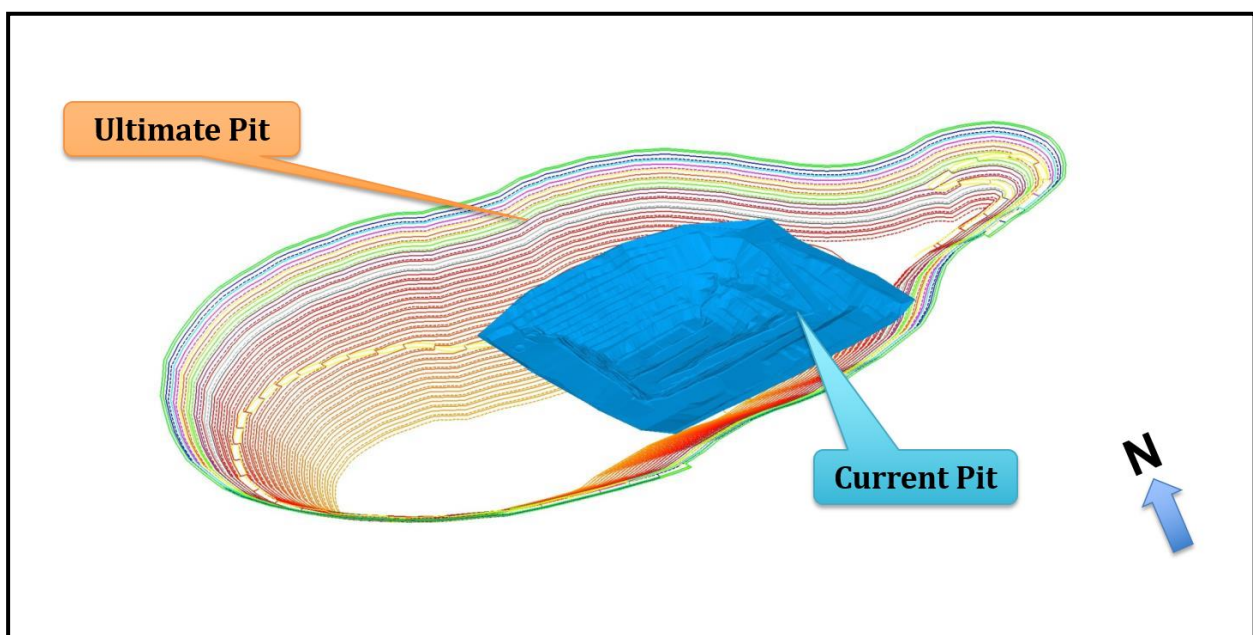
Ultimate pits were designed for the Sunset and Sunrise Pits based on previously mentioned pit optimization parameters, geotechnical parameters and other practical limitations. Pits were designed to a depth of 300m. Ultimate pit design of the Sunset Pit will contain a single pit whereas that of the Sunrise Pit will consist of three separate pits, namely, Main Pit, East Extension and West Extension. Key technical parameters of the ultimate pit design are summarized as below.

- Pit design depth: RL1223m
- Minimum pit floor width: 80m
- Double bench design without the creation of a catch bench between first bench and second bench and double bench height: 14m
- Double bench face slope: Sunset Pit 50°; Sunrise Pit 52°
- Safety berm width (every other double bench): 6m
- Minimum mining width: 40m
- Ramp designed on the wall there the wall slope is against the direction of strata dip, due to the geotechnical stability
- Ramp gradient:  $\leq 10\%$

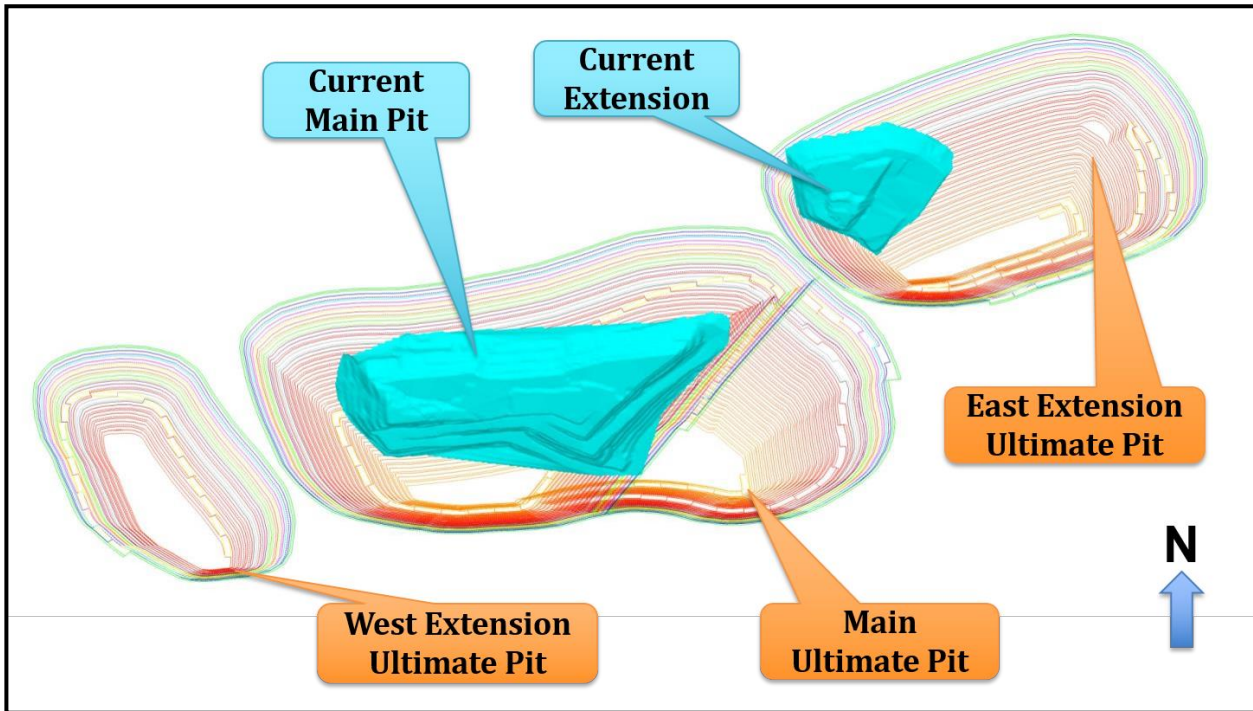


- Ramp width: 16m
- Overall slope angle at Sunset Pit: 37°
- Overall slope angle at Sunrise West Extension: 37°
- The walls at Sunrise Main Pit have been separated into five zones of different wall slope angles:
  - A. North wall slope angle: 36°
  - B. Northeast wall slope angle: 34°
  - C. Northwest wall slope angle: 31°
  - D. South wall and southeast wall slope angle: 37°
  - E. West and southwest wall slope angle: 39°
- The walls at Sunrise East Extension have been separated into two zones of different wall slope angles:
  - A. West wall and southwest wall slope angle: 39°
  - B. North wall, east wall and south walls slope angle: 35°
- Coal recovery limited to the SGS lease boundary
- Waste removal may occur outside of the SGS lease boundary

Figure 16-18 and Figure 16-19 show the 3D ultimate pit shell of the Sunset and Sunrise Pits respectively.



**Figure 16-18: 3D View of Sunset Ultimate Pit Shell (not to scale)**



**Figure 16-19: 3D View of Sunrise Ultimate Pit Shell (not to scale)**

Sunset and Sunrise ultimate pit shell layout are shown in Figure 16-20 and Figure 16-21 respectively. 3D view of Sunset and Sunrise pit shells are shown in Figure 16-22 and Figure 16-23 respectively. The Sunset Pit design and sections through the Sunset Pit are shown in Figure 16-24 to Figure 16-27. The annual stage layout of the Sunset Pit and dump are shown in Figure 16-28 to Figure 16-41. The Sunrise Pit design and sections through the Sunset Pit are shown in Figure 16-42 to Figure 16-45. The annual stage layout of the Sunrise Pit and dump are shown in Figure 16-46 to Figure 16-59. Figure 16-20 to 16-59 are available in Appendix F.

The quantities of waste and coal within the Sunset and Sunrise Pits have been calculated using the Minex software.

## **16.9 PRODUCTION AND WASTE SCHEDULING**

Production has commenced in the Sunset Pit since 2008 and Sunrise Pit since 2010. As of the end of 2016, a total of approximately 20.2 million tonnes of ROM coal were mined out mostly from Seam No 5L and 5U of both the Sunset and Sunrise Pits. A total of around 18.43 million



tonnes of coal have been exported to international users since 2008. The void of the Sunset Pit was sized approximately 871m long (west – east), 675m wide (south – north) and 166m deep (bottom of the pit) as of the end of 2016. The void of the Sunrise Main Pit was sized approximately 1253m long (west – east), 618m wide (south – north) and 126m deep (bottom of the main pit) as of the end of 2016.

Several iterations of scheduling were needed to determine the preferred mining sequence. To mine preferentially Seam No 5L and 5U, the pit wall pushback, in specific north wall and south wall, is necessary during the initial years either in the Sunset Pit or Sunrise Pit. The preferred sequence has a series of nested pit shells within the ultimate pit, combined with pit wall pushback at the Sunset Pit. Bench based pit wall pushback to mine the ultimate pit from top to bottom is applied to the Sunrise Pit. Balancing between production and waste stripping between the Sunset and Sunrise Pits will enable a lower strip ratio throughout the life-of-mine (LOM).

DMCL estimated ROM coal from the Proven and Probable Reserve for the Sunset and Sunrise Pits. The key assumptions were: 1) a mining recovery of 95% and dilution of 2.5% by the weight of coal adopted to account for the mining losses and dilutions, and 2) statistics of raw coal ash content ranges from coal sample data is applied to estimate annual ROM coal quantities based on ash content categories. Long-term mine plan is confined within the ultimate pit shells. The production target is to deliver approximately 9 million tonnes per annum of ROM coal starting from 2017. The peak production is approximately 9.3 million tonnes of ROM coal during the fifth year (2021).

Table 16-3 shows the annual production and waste schedule of the Sunset and Sunrise Pits. Table 16-4 and 16-5 shows the annual ROM coal quantities based on raw coal ash content for the Sunset and Sunrise Pits respectively. Table 16-6 shows the ROM coal quantities based on raw coal ash content for combined Sunset and Sunrise Pits.

**Table 16-3: Annual Production and Waste Schedule of the Sunset and Sunrise Pits**

Year		Sunset Pit			Sunrise Pit			Combined		
		ROM	Waste	Strip Ratio	ROM	Waste	Strip Ratio	ROM	Waste	Strip Ratio
		kt	k BCM	BCM/tonne	kt	k BCM	BCM/tonne	kt	k BCM	BCM/tonne
1	2017	3,054	8,806	2.9	1,634	22,173	13.6	4,688	30,979	6.6
2	2018	4,039	19,214	4.8	4,251	19,534	4.6	8,290	38,748	4.7
3	2019	4,163	15,715	3.8	4,325	14,919	3.5	8,488	30,634	3.6
4	2020	4,454	15,999	3.6	4,415	15,855	3.6	8,869	31,854	3.6
5	2021	4,552	17,047	3.7	4,750	18,107	3.8	9,302	35,154	3.8
6	2022	4,477	12,144	2.7	4,403	17,184	3.9	8,880	29,328	3.3
7	2023	4,578	20,272	4.4	4,264	19,554	4.6	8,842	39,826	4.5
8	2024	4,154	11,720	2.8	4,535	12,833	2.8	8,689	24,553	2.8
9	2025	4,533	14,380	3.2	4,539	6,796	1.5	9,072	21,175	2.3
10	2026	4,625	16,161	3.5	4,416	25,482	5.8	9,041	41,643	4.6
11	2027	4,112	14,169	3.5	4,672	11,198	2.4	8,784	25,366	2.9
12	2028	4,386	17,346	4.0	4,466	12,626	2.8	8,852	29,972	3.4
13	2029	4,277	12,472	2.9	3,023	12,347	4.1	7,300	24,819	3.4
14	2030	4,905	8,544	1.7	-	-	n/a	4,905	8,544	1.7
<b>Total</b>		<b>60,309</b>	<b>203,987</b>	<b>3.4</b>	<b>53,693</b>	<b>208,608</b>	<b>3.9</b>	<b>114,002</b>	<b>412,595</b>	<b>3.6</b>

**Table 16-4: Annual ROM Coal Quantities by Ash Content for the Sunset Pit**

<i>Year</i>		<i>ROM</i>	<i>A1</i>	<i>B1</i>	<i>F1</i>	<i>F2</i>
			Ash: < 10%	Ash: 10% - 18%	Ash: 18% - 28%	Ash: 28% - 50%
			<i>kt</i>	<i>kt</i>	<i>kt</i>	<i>kt</i>
1	2017	3,054	1,690	814	346	205
2	2018	4,039	1,266	1,525	793	455
3	2019	4,163	1,210	1,606	900	446
4	2020	4,454	1,083	1,801	1,009	562
5	2021	4,552	1,109	1,853	999	591
6	2022	4,477	2,459	1,199	511	308
7	2023	4,578	2,272	1,318	661	327
8	2024	4,154	2,230	1,110	581	233
9	2025	4,533	2,388	1,157	708	280
10	2026	4,625	2,159	1,344	869	253
11	2027	4,112	2,272	1,057	566	217
12	2028	4,386	1,191	1,720	1,002	472
13	2029	4,277	1,532	1,497	863	386
14	2030	4,905	2,531	1,270	789	314
<b>Total</b>		<b>60,309</b>	<b>25,390</b>	<b>19,271</b>	<b>10,598</b>	<b>5,050</b>

**Table 16-5: Annual ROM Coal Quantities by Ash Content for the Sunrise Pit**

<i>Year</i>		<i>ROM</i>	<i>A1</i>	<i>B1</i>	<i>F1</i>	<i>F2</i>
			Ash: < 10%	Ash: 10% - 18%	Ash: 18% - 28%	Ash: 28% - 50%
		<i>kt</i>	<i>kt</i>	<i>kt</i>	<i>kt</i>	<i>kt</i>
1	2017	1,634	296	535	680	124
2	2018	4,251	1,075	1,876	983	317
3	2019	4,325	1,295	1,979	726	326
4	2020	4,415	1,354	1,912	730	419
5	2021	4,750	1,572	1,885	738	556
6	2022	4,403	1,044	1,770	1,217	371
7	2023	4,264	939	1,806	1,177	342
8	2024	4,535	1,128	2,215	833	359
9	2025	4,539	1,158	2,246	798	337
10	2026	4,416	1,074	1,886	1,046	411
11	2027	4,672	1,159	2,110	989	414
12	2028	4,466	834	1,584	1,778	270
13	2029	3,023	533	899	1,411	180
<b>Total</b>		<b>53,692</b>	<b>13,460</b>	<b>22,703</b>	<b>13,105</b>	<b>4,424</b>

**Table 16-6: Annual ROM Coal Quantities by Ash Content for Combined Sunset and Sunset Pits**

<i>Year</i>		<i>ROM</i>	<i>A1</i>	<i>B1</i>	<i>F1</i>	<i>F2</i>
			Ash: < 10%	Ash: 10% - 18%	Ash: 18% - 28%	Ash: 28% - 50%
			<i>kt</i>	<i>kt</i>	<i>kt</i>	<i>kt</i>
1	2017	4,688	1,986	1,348	1,025	329
2	2018	8,290	2,341	3,401	1,776	771
3	2019	8,488	2,505	3,585	1,626	772
4	2020	8,869	2,437	3,713	1,739	980
5	2021	9,302	2,681	3,738	1,737	1,147
6	2022	8,880	3,503	2,970	1,729	678
7	2023	8,842	3,211	3,124	1,838	669
8	2024	8,689	3,358	3,325	1,414	592
9	2025	9,072	3,545	3,403	1,507	618
10	2026	9,041	3,233	3,230	1,915	664
11	2027	8,784	3,431	3,167	1,555	630
12	2028	8,852	2,025	3,304	2,781	742
13	2029	7,300	2,065	2,396	2,273	566
14	2030	4,905	2,531	1,270	789	314
<b>Total</b>		<b>114,002</b>	<b>38,852</b>	<b>41,974</b>	<b>23,704</b>	<b>9,472</b>

## 16.10 WASTE DUMP DESIGN AND SCHEDULE

According to the updated mine plan, the pits do not reach their ultimate depth until the final year of the schedule. Therefore, all waste is assumed to be dumped ex-pit in the existing waste dump areas at the Sunset and Sunrise Pits within SGS’s lease boundary. This will additionally allow future exposure and thus excavation of coal seams of the pits to a greater depth, given that those coal resources are proven to be economic viable. Key assumptions used in the dump design are summarized in Table 16-7.

**Table 16-7: Sunset and Sunrise Waste Dump Design Parameters**

<i>Dump Design Parameter</i>	<i>Sunset Dump</i>	<i>Sunrise Dump</i>
Dump Bench Height (m)	14	14
Dump Bench Face Slope (°)	32	32
Dump Bench Safety Berm Width (m)	6	6
Minimum Offset Distance - Pit Crest to Dump (m)	100	100
Maximum Dump Height (above current surface) (m)	120	100
Swell Factor for Waste Rock	1.2	1.2

The excavation face for each year will be determined from the production schedule for both the Sunset and Sunrise Pits. A corresponding annual dumping plan will be generated to accommodate all the waste. Based on these annual plans, waste truck haul distances were estimated. The pit excavation plans were also used to estimate annual coal haulage distances.

## 16.11 FLEET ESTIMATION

Based on the production schedule set out in the updated mine plan, DMCL estimated the excavator and truck fleets required for the annual production target and waste dumping. Table 16-8 demonstrates the parameters of the excavator and truck fleets selected. Equipment comparable to hydraulic excavators (Cat 6020B) and hauling trucks (Cat 777) are recommended for bulk waste and coal excavation in the Sunset and Sunrise Pits, of which, the



size, capacity and productivity estimate are presented in Table 16-9. The hourly truck productivity is estimated by using 24 minute for a driving cycle, provided by the SGS’s Dispatch System at the mine site, while the hourly loading productivity is estimated based on the parameters presented in Table 16-8.

**Table 16-8: Parameters of Excavator and Truck Fleets**

<i>Items</i>	<i>Unit</i>	<i>Parameters</i>
Non Production Days	day	0
Days Available	day	365
Working Hours Per day	hr	21
Dig Hours available	hr	7665
Dig Hours Used	hr	7665
Shovel Availability (0.85 - 0.95)	min/hr	0.9
Shovel Cycle Time (per bucket loaded)	sec	35.0
Shovel Bucket Fill Factor		1.0
Truck running time, min/hour	min	50.0
Material Swell Factor		1.35
Overall Organization Efficiency Factor	min/hr	0.8

**Table 16-9: Recommended Fleet Type and its Capacity and Productivity**

<i>Fleet Type</i>	<i>Model</i>	<i>Capacity</i>	<i>Productivity</i>
Haul Truck	Cat 777	Empty Weight (Kg): 56428 Loaded Weight (Kg): 133540 Loaded Capacity – Truck (m <sup>3</sup> ): 36.3 Loaded Capacity – Heaped (m <sup>3</sup> ): 51.3	93.3 BCM/hr
Hydraulic Mining Shovel	Cat 6020B	Bucket Capacity – Heaped (m <sup>3</sup> ): 12.0 Operation Weight (tonnes): 224.0 Maximum Digging Height (m): 13.9 Maximum Digging Depth (m): 8.1	653.5 BCM/hr

Excavator and truck requirements are estimated based on annual production target and haul distances with the parameters shown above. Table 16-10 shows the annual numbers of excavator and truck required for the Sunset and Sunrise Pits.

**Table 16-10: Estimate of Annual Numbers of Excavator and Truck Required**

<i>Year</i>		<i>Sunset Pit</i>		<i>Sunrise Pit</i>		<i>Combined</i>	
		<i>36m<sup>3</sup> (50t) Truck</i>	<i>12m<sup>3</sup> Excavator</i>	<i>36m<sup>3</sup> (50t) Truck</i>	<i>12m<sup>3</sup> Excavator</i>	<i>36m<sup>3</sup>(50t) Truck</i>	<i>12m<sup>3</sup> Excavator</i>
		<i>Unit</i>	<i>Unit</i>	<i>Unit</i>	<i>Unit</i>	<i>Unit</i>	<i>Unit</i>
1	2017	17	2	36	5	53	7
2	2018	42	6	43	6	85	12
3	2019	37	5	36	5	73	10
4	2020	39	6	38	5	77	11
5	2021	42	6	44	6	86	12
6	2022	32	5	42	6	74	11
7	2023	44	6	42	6	86	12
8	2024	28	4	31	4	59	8
9	2025	39	6	22	3	61	9
10	2026	38	5	55	8	93	13
11	2027	38	5	33	5	71	10
12	2028	42	6	33	5	75	11
13	2029	32	5	30	4	62	9
14	2030	30	4			30	4
<b>Average</b>		<b>36</b>	<b>5</b>	<b>37</b>	<b>5</b>	<b>70</b>	<b>10</b>

From the above analysis and estimation, to achieve a better equipment scheduling and thus cost control in certain years, the strip ratio and mining incremental depth in certain years should be further adjusted and optimized with a short-term mine planning as the mining operation advances.

## **17. RECOVERY METHODS**

### **17.1 INTRODUCTION**

Historically, the PFS completed in 2012 proposed that the coal processing facilities at the Ovoot Tolgoi Coal Mine should comprise of three stages. Stage 1 (Rotary Breaker) and Stage 2 (Dry Separation) would be constructed at the mine site whereas Stage 3 (Wet Washing) would include transportation of dry-washed coal to a wet washing plant located approximately 45km away at Ceke, China. As of to date, all of the coal products sold are raw coals primarily sized by the mobile screen.

In early 2016, SQR and SGS have formulated optimized mining, coal processing and sales strategies such that SQR is determined to haul the run-of-mine (ROM) to the coal processing facilities to be constructed at the mine site for coal processing before sales. SGS has therefore entered a Build-Operate-Transfer (BOT) contract with Xiangrui Machinery, an EPC contractor who has been building the wet washing plant at its own cost and will operate for around 4 years in return for the processing fee and then transfer the wash plant to SGS. The proposed coal processing is described in details in the following section.

### **17.2 COAL PROCESSING**

The proposed coal processing is considered under the following assumptions:

- Fine and ultra-fine coals fed into the wet washing circuit can be processed, recovered and dewatered through the method of wet washing
- Water used for wet washing would be adequately supplied and recirculated within the wet washing plant
- Dry separation is not included due to a lack of detailed assessment
- Coal products are designed based on the existing market conditions.

The proposed coal handling and processing, consisting of four stages, are discussed below and

are summarized in Figure 17-1.

### 17.2.1 Screening

- To achieve sizing control, the ROM coal is fed to the mobile screen for sizing and breaking to yield an undersized fraction of 200 mm.
- The mobile screens are used to sieve for -200mm fraction of coarser portion of coal with lower ash content.
- The rotary breaker is to sieve for -50mm fraction of finer portion of coal with higher ash content.
- The option of screening by mobile screens or rotary breaker is largely subject to coal prices, oversize rate and handling operation cost.
- Rejects are sent to the waste dump site by trucks.

### 17.2.2 Sorting

- Sorting is to classify ROM coal into five types subject to the coal quality of the coal seams scheduled in the mine plan.
- The raw coals are sampled and tested for ash content, sulphur content and FSI before sent to the raw coal stockpiles.
- Based on the ash content and coking properties, the raw coal is sorted into A1, B1 (coking), B1 (non-coking), F1 and F2 as shown in Table 17-1 below.
- A1, B1 (non-coking), F1 and F2 are ready for direct sales whereas B1 (coking) is fed to the next stage for wet washing.

**Table 17-1: ROM Coal Sorting**

<i>ROM Coal Name</i>	<i>Seam Group</i>	<i>Ash (ad) %</i>	<i>Coking Properties</i>	<i>Coal Product Name</i>
<b>A1</b>	5	≤ 10	yes	SC
<b>B1</b>	5	10 - 50	yes	-
	5	10 -18	no	TC
<b>F1</b>	6,7, 8,9,10	≤ 28	no	J
<b>F2</b>	6,7, 8,9,10	28 - 50	no	J

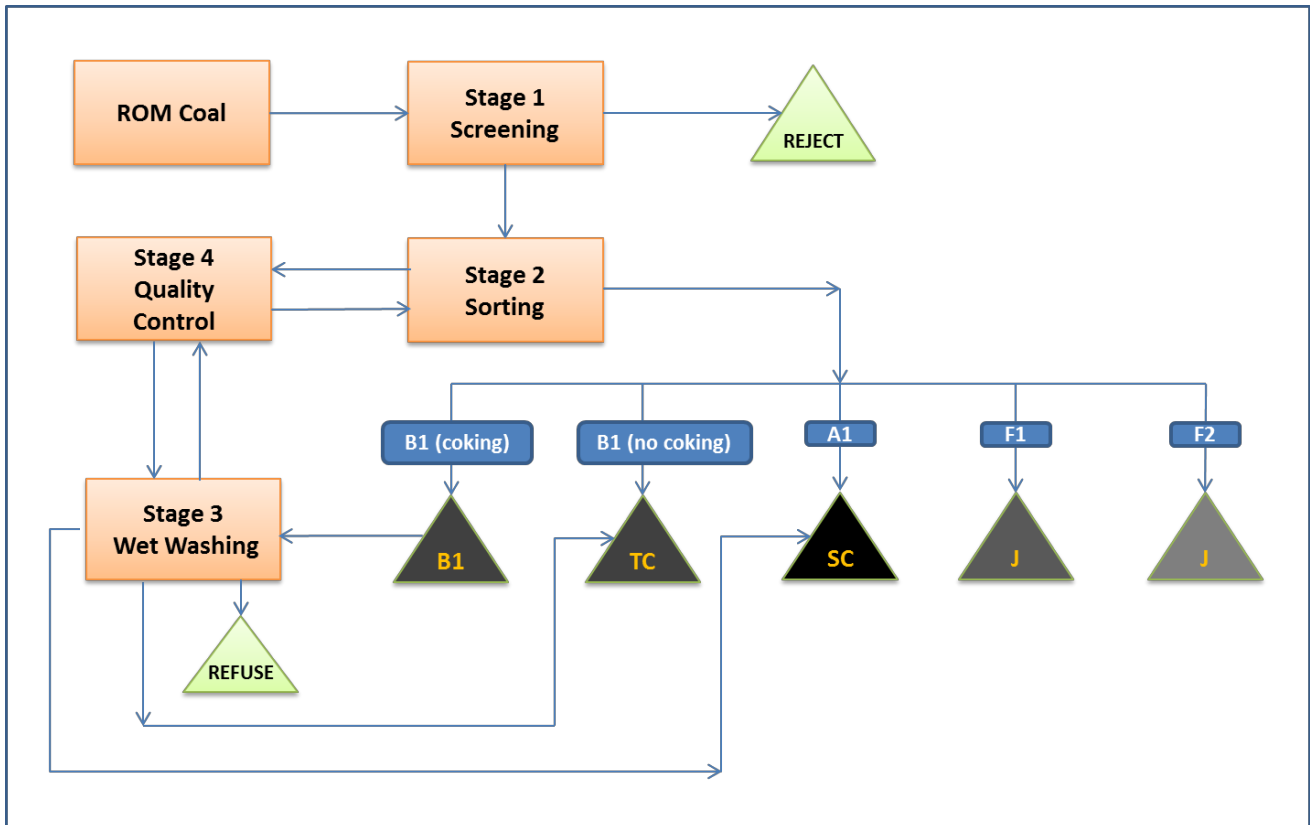
### 17.2.3 Wet Washing

- B1 (coking) is fed into the new wet washing plant (WWP) which is currently under construction within SGS’s mine site.
- The WWP is equipped with the customized jig washing circuit designed to produce clean coking coal and thermal coal.
- SGS has entered into a Build-Operate-Transfer (BOT) contract with Xiangrui Machinery, an EPC contractor who has been building the wash plant at its own cost and will operate for around 4 years in return for the processing fee and then transfer the wash plant to SGS.
- The contract specifies that the WWP shall have an initial annual capacity of 2.4 million tonnes of feed coal.
- The jig capacity shall be 160 – 260 tonnes of feed coal per hour per jig unit.
- Operating cost shall be RMB 25 per tonne of feed coal, including RMB 4 per tonne of feed coal as pay-back of the invested capital cost to the EPC contractor.
- Operational sampling and testing frequency is set for one or two samples per hour.
- The product from the wash plant will be coking coal with ash content lower than 10.5% (ad).
- DMCL understands that the jig washing circuits were delivered to the Ovoot Tologi Coal Mine for installation and that the new WWP is expected to commission by the second half of 2017 (Figures 17-2 to 17-4).

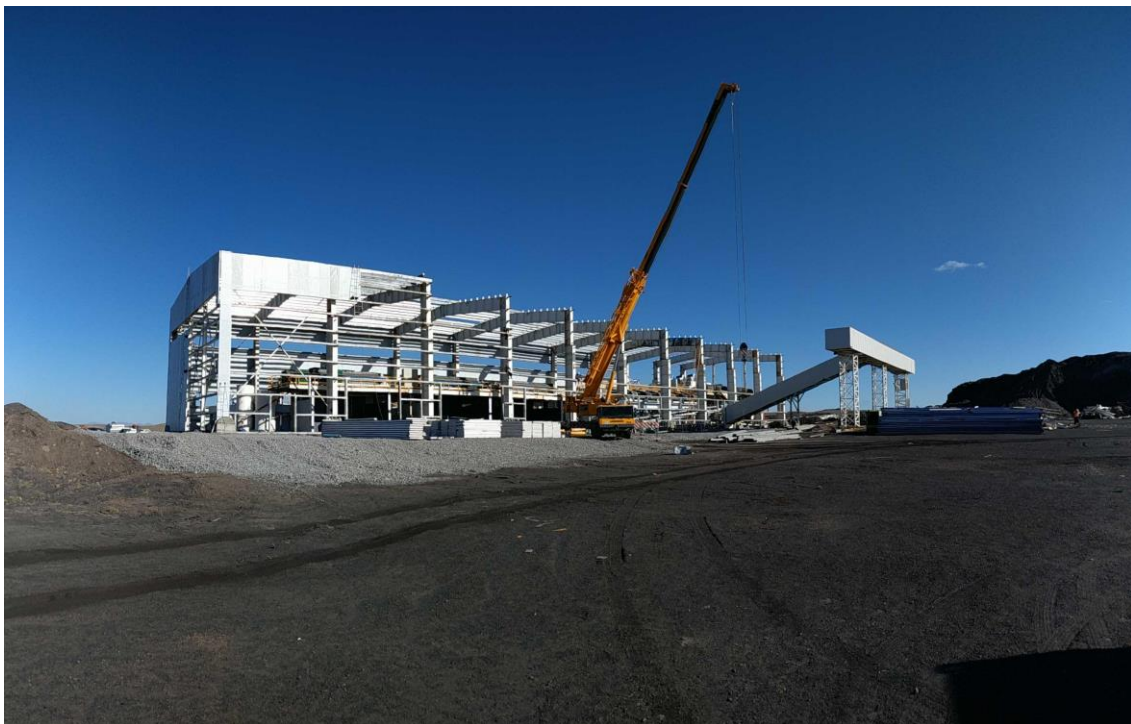
- The hydrogeological survey commissioned in 2012 by SGS (Aquaterra 2012) has identified a water source located around 30km away from the mine site, suggesting that the ground water is suitable for industrial use and is capable of supporting WWP for steady coal washing. DMCL understands that SGS is currently planning to construct water pipes to transport the groundwater from the identified source to the mine site. SGS has been granted with the water permit for water use.
- Considering the sulphur content of the raw coal, protection measures against spontaneous combustion are recommended.
- Refuse is sent to the waste dump site by trucks.

#### **17.2.4 Quality Control**

- Quality control will focus on coal quality and quantity of raw coal, coal feed and products. The coal quality control is applied with respect to ash, sulphur, moisture, FSI and caloric value. For the coal product, it is the product specification required by customers.
- Quality control is engaged to support the sorting and WWP through interchange of monitoring data.
- Instruments used for quality control will be scheduled for maintenance and calibration routinely.
- Washed products are stocked separately from screened coals.
- Coals and coal products are tested and stocked in separate product stockpiles based on the product specification required by customers.
- If a thermal coal product does not reach the required specification, it will be blended with other coal products to meet the required specification.



**Figure 17-1: Flowchart of the Proposed Coal Handling and Processing (SC, TC and J are the finished coal products)**



**Figure 17-2: Wet Washing Plant under Construction**



**Figure 17-3: Components are delivered to the Mine Site for Assembly**



**Figure 17-4: Installed Movable Screen Jigs of the Wet Washing Plant**



### **17.2.5 Yield Estimation**

The yield of coal processing is estimated based on the coal ash estimation of different ROM coals, existing facilities (mobile screen and rotary breaker) and expected WWP processing circuit. Considered the range of ROM coal ash, the yields are estimated with corresponding range and average.

Given that Seam No. 5U and 5L have the following advantages:

- Accounted for more than 70% of the total reserve
- Low ash content with coking properties
- Capable of being separately mined from the other coal seams

ROM coal from the Seam No.5 is planned to produce two coal products, namely, screened coking coal and washed coking coal, termed as Product SC. The washing yield is simulated based on the conventional jig washing circuit and washability test.

The estimated yield of each type of ROM coal, its proposed processing method and product specifications are presented in Table 17-2 below.

**Table 17-2: Estimated Processing Yield and Product Specifications**

Pit	ROM Coal Category				Coal Product Category										Processing Method
	ROM Coal Name	Seam	Ash ad, %	Coking Properties	Product Name	Yield %		Product Specification							
						Range	Average	Ash ad, %	Moisture ad, %	VM daf, %	FSI	Sulphur ad, %	CV ad, kcal/kg	Application	
Sunset	A1	5	≤ 10	yes	SC	100-95	98	10.0	7.0	36.0	4.5	< 1.0	7,000	Coking Coal	Screening
	B1	5	10 - 18	yes	SC	85 - 65	75	10.0	7.0	36.0	4.5	< 1.0	7,000	Thermal Coal	Washing
					TC	15 - 5	10	18.0	8.0	38.0	-	1.3	6,200		
		5	10-18	no	TC	n/a	n/a	15.0	5.0	37.0	-	1.2	6,200	Thermal Coal	Screening
	F1	8,9,10	18-28	no	J	60-75	65	18.0	5.0	40.0	-	1.4	6,000	Thermal Coal	Screening
	F2		28 - 50	no		50-60	55	28.0	5.0	40.0	-	1.4	5,500		Screening
Sunrise	A1	5	≤ 10	yes	SC	100-95	98	10.0	7.0	36.0	4.5	< 1.0	7,000	Coking Coal	Screening
	B1	5	10 - 50	yes	SC	85 - 55	65	10.0	7.0	36.0	4.5	< 1.0	7,000	Thermal Coal	Washing
					TC	30 - 10	20	18.0	8.0	38.0	-	1.3	6,200		
		5	10-18	no	TC	n/a	n/a	15.0	5.0	37.0	-	1.2	6,200	Thermal Coal	Screening
	F1	6, 7	18-28	no	J	60-75	65	18.0	5.0	40.0	-	1.4	6,000	Thermal Coal	Screening
	F2		28 - 50	no		50-60	55	28.0	5.0	40.0	-	1.4	5,500		Screening

### 17.3 FINISHED COAL PRODUCTS

Given that the ash content and FSI may vary from seam to seam, for example, Seam No. 5, No. 6, No.7 and No. 8 have coking coal properties with low ash content, while the other seams may not, the best optimized processing strategy is to deliver multi-clean coal products which will maximize the value of the mining operation of the Ovoot Tolgoi Coal Mine. The specifications of the proposed finished coal products are summarized in Table 17-3 below.

**Table 17-3: Finished Coal Products of the Ovoot Tolgoi Coal Mine**

<i>Product Name</i>	<i>Product Specification</i>						<i>Use</i>
	<i>Ash ad, %</i>	<i>Mt ad, %</i>	<i>VM daf, %</i>	<i>FSI</i>	<i>Sulphur ad, %</i>	<i>CV ad, kcal/kg</i>	
<b>SC</b>	10.0	7.0	36.0	4.5	< 1.0	7,000	Coking coal
<b>TC</b>	15.0 - 18.0	8.0	38.0	-	1.2 - 1.3	6200 - 6000	Thermal coal
<b>J</b>	18.0 - 28.0	5.0	40.0	-	1.3 - 1.4	6000 - 5500	Thermal coal

## 18. PROJECT INFRASTRUCTURES

Substantial infrastructures, including heavy equipment workshops, offices, employee accommodation and an airstrip capable of handling commuter aircraft for employee transport have been established at the mine site.

Coal is hauled in trucks from the mine site to Ceke border in China via paved road. In Ceke, the coal is loaded onto rail wagons or trucks for shipment to customers.

Water for the camp is being supplied from water supply wells drilled nearby. Bottled water is being used for potable purposes. Water for dust suppression is available from the pit dewatering. SGS commissioned a hydrogeological survey in 2012 (Aquaterra 2012) and has identified a water source located around 30km away from the mine site. The survey suggested that the ground water is suitable for industrial use and is capable of supporting a wet coal processing plant for steady coal washing. DMCL understands that SGS is currently planning to construct water pipes to transport the groundwater from the identified source to the mine site. SGS has been granted with the water permit for water use.

Electrical power for the camp and shop complexes was initially supplied by diesel generators. The camp and shop complexes are now connected to a powerline that runs from China to Gurvantes Saum, supplying electrical power to the mine site. DMCL understands that SGS plans to connect the coal handling facility to the power grid which is currently under construction by the Mongolian Government or another powerline from China that will be built by an electricity company in China.

## 19. MARKET STUDIES AND CONTRACTS

### 19.1 MARKET STUDIES

SGS commissioned Shanxi Fenwei Information Service Co. Ltd of China in January 2017 to prepare an independent market analysis and price forecast for its coal products from 2017 to 2030. The following sections are extracted from that report and DMCL has no reason not to rely on such information.

#### 19.1.1 General Overview Of Price Forecast

Coal price is mainly influenced by supply-demand relation, inflation rate and industry policies, explained below:

- (1) Supply-demand relation: It is the predominant factor that decides coal price, and other factors will affect coal price by firstly altering supply-demand relation, i.e., oversupply leads to price drop, while undersupply triggers price rise.
- (2) Coal quality: It directly determines the value of coal products. To choose Chinese benchmark coals with similar quality with SQR coal, and forecast their prices, which will become basis for SQR coal pricing.
- (3) Inflation rate: Coal price is always affected by inflation rate, and the historical prices show that there is a positive correlation between inflation rate and coal price. So we shall take inflation rate into account when making price forecast.
- (4) Industry policies: China's "13th Five-Year Plan for Coal Industry Development" (2016-2020) states that ① China has been expediting adjustment of energy consumption mix, which bolsters development of clean and low-carbon energy, and lowers the share of coal in primary energy consumption mix, while coal will remain as the country's predominant energy in the long run. By 2020, non-fossil energy and natural gas will account for around 15% and 10% respectively, in China energy consumption mix, with the share of coal falling to around 58%. ② China shall phase out 800 Mtpa of outdated coal capacity, and increase 500

Mtpa of advanced coal capacity through capacity reducing replacement and optimizing coal capacity layout. By 2020, China coal production will be 3,900 Mt and demand will reach 4,100 Mt. The number of coalmines will be around 6,000. ③ Within 3 years since 2016, China will in principle not approve construction of new mines, technical transformation of newly-added capacity and expansion of designed capacity. ④ China shall encourage high-quality coal import, esp. coking coal, but strictly restrict low-CV and high-sulfur coal import. China shall encourage coal export by improving coal export policies.

(5) Government policies on coal prices: In January 2017, the NDRC, in collaboration with China Coal Industry Association, China Electricity Council and China Iron and Steel Industry Association, issued the “Memo on Restraining Abnormal Fluctuations in Coal Market Prices” which explicitly prescribes ranges for executing price regulation. In light of the Memo, during 2016-2020 (a full year is deemed as a cycle in principle), the mid-to-long term contract price agreed by major coal, electricity and steel companies shall serve as benchmark price for coal pricing, and a pre-warning mechanism will be built to guard against abnormal price fluctuations. Thermal coal price regulation is split by three color-coded zones: ① Green Zone: not take any action if price goes up or down by less than 6%. ② Blue Zone: execute appropriate guidance measures if price goes up or down by more than 6% but less than 12%. ③ Red Zone: to activate the responding mechanism if price goes up or down by more than 12%. In 2017 the mid-to-long term contract price is set as 535 yuan/t, on this basis, the reasonable price range in Green Zone shall be 500~570 yuan/t, Blue Zone to be 470~500 yuan/t or 570~600 yuan/t, and Red Zone to be lower than 470 yuan/t or higher than 600 yuan/t. To be more specific, if thermal coal price drops lower than 470 yuan/t, then the government may adopt such measures as 276 workdays; or if thermal coal price rises above 600 yuan/t, then the government may adopt such measures as 330 workdays.

(6) Cost: Cost props up prices. Since 2012H2, Chinese coking coal prices started a four-year consecutive decline because of oversupply and weak demand. Despite of multiple measures for lowering production cost, more and more Chinese coal enterprises still slipped into deficit. In 2015-end and 2016-start, China coal production cost was too low to drop further, and over 90% of coalmines were suffering losses and difficulty in sustaining operation, and the capital

input for continuing coal mining and improving safety conditions was extremely short. In early February 2016, China's State Council made public the "Opinions on Resolving Coal Industry Overcapacity and Helping Enterprises through Difficult Times", which states to resolve coal overcapacity and reduce production (all coalmines to exercise annual 276 workdays), which effectively lowered domestic coal production, tightened supply and triggered soaring prices. In order to stabilize coal supply and prices, the NDRC began to loosen implementation of 276-workdays policy; by mid-November, all qualified safe coalmines were allowed to resume 330 workdays before the end of heating season (the first day of each April). During 2017-2020, Chinese government will keep carrying out decapacity policy and 276-workdays policy to regulate coal supply and prices, and maintain coal prices at a reasonable level, secure certain profit based on a reasonable production cost, safeguard healthy development of coal industry and guard against dramatic price fluctuations. Along with increasing economic benefit, mine employees will gain better salary and welfare, and coalmines are able to inject more funds into reproduction and safety improvement. During 2017-2020, 2021-2025 and 2025-2035, China coal production cost may take an upward trend, registering an AAGR at 3%-5%, 2%-3% and 1%-2%, respectively.

(7) Resource scarcity: Coking industry has a rigid demand for coking coal. Through years' development, China premium coking coal resources will remain relatively tight in the future. The resource scarcity will be able to prop up coking coal prices.

(8) Characteristics of target markets: ① Wuhai: 1/3JM is basic coal for coal blending, i.e., there has been rigid demand for low-ash and low-sulfur 1/3JM. ② Gansu (JISCO): a net importer of 1/3JM.

### **19.1.2 Methodology**

#### **Product Specifications**

Product specifications of benchmark coal and SQR coal are summarized below:

**Table 19-1: Product Specifications of Benchmark Coal and SQR Coal**

Item	Specifications	A	S	V	G	CV
Benchmark coal	Jingtang Port 1/3JM	10.5	1	33	75	
	Wuhai, Jiayuguan 1/3JM	10.8	1.1	30-33	83	
	Jiayuguan 5,500 Kcal/kg NAR	18	1	30		5500
	Qinhuangdao Port 5,500 Kcal/kg NAR	20	1	28		5500
SGR coal	1/3 coking - Product SC	10	0.6	30-33	70	
	6200 CV thermal -Product TC	15	1.2	30-33	40-50	6200
	5800 CV thermal - Product J	23	1.5	30-35	0	5800

### **Benchmark Prices**

The benchmark prices for the two targeted markets are as below:

- Gansu (JISCO): ①Benchmark thermal coal: Jiayuguan 5,500 Kcal/kg NAR; ② Benchmark 1/3JM: Jiayuguan 1/3JM.
- Wuhai: Benchmark coal: Wuhai 1/3JM

### **Key Assumptions**

(1) Domestic coal prices feature co-movement. We assume domestic coal market is a fully competitive market, then the coals with same quality will have similar prices.

(2) Although the coal markets in China’s northwestern and coastal regions may have some independence, the historical price trend has proved that China coal prices in different regions still feature co-movement.

(3) We net back calculated selling prices in consumption areas into the prices at Ceke Border.

(4) The annual average price throughout a year will represent annual price.

### **Forecast Method**

(1) To forecast thermal coal and 1/3JM prices at transfer ports in light of China coal supply-demand pattern.

(2) To forecast prices at target markets based on price variation trend at transfer ports.



(3) To estimate SQR 1/3JM prices at target markets, and then compare with benchmark coal historical prices, and figure out their price difference. For example, in Wuhai, SQR 1/3JM price is 100 yuan/t lower than Wuhai 1/3JM historical average price. In Jiayuguan: SQR 1/3JM price is 430 yuan/t lower than local Jiayuguan coal.

(4) To estimate SQR 1/3JM prices at target markets: benchmark coal price to minus price difference and then consulting with premium/penalty standard.

(5) To estimate the transport cost from Ceke Border to target markets.

(6) SQR 1/3JM price at Ceke = selling price at target markets – transport cost

### 19.1.3 Price Forecast From 2017 To 2030

The forecasted price of different targeted markets are based on the factors explained in Section 19.1.1 and methodology in Section 19.1.2 as shown in Table 19-2 below.

**Table 19-2: Price Forecast of Different Targeted Markets**

	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
1/3 coking -Product SC (Wuhai)	634	658	684	706	729	752	777	802	828	850	873	896	920	945
1/3 coking -Product SC (Jiayuguan)	614	638	663	686	709	732	757	782	808	830	853	876	900	924
6200 CV thermal -Product TC (Jiayuguan)	381	392	404	414	425	435	446	457	469	480	492	505	517	530
5800 CV thermal -Product J (Jiayuguan)	320	329	339	348	356	365	374	384	393	403	413	424	434	445

*RMB/US\$ is assumed to be 7:1*

The forecasted selling price at Ceke Border is derived by deducting the benchmark coal price at targeted markets by the logistics cost from Ceke border to targeted price, as summarized in Table 19-3 below:

**Table 19-3: Price Forecast at Ceke Border**

1/3 coking - Product SC	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Wuhai—Ceke	438	458	480	499	517	536	555	575	596	614	632	651	671	691
Jiayuguan—Ceke	518	541	564	584	605	627	650	673	698	718	739	760	782	804
<b>6200CV Thermal coal - Product TC</b>														
Jiayuguan—Ceke	285	295	305	313	321	330	339	348	359	368	378	389	399	410
<b>5800CV Thermal coal - Product J</b>														
Jiayuguan—Ceke	224	232	240	246	253	260	267	275	283	291	299	308	316	325

*RMB/US\$ is assumed to be 7:1*

The forecasted selling price at mine gate is derived by deducting forecasted price at Ceke border (see above table) by the logistics cost and China import duty and taxes as provided by SQR, as summarized below:

**Table 19-4: Price Forecast at Mine Gate**

1/3 coking - Product SC	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Wuhai—Ceke	291	307	323	337	350	363	378	392	408	421	434	448	462	477
Jiayuguan—Ceke	353	370	387	402	417	433	450	467	485	500	515	531	547	564
<b>6200CV Thermal coal - Product TC</b>														
Jiayuguan—Ceke	175	182	189	194	199	205	211	216	224	230	237	244	251	259
<b>5800CV Thermal coal - Product J</b>														
Jiayuguan—Ceke	129	134	139	143	147	152	156	161	166	171	177	182	188	194

*RMB/US\$ is assumed to be 7:1*

## 19.2 CONTRACTS

SGS generally negotiates coal sales contracts on a monthly basis. The number of customers changes from quarter to quarter, but has generally been in the range of 5-8 customers in any quarter.

## **20. ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT**

### **20.1 ENVIRONMENTAL STUDIES**

The key environmental reports are titled Detailed Environmental Impact Assessment (DEIA) for the Nariin Sukhait Coal Deposit Mining Project, prepared by Environmental Consulting Company (ENCO), 2006, and the Addendum, prepared in 2008.

The main changes to the Ovoot Tolgoi coal mine that are addressed in DEIA are:

- Annual volume of coal and waste rock extraction increased from 0.5 MT and 1.05 Mm<sup>3</sup> to 4 MT and 15 Mm<sup>3</sup> respectively;
- Area of mine pits increased to 319 ha (total area of all pits) and maximum depth increased from 70 m to 200 m;
- Area of waste rock dumps (WRD) increased to 331 ha (total of all WRDs) and height increased from 20 m to 60 m;
- Frequency of blasting increased from once per week to more than once per week;
- Increased fleet of heavy mining vehicles;
- Number of operating days increased from 260 days to 350 days per year;
- Workforce size increased from 126 to 292, with around 200 people on site at any one time;
- Projected mine life decreased from 20 years to 17 years;
- Change from operations during daylight hours only to continuous 24 hour operations (excluding blasting, which is in daylight hours only); and
- Relocation of the accommodation camp to a site that is situated near to airport, approximately 3 km east of the Sunrise field.

The Addendum reviewed the possible impact of each of these changes and concluded that "most of the impacts of the changed mining plan would be within the range of effects already described in the original DEIA".

The Addendum identified the impact on groundwater of the deeper pits as a possible exception to being within the range of original impacts. As mining has progressed, the quantity of groundwater flowing into the pits has been less than originally anticipated and consequently, the impact of mining on groundwater has been less. A hydrogeological survey was commissioned by SGS in 2010 to investigate ground water sources near Ovoot Tolgoi and concluded "Revised estimates of mine inflows at the Sunset pit suggest that dewatering production will be sufficient for immediate mine water requirements, and may provide a supplementary water source" and "However, dewatering production cannot be considered a viable long term supply". As the mining operation progresses on Sunrise and Sunset Field, pit water has not been reported to be a material issue that will adversely affect the operation. For this reason, DMCL considers that the revised pit depth (approximately 300m below the surface) will not have significant additional impacts on groundwater compared to the pit depth of 200m.

In 2012, SGS has prepared the PFS with the following changes relative to the previously approved mine plan:

- Annual volume of coal and waste rock extraction increased from 4.0 Mt and 15 Mm<sup>3</sup> to 9 Mt and 95 Mm<sup>3</sup> respectively
- Area of mine pits increased to 734 ha (total area of all pits) and maximum depth increased from 200 m to 320 m
- Area of waste rock dumps (WRD) increased to 1939 ha (total of all WRDs) and height increased from 60 m to 140 m
- Increased fleet of heavy mining vehicles
- Workforce size increased from 292 to approximately 1200, with around 700 people on site at any one time
- Projected mine life increased to 26 years (2008 to 2034).

The waste rock is planned to be dumped on the surface outside of the pit limits. As part of routine environmental monitoring, any discharges from these waste dumps will be monitored and tested.



The 2012 Technical Report concluded that the PFS and its mine plan were likely within the range of effects in the original DEIA and that approval would be likely granted based on past experience.

## **20.2 WATER PERMIT**

SGS has received approval from the Water Resources Committee of The Natural Environment Green Developing Tourism Department of Mongolia in 2014 such that SGS is allowed to undergo production capacity in Maidar and Jargalant at 10212 m<sup>3</sup>/day; in Baynling and Harztain Bulag at 29376 m<sup>3</sup>/day; in Tuul and Unsgen at 18144 m<sup>3</sup>/day; and in Tooin Shand 17712 m<sup>3</sup>/day.

## **20.3 COMMUNITY INVOLVEMENT**

SGS started a process of signing a cooperation agreement with the administration of Umnugobi province. The agreement regulates the cooperation between SGS and the administration of province under which SGS will make contributions for the socio-economic growth of UG province and the western part of the province where SGS operates. The agreement also provides SGS an opportunity for the uninterrupted and normal operations of production, finance and business in the licensed area.

Under its newly developed Corporate Social Responsibility Strategy, SGS intends to develop and implement Community Development Plans for each of the soums in which it operates. Community development plans are developed in close cooperation with the respective government and community members.

SGS has concluded a cooperation agreement with Vocational Training and Production Center (VTPC) of Umnugobi province in order to improve skill-sets of teachers and students of the VTPC and to train qualified and skilled people in the mining sector to assist them in finding employment. Under the agreement, students will be engaged in internships at Ovoot Tolgoi mine operations.

## 21. CAPITAL AND OPERATING COSTS

### 21.1 CAPITAL COSTS

Capital costs for the Ovoot Tolgoi Coal Mine generally include mining equipment, coal processing facilities, infrastructures, sustaining capital and exploration. The historic and forecasted capital costs are shown in Table 21-1 below for the period from 2013 to 2019.

**Table 21-1: Historic and Forecasted Capital Costs for the Ovoot Tolgoi Coal Mine**

<i>In US\$' million</i>	<i>Historic</i>				<i>Forecast</i>		
	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>
<b>Mining Equipment</b>	1.4	3.8	3.1	2.1	to be covered by leasing arrangement with mining contractor		
<b>Coal Processing Facilities</b>	-	-	-	-	to be covered by BOT arrangement with washing contractor		
<b>Infrastructure</b>	2.1	0.1	0.1	-	1.0	2.0	2.0
<b>Sustaining Capital</b>	4.2	2.2	1.8	4.1	12.1	18.8	13.2
<b>Exploration</b>	1.2	1.3	0.2	0.4	1.0	2.0	2.1
<b>Contingency</b>	-	-	-	-	2.0	3.0	2.0

*RMB/US\$ is assumed to be 7:1*

Capital cost during the period from 2013 to 2016 was low after heavy investment during the period from 2008 to 2012 when SGS invested US \$394m in mining equipment and US \$70 million in infrastructures during the period.

### 21.1.1 Mining Equipment

The capital costs for mining equipment include equipment for mining coal, waste stripping, hauling and supporting equipment. Based on the new mining strategy, production target and equipment selection, it is estimated that the average number of excavators and haul trucks required throughout the life-of-mine are 10 units and 70 units respectively as shown in Table 21-2. DMCL recommends that SGS should purchase 10 units of excavators and 70 units of trucks and lease additional equipment by short-term operating leases provided that there is any shortfall in the equipment during a particular year.

**Table 21-2: Annual Numbers of Excavators and Haul Trucks Required**

Year	Annual Production Profile			Excavators and Haul Trucks Required	
	Total ROM mt	Waste m BCM	Strip Ratio BCM/t	Excavators Unit	Haul Trucks Unit
1	4.7	31.0	6.6	7	52
2	8.3	38.7	4.7	12	85
3	8.5	30.6	3.6	10	72
4	8.9	31.9	3.6	11	77
5	9.3	35.2	3.8	12	86
6	8.9	29.3	3.3	11	74
7	8.8	39.8	4.5	12	86
8	8.7	24.6	2.8	9	60
9	9.1	21.2	2.3	9	61
10	9.0	41.6	4.6	13	93
11	8.8	25.4	2.9	10	71
12	8.9	30.0	3.4	11	75
13	7.3	24.8	3.4	9	63
14	4.9	8.5	1.7	4	30
<b>Average</b>				<b>10</b>	<b>70</b>

The capital costs for 10 units of excavators and 70 units of trucks are estimated to be US\$89M including 10 units of excavators for US\$40M and 70 units of haul trucks for US\$49M based on latest quotes from equipment suppliers. Considering the financial resources available to SQR, SQR is liaising with mining contractors to enter into leasing arrangement for those equipment and SQR will pay equipment rental plus interest cost for the equipment during the lease term.

The annual leasing fee of excavators and haul trucks is estimated to be US\$19.58M (including interest cost of 10% per annum), detailed in Table 21-3 below. The leasing fee is included in and is considered as part of the operating cost described in Section 21.2.

**Table 21-3: Equipment Leasing**

<i>Items</i>	<i>No of Units</i>	<i>Unit Cost (US\$/unit)</i>	<i>Sub-Total (US\$)</i>	<i>Lease Term</i>	<i>Lease Fee /year (US\$)</i>
Excavator	10	4,000,000	40,000,000	5 year	8,800,000
Truck	70	700,000	49,000,000	5 year	10,780,000
<b>Total</b>			<b>89,000,000</b>	<b>5 year</b>	<b>19,580,000</b>

DMCL understands that SGS is currently liaising with a number of Chinese mining contractors to undertake the mining operation. In general, contract-mining reduces significantly the capital expenditure for SGS required for the new mining strategy and expanded production capacity and also ensures a higher utilization rate of mining equipment which generally requires a timely supply of various parts. Chinese contractors are expected to have reasonable advantages, compared to contractors from other regions, in maintaining a steady supply of different parts for the mining equipment given that Ovoot Tolgoi Coal Mine is located only around 45km away from the Ceke border in China.



### **21.1.2 Coal Processing**

The capital costs for coal processing facilities include mobile screens and a proposed wet washing plant. Regarding the wet washing plant facility which is currently under construction, as of the reporting date, SGS has entered into a Build-Operate-Transfer (BOT) contract with Xiangrui Machinery, a EPC contractor which has been building the new wet washing plant at its own cost and will operate for around 4 years in return for the processing fee and then transfer the wash plant to SGS. Thus DMCL understands that the capital cost for the wet washing plant under construction (2.4 million tonnes per annum in phase 1) will be responsible by the contractor and therefore, SGS shall not require a capital commitment for this. In addition, SGS expects that the addition of washing capacity (another 2.4 million tonnes per annum in phase 2) will be carried out in similar arrangement such that the EPC contractor will bear the capital cost in return for a processing fee.

### **21.1.3 Infrastructures**

Infrastructure includes workshops, accommodation, mine office and on-site overhead facilities.

### **21.1.4 Sustaining Capital**

Sustaining capital includes maintenance and replacement of equipment, pit infrastructure, pit de-watering, geotechnical work and safety-related work.

### **21.1.5 Exploration**

Exploration includes survey, drilling program, drilling-related surveys, lab testing and other associated work.

### 21.1.6 OPERATING COSTS

The operating cash costs include mining cost, coal processing cost, general and administration cost, marketing and sales cost, production taxes, resource compensation levy and other cash cost items. The historic and forecasted operating costs are summarized in Table 21-4 below. The increase of operating costs from the period of 2013-2016 to the period of 2017-2019 is primarily due to higher coal production and higher BCM moved in the period of 2017-2019.

**Table 21-4: Historic and Forecasted Operating Costs for the Ovoot Tolgoi Coal Mine**

<i>In US\$' million</i>	<i>Historic</i>				<i>Forecast</i>		
	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>
<b>Mining</b>	33.1	13.4	16.7	33.2	96.4	147.8	127.4
<b>Coal Processing</b>	1.4	3.5	0.8	3.3	3.7	21.5	27.1
<b>Admin and Marketing</b>	7.3	5.5	3.7	6.3	8.0	8.2	8.3
<b>Tax, Royalty and Government Charges</b>	4.8	2.2	1.3	4.5	13.4	18.6	24.1
<b>Contingency</b>	n/a	n/a	n/a	n/a	11.1	11.1	8.8

*RMB/US\$ is assumed to be 7:1*

SGS is considering to switch from traditionally self-mining to contract-mining in order to reduce mining cost and effectively address the additional demand of mining equipment and labour force resulted from the new mining strategy and expanded production target. In case of contract-mining, SGS will only be required to pay a contracting fee to the contractor covering all the cost items below including a reasonable profit for the mining contractor.

The unit base mining costs of material moved are estimated to be US\$2.97/BCM for 2017 including the unit cost for coal mining, waste removal and mine general and administration expenses. Breakdown of the estimate of the base mining cost per BCM of material moved is shown in Table 21-5 below.

**Table 21-5: Breakdown of Base Mining Cost Per BCM of Material Moved**

	<i>Total</i> <i>US\$/BCM</i>
Fuel	1.15
Blasting	0.32
Maintenance, Tires And Spare Parts	0.24
Labour	0.09
Mine General and Administration	0.22
Equipment Leasing Cost	0.46
Mining Contractor Profits	0.20
Contingency (10%)	0.27
<b>Base Mining Cost</b>	<b>2.97</b>

As mining progresses, the depth of mining increases and so is the lifting distance. Therefore the total mining costs (mining cost plus lifting cost) will increase with depth of mining. The estimate of total unit mining cost (in US\$/BCM) throughout the life-of-mine, being the base mining cost plus the lifting cost, is summarized in Table 21-6 below. The average LOM mining cost per BCM of material moved is US\$4.4/BCM.

**Table 21-6: Mining Cost Per BCM of Material Moved**

<i>Year</i>	<i>Weighted average depth of pits</i>	<i>Incremental depth of pits over 2016 pit level</i>	<i>Base mining cost</i>	<i>Incremental lifting cost</i>	<i>Total mining cost per BCM material moved (before inflation)</i>	<i>Total mining cost per BCM of material moved (after inflation)</i>
	<i>meter</i>	<i>meter</i>	<i>US\$/BCM</i>	<i>US\$/meter</i>	<i>US\$/BCM</i>	<i>US\$/BCM</i>
1	107	14	2.97	0.08	3.05	<b>3.12</b>
2	184	91	2.97	0.54	3.51	<b>3.68</b>
3	198	104	2.97	0.63	3.60	<b>3.86</b>
4	208	115	2.97	0.69	3.66	<b>4.03</b>
5	214	120	2.97	0.72	3.69	<b>4.17</b>
6	219	125	2.97	0.75	3.72	<b>4.31</b>
7	176	83	2.97	0.50	3.47	<b>4.11</b>
8	192	98	2.97	0.59	3.56	<b>4.31</b>
9	243	150	2.97	0.90	3.87	<b>4.79</b>
10	191	97	2.97	0.58	3.55	<b>4.50</b>
11	255	162	2.97	0.97	3.94	<b>5.09</b>
12	216	122	2.97	0.73	3.70	<b>4.87</b>
13	223	129	2.97	0.77	3.74	<b>5.03</b>
14	300	206	2.97	1.24	4.21	<b>5.76</b>

*RMB/US\$ is assumed to be 7:1*

Unit cash mining cost per tonne of coal throughout the LOM is estimated as below. The average LOM mining cost per tonne of coal is US\$18.65/tonne.

**Table 21-7: Cash Mining Cost Per Tonne of Coal**

<i>Year</i>	<i>Total mining cost per BCM of material moved (after inflation)</i>	<i>Total material moved</i>	<i>Total mining cost</i>	<i>ROM</i>	<i>Total mining cost per tonne of coal (after inflation)</i>
	<i>US\$/BCM</i>	<i>k BCM</i>	<i>million US\$</i>	<i>kt</i>	<i>US\$/tonne</i>
1	3.12	34,328	107.1	4,688	<b>22.83</b>
2	3.68	44,669	164.3	8,290	<b>19.81</b>
3	3.86	36,697	141.6	8,488	<b>16.68</b>
4	4.03	38,189	153.8	8,869	<b>17.34</b>
5	4.17	41,798	174.2	9,302	<b>18.73</b>
6	4.31	35,671	153.6	8,880	<b>17.30</b>
7	4.11	46,141	189.6	8,842	<b>21.44</b>
8	4.31	30,759	132.7	8,689	<b>15.27</b>
9	4.79	27,655	132.5	9,072	<b>14.61</b>
10	4.50	48,101	216.3	9,041	<b>23.92</b>
11	5.09	31,640	160.9	8,784	<b>18.32</b>
12	4.87	36,295	176.9	8,852	<b>19.98</b>
13	5.03	30,033	151.0	7,300	<b>20.68</b>
14	5.76	12,047	69.4	4,905	<b>14.16</b>

*RMB/US\$ is assumed to be 7:1*

Processing costs include wet washing cost and screening cost. Wet washing cost is estimated to be USD4.0/ tonne of feed coal (which is the contracted rate of wet washing as per the BOT contract with the EPC Contractor, plus 10% contingency) in 2017. The screening cost is estimated to be USD3.0/ tonne of feed coal (which is based on historical screening cost data plus 10% contingency) in 2017. The average LOM wet washing cost and screening cost per ton of feel coal are estimated to be USD4.46/tonne and USD3.41/ tonne respectively.



### **21.1.7 DISCUSSION**

Based on our review, DMCL believes that the SGS's forecast for the capital costs and operating costs, with an appropriate contingency, for the Ovoot Tolgoi Coal Mine are fair and reasonable as they generally reflect the future cost increase caused by labor and material and also unit cost savings as the result of the productivity increase. Therefore, these forecasts are generally considered achievable.

## 22. ECONOMIC ANALYSIS

### 22.1 INTRODUCTION

Considering the economic viability of the reserve estimated in this Technical Report resulted from the new mine plan and production schedule, DMCL has performed an economic analysis for the Ovoot Tolgoi Coal Mine to assess the economic viability with respect to the reserve estimated, new processing and sales strategy throughout the life-of-mine. Determination of the economic viability involves the sum of discounted annual free cash flow projected from the start year till the life-of-mine.

The economic analysis presented here is on a 100%-equity basis that shows the basic economics of the project and do not incorporate financing items such as interest paid and loan principal paid back. The analysis also does not incorporate any losses carried forward for tax purposes and any refund of valued-added taxes previously or currently paid.

### 22.2 COAL PRICES

DMCL understands that SGS is selling its coal products to two major markets in China at slightly different coal prices. Based on the coal price forecast conducted by the independent marketing firm discussed in Section 19, the weighted-average prices ex-mine gate of each finished product are summarized in Table 22-1 below.

**Table 22-1: Forecasted Weighted-Average Coal Prices of Finished Products of the Ovoot Toigol Coal Mine from 2017 to 2019**

<i>Finished Products</i>	<i>2017 Prices (US\$/t)*</i>	<i>2018 Prices (US\$/t)</i>	<i>2019 Prices (US\$/t)</i>
Product SC	46.0	48.3	50.7
Product TC	25.1	26.0	27.0
Product J	18.4	19.2	19.9

*\*Coal prices are originally quoted in RMB. RMB/US\$ is assumed to be 7:1*

### 22.3 DISCOUNTED CASHFLOW PROJECTION

Based on the capital costs, operating costs, revenue, taxes and government charges described in previous sections, the Net Present Value (NPV) is estimated to be about US\$360 million at a discount rate of 15% for the base case. Detailed NPV calculation is available in Appendix.

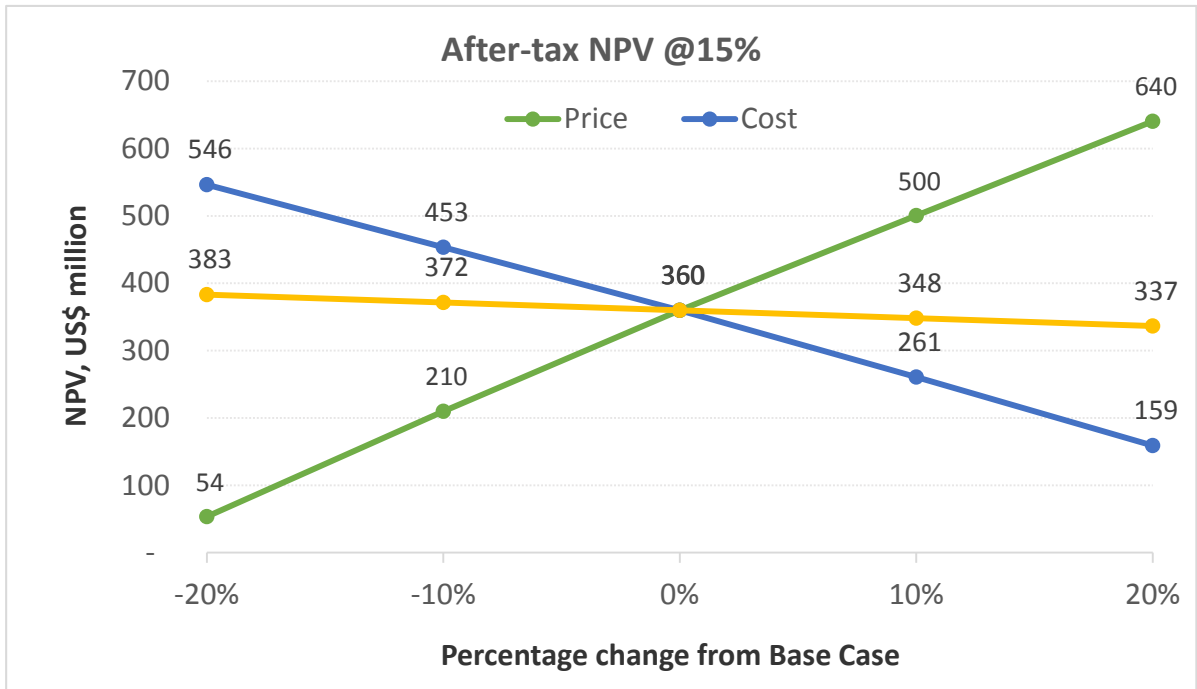
### 22.4 SENSITIVITY ANALYSIS

Sensitivity analysis has been run for various changes of the base case parameters, including coal prices, operating costs and capital costs. The results are summarized in Table 22-2 and plotted in Figure 22-1 below.

**Table 22-2: Sensitivity Analysis of the Ovoot Tolgoi Coal Mine**

<i>in Million US\$</i>	<b>+20%</b>	<b>+10%</b>	<b><i>Base NPV</i></b>	<b>-10%</b>	<b>-20%</b>
<b>Coal Prices</b>	640	500	360	210	54
<b>Operating Costs</b>	159	261	360	453	546
<b>Capital Costs</b>	337	348	360	372	383





**Figure 22-1: Sensitivity Chart of Varying Coal Prices, Operating Costs and Capital Costs for the Ovoot Tolgoi Coal Mine**

Similar to the majority of mining projects in the world, the cashflow projection and the NPV estimate are the most sensitive to commodity prices. The Ovoot Tolgoi Coal Mine is no exception as demonstrated in above table and chart.



### **23. ADJACENT PROPERTIES**

Ovoot Tolgoi Coal Deposit is located immediately adjacent to the Nariin Sukhait deposit which is being mined separately by Mongolyn Alt Corporation (MAK) and a joint-venture between MAK and Inner Mongolia Qinghua Company (Qinghua-MAK JV). The Qinghua-MAK JV commenced its open-pit operation of the No. 5 Seam in 2003 (West pit), whereas MAK commenced its open-pit operation in 2008 (East Pit). The East Pit was formerly operated by Qinghua-MAK JV, which is immediately north of the SGS Sunrise Field, mining the same seams.

Based on the information supplied by SGS, annual production from these mines is estimated to be in excess of 5 million tonnes per year (mtpa) of coal, transported to customers in China. A publicly available summary report produced by the Mongolian State Geological Centre (Dashkhoral et al, 1992) reports coal resources of 125.5 million tonnes (Mt) within the MAK property.

Daytime mining operation typically involve loading directly at the mine sites up to 200 - 300 road-hauling trucks from China. The trucks return across the border each night and offloaded the coal at Ceke. Night shift activities focus on the removal of overburden. It is estimated that a workforce of approximately 400 miners is employed at those mine sites.

It was previously reported that the MAK East Pit operations have trespassed and recovered a minor amount of coal from SGS tenement. SGS management has discussed this issue with MAK. However, no legal action is pending regarding this issue.

A Memorandum of Understanding (MOU) between MAK and SGS covering mining operation across the leasing boundary was first signed on May 24, 2007. Subsequently, a cooperation agreement has been entered by MAK and SGS on February 20, 2014 which allows SGS to strip off the overburden in MAK's property at SGS's own cost. The coal within the pits and within the MAK's property has been treated as generating no revenue and having no associated cost. Such an agreement is material to SGS's LOM operation and long-term mine planning. DMCL understands that the agreement has been properly honoured by both



parties since establishment. It is worth to note that the current Resource and Reserve estimates documented in this report do not contain any coal within the MAK's property.



## **24. OTHER RELEVANT DATA AND INFORMATION**

DMCL is not aware of any other mining, processing, infrastructure, environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant factors that would materially affect the Resource and Reserve estimate.

Sections of this report are derived from previous NI 43-101 reports compiled and prepared by Norwest, TAG and RPM and include information provided to DMCL by SQR and SGS.

## 25. INTERPRETATION AND CONCLUSIONS

Considerable work has been completed at the Ovoot Tolgoi Coal Mine, including systematic exploration, resource delineation and estimation, washability tests, pre-feasibility study, mine planning, production scheduling, equipment selection, optimized sales strategy, reserve estimation and environmental impact assessment.

DMCL's technical review of drillhole data and the resource model, and its on-site assessment suggested the Ovoot Tolgoi Coal Mine has been subjected to a significant amount of tectonic deformation comprising an east-west-trending regional thrust fault with hanging wall strata modified by different secondary folding. Coal seams are typically dipping in angle from 35° to 55° and are occasionally sub-vertically dipping.

DMCL's review further indicated that the previous Geology-Type classification in the 2016 Technical Report by RPM was not strongly justified by current technical findings. Tight folds, steeply inclined and overturned beds, were not widely present whereas large displacement faults are generally absent in both Sunrise and Sunset coalfields at the Ovoot Tolgoi Coal Mine.

The different conclusions in Geology-Type between the 2016 Technical Report by RPM and DMCL's conclusion are likely attributable to DMCL's more recent site visit (February 2015 by RPM vs December 2016 by DMCL) and DMCL's benefit of being able to observe coal seams exposed by mining operations during 2015 and 2016, which seems generally retained normal stratigraphic sequences, thicknesses and continuity. As a result, DMCL concluded that the Geology Type of the Ovoot Tolgoi Coal Mine, including Sunrise Main, Sunrise Extension, Sunset Main and Sunset Extension, should be reverted to its prior categorization as "Complex".

Reserves were estimated to total 114.17 million tonnes, comprising 59.57 million tonnes at Sunset and 54.59 million tonnes at Sunrise. Proven Reserve, comprising of the Measured Resource only, totals 99.49 million tonnes, of which 55.23 million tonnes at Sunset and 44.25 million tonnes at Sunrise. Probable Reserve, comprising of the Indicated Resource only, totals



14.68 million tonnes, of which 4.34 million tonnes at Sunset and 10.34 million tonnes at Sunrise respectively.

Based on the optimized mining strategy and processing strategy, three types of finished coal products will be produced at the Ovoot Tolgoi Coal Mine, comprising of metallurgical coal and two types of thermal coal.

## **26. RECOMMENDATIONS**

### **26.1 EXPLORATION**

- Downhole survey of verticality should be carried out for future drilling programs to enhance the accuracy of the resource model and hence resource estimation. This will be an ongoing annual cost of approximately US\$ 10,000.

### **26.2 RESOURCE MODELLING**

- As further exploration program and coal quality sampling programs proceed, the resource model should be updated on an on-going basis so as to develop a better understanding of the geology and coal quality for refining the mine plan in the future. This will be an ongoing annual cost of approximately US\$ 10,000.
- Routine data validation and verification should be continued for additional exploration data as an integral part of the database management system. No cost impact.

### **26.3 GEOTECHNICAL ENGINEERING**

- Detailed geotechnical assessment of pit wall stability is recommended to be an integral part of a short-term mine plan and detailed mine design. This will be an ongoing annual cost of approximately US\$ 50,000.
- Long-term and continuous monitoring, analysis, review and reporting of the pit wall stability should be considered as a routine practice by the mine site to ensure production and also safety of the workers. No cost impact.

## 26.4 HYDROGEOLOGY

- Hydrogeological data should be reviewed on an on-going basis and is recommended to be an integral part a short-term mine plan and detailed mine design. This will be an ongoing annual cost of approximately US\$ 20,000.
- Groundwater model should be updated by integrating the data collected from historical and existing groundwater monitoring wells. This will be approximately US\$ 40,000
- The routine monitoring will be conducted for employment of pit dewatering system as appropriate to enhance pit wall stability and reduce pit seepage, if necessary, with the pit development. No cost impact.

## 26.5 MINING

- The mining operation should implement the updated mine plan to achieve the goals set out by the latest mining strategy, processing strategy and sales strategy. No cost impact.
- A more detailed reserve model is recommended to be developed, to address the need of a more detailed monthly production schedule and short-term mine plan with the integration of, such as, pit wall stability analysis and hydrogeology assessment. This will be an ongoing annual cost of approximately US\$ 30,000.
- The resource model should be updated by integrating additional validated coal sample analysis data, geological and geotechnical findings from exposures of mine pits in order to enhance the development of a detailed monthly production schedule and reserve database. No cost impact.
- A study should be commenced to evaluate the procurement of mining equipment from neighboring countries like China for a lower transport cost and steady and timely supply of parts. No cost impact if implemented by SGS's personnel.
- With the cooperation agreement in place with MAK in relation to stripping within MAK's property, it is recommended that SGS should establish an effective communication channel and relationship with MAK such that SGS can regularly



update MAK of the details of the mine plan in order to carry out stripping within the MAK's property in a timely manner. No cost impact.

- Reconciliation between planned and actual production should be continued as a good mining practice. This will be an ongoing annual cost of approximately US\$ 20,000.

## **26.6 COAL PROCESSING**

- Characterization and assessment of the coal quality of individual coal seam should be continued on an ongoing basis in order to develop a better understanding of the spatial distribution of coal quality of the pit and within individual seams. Ongoing coal quality characterization may also benefit the processing strategy and hence a better product mix for SGS. No cost impact.
- Further coal quality characterization and washability tests should be executed for individual coal seam, particularly Seam No 5, which offers the best quality of coal products and the contribute to the majority of production. This will be an ongoing annual cost of approximately US\$ 20,000.
- SGS should establish fair and reasonable terms and conditions with the washing plant operator in relation to feeding, washing cost, product specifications, throughput capacity, penalty and bonus. No cost impact other than legal expenses.
- DMCL understands that the proposed washing plant is to commission by the second half of 2017, a performance test should be performed in relation to its throughput capacity, separation efficiency, feeding size limits, ultra-fines treatment. No cost impact.
- Given that the new wet washing plant can only process 2.4 million tonnes feed per year, further feasibility study of expansion of the washing capacity to 4-5 million tonnes per annum (phase 2) and to 6-7 million tonnes per annum capacity (phase 3 if need) should be proceeded as early as possible in order to meet the washing demand of the updated mine plan. This will be approximately US\$ 50,000.



## 27. REFERENCES

Aquaterra 2010. Ovoot Tolgoi Water Supply - Phase 1 Scoping Study Ausenco Taggart 2012 Summary Report of Coal Handling Facility.

Aquaterra 2012. Findings From Groundwater Exploration Works Undertaken In The Tooroin Shand Area (Estimated Exploitable Groundwater Reserves) For Supply To The Ovoot Tolgoi Mine (July 2012).

Canadian Securities Administrators, 2011. National Instrument 43-101 Standards of Disclosure for Mineral Projects. Policy Document.

Canadian Securities Administrators, 2011. Companion Policy 43-101CP. Policy Document.  
Canadian Securities Administrators, 2011. Technical Report Form 43-101F1. Policy Document.

CIM Standing Committee on Reserve Definitions, November 2010. CIM Definition Standards for Mineral Resources and Mineral Reserves.

CIM Standing Committee on Reserve Definitions, October 2004. Exploration Best Practices Guidelines: Included in CIM Standards on Mineral Resources and Reserves - Definitions and Guidelines. CIM Bulletin, v. 93, no. 1044, pp. 53-61.

Dashkhorol, J., Baatar, G., Dashdondov, J., and Orgil, D., 1992. Report on results of prospecting and detailed exploration of Nariin Sukhait black coal deposit in Gurvan Tes soum of Umnugobi aimag /resource estimation as of January 1, 1992, Ulaanbaatar.

Dashtsren, D. and Jagar, S., 1971. Report on results of prospecting-revision work done by geological team #5 on coal in Omonogobi aimak, Ulaanbaatar.

ENCO Co Ltd, 2005. Report of the Detailed Environmental Impact Assessment for the Project "Nariin Sukhait Coal Deposit Mining".



ENCO Co Ltd, 2007 Addendum to The Detailed Environmental Impact Assessment for the Ovot Coal Project.

Graham, S.A., Hendrix, M.S., Johnson, C.L., Badamgarav, D., Badarch, G., 2001. Sedimentary record and tectonic implications of Mesozoic rifting in southeast Mongolia. Geological Society of America Bulletin, v. 113, no. 12, p. 1560-1579.

Hendrix, M.S. et al., 1996. Noyon Uul syncline, southern Mongolia: Lower Mesozoic sedimentary record of the tectonic amalgamation of central Asia. Geological Society of America Bulletin, v. 108, no. 10, p. 1256-1274.

Hendrix, M.S. et al., 2001. Triassic synorogenic sedimentation in southern Mongolia: early effects of intercontinental deformation. Geological Society of America Memoir 194, p. 389-412.

Huebeck, C., 2001. Assembly of central Asia during the middle and late Paleozoic. Geological Society of America Memoir 194 p. 1-21.

Hughes, J.D., Klatzel-Mudry, L., and Nikols, D.J. 1989. "A Standardized Coal Resource/Reserve Reporting System For Canada", Geological Survey of Canada Paper 88-21.

Klinowski, G. W., 2007. Ovoot Tolgoi Project, Underground Mine Plan, Hydraulic Mining Concept.

Lamb, M.A., and Badarch, G., 2001. Paleozoic sedimentary basins and volcanic arc systems of southern Mongolia: New geochemical and petrographic constraints. Geological Society of America Memoir 194, p. 117-149.

Meng, Q.R., Hu, J.M., Jin, J.Q., Zhang, Y., and Xu, D.F., 2003. Tectonics of the late Mesozoic wide extensional basin system in the China-Mongolia border region. Basin Research, v. 15, p. 397-415.



Mineral Resources and Petroleum Authority of Mongolia, 2003. Coal and oil shale deposits and occurrences of Mongolia.

Norwest Corporation, 2006. Groundwater and Surface Water Hydrology Report, Nariin Sukhait 2006 Investigation, Mongolia.

Norwest Corporation, 2007a. Technical Report, Coal Geology and Resources, Narin Sukhait Property, Omnogovi Aimag, Mongolia.

Norwest Corporation, 2007b. Technical Report of Ovoot Tolgoi Underground Mining Potential.

Norwest Corporation, 2007c. Technical Report of Coal Geology and Resources, Ovoot Tolgoi Property, Omnogovi Aimag, Mongolia.

Norwest Corporation, 2009. Ovoot Tolgoi Preliminary Feasibility Study (Volumes 1, 2 & 3).

Norwest Corporation, 2009. Technical Report of Coal Geology, Resources and Reserves Ovoot Tolgoi: A Production Property. Omnogovi Aimag, Mongolia.

P.E.A.T. (Aust) Pty Ltd, 2011 Qualified Person's Report on a Pre-Feasibility Coal Processing Study for South Gobi Sands.

RungePincockMinarco (formerly MinarcoMineConsult), 2011. Technical Report of Coal Geology And Resources And Reserves, Ovoot Tolgoi Complex, Mongolia.

RungePincockMinarco (formerly MinarcoMineConsult), 2012. NI 43-101 Technical Report of Coal Geology And Resources And Reserves, Ovoot Tolgoi Complex, Mongolia.

RungePincockMinarco, 2016. NI 43-101 Technical Report of Resource Estimate, Coal Geology And Resources, Ovoot Tolgoi Complex, Mongolia.



Seedsman Geotechnics, 2011 South Gobi Sands - Geotechnical Assessment Seedsman Geotechnics, 2012 Pit Design Parameters for 2012 Pit Designs SGS North America Inc., 2012 Engineering Report on Ejin Jinda Wash Plant.

SouthGobi Energy Resources, 2009. Technical Report: Coal Geology and Resources, Ovoot Tolgoi Project, Omnogovi Aimag, Mongolia.

The Americas Group, 2008. Technical Report: Surface Coal Geology and Resources, Ovoot Tolgoi West Field, Omnogovi Aimag, Mongolia.

The Americas Group, 2008. Technical Report: Underground Resources at Ovoot Tolgoi Sunset Field, Omnogovi Aimag, Mongolia.

Volkhonina, V.S., 1952. Report on geological and hydrogeological mapping at the scale of 1:500000 in South Gobi, People's Republic of Mongolia, Ulaanbaatar.



## 28. APPENDIX

### APPENDIX A – GLOSSARY AND DEFINITION

<b>Ash</b>	refers to ash content of coal
<b>BCM</b>	stands for bank cubic metre
<b>Company</b>	means SouthGobi Resources Ltd “SQR” or “the Client”
<b>CSN</b>	stands for Crucible Swelling Number
<b>CV</b>	stands for Calorific Value,
<b>DMCL</b>	refers to Dragon Mining Consulting Limited
<b>Element</b>	Chemical symbols used in this report Al – Aluminium Au – Gold Ag – Silver As – Arsenic Ba – Barium Cu – Copper Fe – Iron K – Potassium Mg – Magnesium Mn – Manganese Na – Sodium O - Oxygen Pb – Lead S – Sulphur

Si – Silicon

Sr – Strontium

Ti – Titanium

Zn – Zinc

**Exploration Target/Results**

includes data and information generated by exploration programmes that may be of use to investors. The reporting of such information is common in the early stages of exploration and is usually based on limited surface chip sampling, geochemical and geophysical surveys. Discussion of target size and type must be expressed so that it cannot be misrepresented as an estimate of Mineral Resources or Ore Reserves

**FSI**

refers to Free Swelling Index

**GPS**

stands for Global Positioning System

**GSC**

refers to Geological Survey of Canada

**In-situ**

means rock or mineralisation in place in the ground

**Indicated Mineral Resource**

is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits,

workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed

**Inferred Mineral Resource**

is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.

**Kcal**

stands for kilocalorie

**km**

stands for kilometre

**kt**

stands for thousand tonnes

**m**

stands for metres

**MAK**

refers to Monogolyn Alt Corporation

**Mineral Resource**

is a concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth’s crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific



geological evidence and knowledge.

### **Measured Mineral Resource**

is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity

### **Metallurgy**

Physical and/or chemical separation of constituents of interest from a larger mass of material. Methods employed to prepare a final marketable product from material as mined. Examples include screening, flotation, magnetic separation, leaching, washing, roasting etc.

### **Mineral Reserve**

is the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined

<b>Moisture</b>	refers to moisture or inherent moisture content of coal as specified
<b>mRL</b>	means metres above sea level
<b>Mt</b>	stands for million tonnes
<b>Mtpa</b>	means million tonnes per annum
<b>NI 43-101</b>	means Canadian National Instrument 43-101
<b>NPV</b>	stands for Net Present Value
<b>Open-pit</b>	means open cut mining which is mining from a pit open to surface and usually carried out by stripping of overburden materials
<b>Ore</b>	is the portion of a reserve from which a metal or valuable mineral can be extracted profitably under current or immediately foreseeable economic conditions
<b>PFS</b>	stands for Preliminary Feasibility Study
<b>Probable Ore Reserve</b>	A “Probable Mineral Reserve” is the economically mineable part of an Indicated and, in some circumstances, a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified.

**Proven Ore Reserve**

A “Proven Mineral Reserve” is the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction is justified.

**Regolith**

is a geological term for a cover of soil and rock fragments overlying bedrock

**Qualified Person (QP)**

A “Qualified Person” means an individual who is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development or operation or mineral project assessment, or any combination of these; has experience relevant to the subject matter of the mineral project and the technical report; and is a member or licensee in good standing of a professional association.

**Resource**

A Mineral Resource is a concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth’s crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.

<b>RL</b>	means Reduced Level, an elevation above sea level
<b>RMB</b>	stands for Chinese Renminbi Currency Unit
<b>RMB/t</b>	stands for Chinese Renminbi per material tonne
<b>ROM</b>	stands for run-of-mine, being material as mined before beneficiation
<b>RPM</b>	refers to RungePincockMinarco Ltd or formerly MinarcoMineConsult
<b>Saprolite</b>	is a geological term for weathered bedrock
<b>SG</b>	stands for specific gravity
<b>sq.km or km<sup>2</sup></b>	stands for square kilometre
<b>Strip Ratio</b>	refers to the ratio of the volume of overburden (or waste material) required to be handled in order to extract some tonnage of ore.
<b>t</b>	stands for tonne
<b>t/bcm</b>	stands for tonnes per bank cubic metre (i.e. tonnes in situ) a unit of density
<b>tonne</b>	refers to metric tonne
<b>tpa</b>	stands for tonnes per annum
<b>tpd</b>	stands for tonnes per day



<b>UG</b>	means underground mining which is an opening in the earth accessed via shafts, declines or adits below the land surface to extract minerals
<b>US\$</b>	stands for United States dollars
<b>VM</b>	stands for volatile matter of coal, representing the components of coal, except for moisture, which are liberated at high temperature in the absence of air
<b>Yuan</b>	stands for the currency of People's Republic of China



## APPENDIX B – CERTIFICATE OF QUALIFIED PERSON

I, Weiliang Wang, a director and Professional Geoscientist of Dragon Mining Consulting Limited of Room 2603, 26/F, Tung Wai Commercial Building, 109-111 Gloucester Road, Wanchai, Hong Kong, and am one of the authors of the Technical Report for the Ovoot Tolgoi Coal Mine, South Gobi Province, Mongolia, prepared for SouthGobi Resources Ltd, dated May 15, 2017 (the "Technical Report"), hereby certify that:

1. I am a Certified Professional Geoscientist of the Association of Professional Geoscientists of Ontario, Canada (Registration No. 2121) and a member of the Australasian Institute of Mining & Metallurgy (Registration No. 306476)
2. I graduated with a degree of Bachelor of Science in Geology from China University of Geosciences (Wuhan) in 2001. In addition, I obtained a degree of Master of Science in Geology in 2004 from Peking University and a Doctor of Philosophy in Geology in 2009 from the University of Hong Kong.
3. My relevant experience includes 15 years of field exploration and project evaluation for precious, base metal and coal projects in Canada and internationally. I have been involved with coal exploration and resource estimation since 2009.
4. I am a Qualified Person for the purposes of the National Instrument 43-101 of the Canadian Securities Administrators ("NI 43-101").
5. I visited and inspected the Sunset and Sunrise Coal Fields of the Ovoot Tolgoi Deposit between the dates 7th to 14th April 2017.
6. I am responsible for the preparation and the supervision of Geological Setting and Mineralization (Chapter 7), Deposit Types (Chapter 8), Exploration (Chapter 9), Drilling (Chapter 10), Sample Preparation (Chapter 11), Data Verification (Chapter 12) and Resource Estimation (Chapter 14) of the Technical Report.
7. I am independent of SouthGobi Resources Ltd. in accordance with the application of Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with that instrument and form.
10. That, at the effective date of the Technical Report, to the best of my knowledge, information, and belief, those parts of the Technical Report that I am responsible for, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Toronto, Canada this 15<sup>th</sup> day of May 2017.

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Weiliang Wang, PhD., P.Geol.



## CERTIFICATE OF QUALIFIED PERSON

I, Lin Tao (Vincent) Li, Professional Engineer at Dragon Mining Consulting Limited of Room 2603, 26/F, Tung Wai Commercial Building, 109 - 111 Gloucester Road, Wanchai, Hong Kong, and am one of the authors of the Technical Report for the Ovoot Tolgoi Coal Mine, South Gobi Province, Mongolia, prepared for SouthGobi Resources Ltd., dated May 15, 2017 (the "Technical Report"), hereby certify that:

1. I am a registered Professional Engineer and Geologist of the Association of Professional Engineers and Geoscientists of Alberta (APEGA No. 75174) and Professional Engineer and Professional Geoscientist of the Association of Professional Engineers and Geoscientists of British Columbia, Canada (APEGBC No. 35153).
2. I graduated with a B.Eng. in Coal Geology and Exploration from the University of Xian Science and Technology of China in 1984, post-graduated with Civil Engineering from the University of Xian Architectural Science and Technology of China in 1997, and B.A.T. with Petroleum Engineering of the Southern Alberta Institute of Technology, Canada in 2004.
3. I have been continuously and actively engaged in the exploration, assessment, development, and mine plan of coal and related natural resource development projects since my graduation from university in 1984. I have particular experiences in work with coal exploration and mine development in British Columbia, Canada since 2009.
4. I am a Qualified Person for the purposes of the National Instrument 43-101 of the Canadian Securities Administrators ("NI 43-101").
5. I visited and inspected the Sunset and Sunrise Coal Fields of the Ovoot Tolgoi Deposit between the dates 8th to 19<sup>th</sup> of December 2016.
6. I am responsible for the preparation and the supervision of Summary (Chapter 1), Introduction (Chapter 2), Reliance on Other Experts (Chapter 3), Property Description (Chapter 4), Accessibility and Climate (Chapter 5), History (Chapter 6), Reserve Estimation (Chapter 15), Mining Method (Chapter 16), Project Infrastructures (Chapter 18), Market Studies and Contracts (Chapter 19), Environmental Studies (Chapter 20), Capital Costs and Operating Costs (Chapter 21), Economic Analysis (Chapter 22), Adjacent Properties (Chapter 23), Other Relevant Data and Information (Chapter 24), Interpretation and Conclusion (Chapter 25) and Recommendations (Chapter 26) of the Technical Report in accordance with NI 43-101 for this property.
7. I am independent of SouthGobi Resources Ltd. in accordance with the application of Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property which is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and those parts of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. That at the effective date of the Report, to the best of my knowledge, information and belief, that part of the Technical Report that I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Vancouver, Canada this 15<sup>th</sup> day of May, 2017.

Lin Tao (Vincent) Li, P.Eng., P.Geol.



## CERTIFICATE OF QUALIFIED PERSON

I, Larry (Xiangwen) Li, Professional Engineer with Dragon Mining Consulting Limited of Room 2603, 26/F, Tung Wai Commercial Building, 109-111 Gloucester Road, Wanchai, Hong Kong, and am one of the authors of the Technical Report for the Ovoot Tolgoi Coal Mine, South Gobi Province, Mongolia, prepared for SouthGobi Resources Ltd., dated May 15, 2017 (the "Technical Report"), hereby certify that:

1. I am a registered Professional Engineer of the Association of Professional Engineers and Geoscientists of British Columbia, Canada (APEGBC No. 35190).
2. I graduated with a B.Eng. in Heilongjiang University of Science and Technology of China in 1982, and majored in Mineral Processing.
3. I have been continuously and actively engaged in the coal processing and handling, including the engineering designs, project management and construction, and plant operation at mine site since 1982 in China and 2005 in British Columbia, Canada. I have more than 20 years of experience in work in relation to coal processing and handling.
4. I am a Qualified Person for the purposes of the National Instrument 43-101 of the Canadian Securities Administrators ("NI 43-101").
5. I am responsible for the preparation and the supervision of Mineral Processing and Metallurgical Testing (Chapter 13) and Recovery Methods (Chapter 17) of the Technical Report in accordance with NI 43-101 for this property.
6. I am independent of SouthGobi Resources Ltd. in accordance with the application of Section 1.5 of NI 43-101.
7. I have had no prior involvement with the property which is the subject of the Technical Report.
8. I have read NI 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with that instrument and form.
9. That, at the effective date of the Technical Report, to the best of my knowledge, information, and belief, those parts of the Technical Report that I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Vancouver, Canada this 15<sup>th</sup> day of May, 2017.

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Larry (Xiangwen) Li, P.Eng.





## APPENDIX C – CONSENT OF QUALIFIED PERSONS

I, Weiliang Wang, a director and Professional Geoscientist of Dragon Mining Consulting Limited of Room 2603, 26/F, Tung Wai Commercial Building, 109-111 Gloucester Road, Wanchai, Hong Kong, and am one of the authors of the Technical Report for the Ovoot Tolgoi Coal Mine, South Gobi Province, Mongolia, prepared for SouthGobi Resources Ltd, dated May 15, 2017 (the "Technical Report"), hereby consent to the filing of the Technical Report with any stock exchange or any other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their website and accessible by the public, of the Technical Report.

Dated at Toronto, Canada this 15<sup>th</sup> day of May, 2017.

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Weiliang Wang, PhD., P.Ge.

I, Lin Tao (Vincent) Li, Professional Engineer at Dragon Mining Consulting Limited of Room 2603, 26/F, Tung Wai Commercial Building, 109 - 111 Gloucester Road, Wanchai, Hong Kong, and am one of the authors of the Technical Report for the Ovoot Tolgoi Coal Mine, South Gobi Province, Mongolia, prepared for SouthGobi Resources Ltd., dated May 15, 2017 (the "Technical Report"), hereby consent to the filing of the Technical Report with any stock exchange or any other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their website and accessible by the public, of the Technical Report.

Dated at Vancouver, Canada this 15<sup>th</sup> day of May, 2017.

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Lin Tao (Vincent) Li, P.Eng., P.Ge.



I, Larry (Xiangwen) Li, Professional Engineer with Dragon Mining Consulting Limited of Room 2603, 26/F, Tung Wai Commercial Building, 109-111 Gloucester Road, Wanchai, Hong Kong, and am one of the authors of the Technical Report for the Ovoot Tolgoi Coal Mine, South Gobi Province, Mongolia, prepared for SouthGobi Resources Ltd., dated May 15, 2017 (the "Technical Report"), hereby consent to the filing of the Technical Report with any stock exchange or any other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their website and accessible by the public, of the Technical Report.

Dated at Vancouver, Canada this 15<sup>th</sup> day of May, 2017.

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Larry (Xiangwen) Li, P.Eng.



## APPENDIX D – DETAILED CASHFLOW MODEL

<b>Mine Plan and Production Schedule for 9mtpa</b>																	
Year			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Year	Unit	Data source	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
<b>Production</b>																	
<b>Ovoot Tolgoi Total</b>																	
<b>BCM ('000)</b>		calc.	34,328	44,669	36,697	38,189	41,798	35,671	46,141	30,759	27,655	48,101	31,640	36,295	30,033	12,047	494,025
<b>Waste BCM ('000)</b>		calc.	30,979	38,748	30,634	31,854	35,154	29,328	39,826	24,553	21,175	41,643	25,366	29,972	24,819	8,544	412,595
<b>ROM ('000 tonne)</b>		calc.	<b>4,688</b>	<b>8,290</b>	<b>8,488</b>	<b>8,869</b>	<b>9,302</b>	<b>8,880</b>	<b>8,842</b>	<b>8,689</b>	<b>9,072</b>	<b>9,041</b>	<b>8,784</b>	<b>8,852</b>	<b>7,300</b>	<b>4,905</b>	114,002
ROM A1		calc.	1,986	2,341	2,505	2,437	2,681	3,503	3,211	3,358	3,545	3,233	3,431	2,025	2,065	2,531	38,850
ROM B1		calc.	1,348	3,401	3,585	3,713	3,738	2,970	3,124	3,325	3,403	3,230	3,167	3,304	2,396	1,270	41,974
ROM F1		calc.	1,025	1,776	1,626	1,739	1,737	1,729	1,838	1,414	1,507	1,915	1,555	2,781	2,273	789	23,703
ROM F2		calc.	329	771	772	980	1,147	678	669	592	618	664	630	742	566	314	9,475
<b>Strip ratio</b>		calc.	<b>6.6</b>	<b>4.7</b>	<b>3.6</b>	<b>3.6</b>	<b>3.8</b>	<b>3.3</b>	<b>4.5</b>	<b>2.8</b>	<b>2.3</b>	<b>4.6</b>	<b>2.9</b>	<b>3.4</b>	<b>3.4</b>	<b>1.7</b>	3.6
<b>Mining cost (\$'million)</b>		calc.	<b>107</b>	<b>164</b>	<b>142</b>	<b>154</b>	<b>174</b>	<b>154</b>	<b>190</b>	<b>133</b>	<b>133</b>	<b>216</b>	<b>161</b>	<b>177</b>	<b>151</b>	<b>69</b>	
Unit cost - \$/BCM		QP	<b>3.12</b>	<b>3.68</b>	<b>3.86</b>	<b>4.03</b>	<b>4.17</b>	<b>4.31</b>	<b>4.11</b>	<b>4.31</b>	<b>4.79</b>	<b>4.50</b>	<b>5.09</b>	<b>4.87</b>	<b>5.03</b>	<b>5.76</b>	
Unit cost - \$/ROM		calc.	<b>22.8</b>	<b>19.8</b>	<b>16.7</b>	<b>17.3</b>	<b>18.7</b>	<b>17.3</b>	<b>21.4</b>	<b>15.3</b>	<b>14.6</b>	<b>23.9</b>	<b>18.3</b>	<b>20.0</b>	<b>20.7</b>	<b>14.2</b>	
<b>Sunrise</b>																	
<b>BCM ('000)</b>		QP	23,340	22,570	18,009	19,009	21,499	20,329	22,599	16,072	10,038	28,637	14,535	15,816	14,506	-	246,960
<b>Waste BCM ('000)</b>		QP	22,173	19,534	14,919	15,855	18,107	17,184	19,554	12,833	6,796	25,482	11,198	12,626	12,347	-	208,608

<b>ROM ('000 tonne)</b>	QP	<b>1,634</b>	<b>4,251</b>	<b>4,325</b>	<b>4,415</b>	<b>4,750</b>	<b>4,403</b>	<b>4,264</b>	<b>4,535</b>	<b>4,539</b>	<b>4,416</b>	<b>4,672</b>	<b>4,466</b>	<b>3,023</b>	-	53,693
ROM A1	QP	296	1,075	1,295	1,354	1,572	1,044	939	1,128	1,158	1,074	1,159	834	533	-	13,460
ROM B1	QP	535	1,876	1,979	1,912	1,885	1,770	1,806	2,215	2,246	1,886	2,110	1,584	899	-	22,703
ROM F1	QP	680	983	726	730	738	1,217	1,177	833	798	1,046	989	1,778	1,411	-	13,105
ROM F2	QP	124	317	326	419	556	371	342	359	337	411	414	270	180	-	4,424
<b>Strip ratio</b>	QP	<b>13.57</b>	<b>4.60</b>	<b>3.45</b>	<b>3.59</b>	<b>3.81</b>	<b>3.90</b>	<b>4.59</b>	<b>2.83</b>	<b>1.50</b>	<b>5.77</b>	<b>2.40</b>	<b>2.83</b>	<b>4.08</b>	-	3.9

### Sunset

<b>BCM ('000)</b>	QP	10,988	22,099	18,688	19,181	20,298	15,342	23,542	14,687	17,617	19,464	17,106	20,479	15,527	12,047	247,065
<b>Waste BCM ('000)</b>	QP	8,806	19,214	15,715	15,999	17,047	12,144	20,272	11,720	14,380	16,161	14,169	17,346	12,472	8,544	203,987
<b>ROM ('000 tonne)</b>	QP	<b>3,054</b>	<b>4,039</b>	<b>4,163</b>	<b>4,454</b>	<b>4,552</b>	<b>4,477</b>	<b>4,578</b>	<b>4,154</b>	<b>4,533</b>	<b>4,625</b>	<b>4,112</b>	<b>4,386</b>	<b>4,277</b>	<b>4,905</b>	60,309
ROM A1	QP	1,690	1,266	1,210	1,083	1,109	2,459	2,272	2,230	2,388	2,159	2,272	1,191	1,532	2,531	25,390
ROM B1	QP	814	1,525	1,606	1,801	1,853	1,199	1,318	1,110	1,157	1,344	1,057	1,720	1,497	1,270	19,271
ROM F1	QP	346	793	900	1,009	999	511	661	581	708	869	566	1,002	863	789	10,598
ROM F2	QP	205	455	446	562	591	308	327	233	280	253	217	472	386	314	5,050
<b>Strip ratio</b>	QP	<b>2.88</b>	<b>4.76</b>	<b>3.78</b>	<b>3.59</b>	<b>3.74</b>	<b>2.71</b>	<b>4.43</b>	<b>2.82</b>	<b>3.17</b>	<b>3.49</b>	<b>3.45</b>	<b>3.95</b>	<b>2.92</b>	<b>1.74</b>	3.4

### Processing

#### Coal Production - by ROM type ('000 tonne)

ROM A1	1,986	2,341	2,505	2,437	2,681	3,503	3,211	3,358	3,545	3,233	3,431	2,025	2,065	2,531	38,850
ROM B1	1,348	3,401	3,585	3,713	3,738	2,970	3,124	3,325	3,403	3,230	3,167	3,304	2,396	1,270	41,974
ROM F1	1,025	1,776	1,626	1,739	1,737	1,729	1,838	1,414	1,507	1,915	1,555	2,781	2,273	789	23,703
ROM F2	329	771	772	980	1,147	678	669	592	618	664	630	742	566	314	9,475
<b>Total</b>	<b>4,688</b>	<b>8,290</b>	<b>8,488</b>	<b>8,869</b>	<b>9,302</b>	<b>8,880</b>	<b>8,842</b>	<b>8,689</b>	<b>9,072</b>	<b>9,041</b>	<b>8,784</b>	<b>8,852</b>	<b>7,300</b>	<b>4,905</b>	114,002

<b>Washing capacity - wet</b>			('000 tonne)	-	2,200	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	
No. of set of washing unit				2	2	4	4	4	4	4	4	4	4	4	4	4	
CAPEX	\$' million	SGR		2.0	3.0	-	-	-	-	-	-	-	-	-	-	-	
<b>Screening Capacity - Rotary Breaker and Mobile Screen</b>			('000 tonne)	5,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	
CAPEX	\$' million	SGR		2.0	2.0	-	-	-	-	-	-	-	-	-	-	-	
<b>From ROM A1 to Product SC (screening)</b>																	
ROM A1	('000 tonne)			-	2,341	2,505	2,437	2,681	3,503	3,211	3,358	3,545	3,233	3,431	2,025	2,065	2,531
Processing yield		QP			98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
Product SC	('000 tonne)			-	2,283	2,442	2,376	2,614	3,416	3,131	3,274	3,457	3,152	3,346	1,975	2,013	2,468
<b>From ROM B1 to Product SC (by wet washing)</b>																	
<b>Sunset</b>																	
ROM B1	('000 tonne)			-	1,525	1,606	1,801	1,853	1,199	1,318	1,110	1,157	1,344	1,057	1,720	1,497	1,270
Washing Yield		QP		75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Product SC	('000 tonne)			-	1,144	1,205	1,351	1,390	899	989	833	867	1,008	793	1,290	1,123	953
Washing Yield - middlings		QP		10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Product TC - middlings	('000 tonne)			-	153	161	180	185	120	132	111	116	134	106	172	150	127
<b>From ROM B1 to Product SC (by wet washing)</b>																	
<b>Sunrise</b>																	
ROM B1	('000 tonne)			-	675	1,979	1,912	1,885	1,770	1,806	2,215	2,246	1,886	2,110	1,584	899	-

Washing Yield		QP	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Product SC	('000 tonne)		-	439	1,286	1,243	1,225	1,151	1,174	1,440	1,460	1,226	1,371	1,029	585	-
Washing Yield - middlings		QP	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Product TC - middlings	('000 tonne)		-	88	257	249	245	230	235	288	292	245	274	206	117	-

**From ROM F1 to Product J (screening)**

ROM F1	('000 tonne)		1,025	1,776	1,626	1,739	1,737	1,729	1,838	1,414	1,507	1,915	1,555	2,781	2,273	789
Processing yield		QP	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Product J1	('000 tonne)		666	1,154	1,057	1,130	1,129	1,124	1,194	919	979	1,245	1,011	1,807	1,478	513

**From ROM F2 to Product J (screening)**

ROM F2	('000 tonne)		329	771	772	980	1,147	678	669	592	618	664	630	742	566	314
Processing yield		QP	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
Product J2	('000 tonne)		181	424	425	539	631	373	368	326	340	365	347	408	311	173

CV of Product J1	Kcal	QP	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
CV of Product J2	Kcal	QP	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500
Average CV of Product J	Kcal	calc	5,893	5,866	5,857	5,839	5,821	5,875	5,882	5,869	5,871	5,887	5,872	5,908	5,913	5,874

**Product Mix - by product type**

Product SC	('000 tonne)		1,986	3,865	4,933	4,970	5,228	5,466	5,293	5,546	5,784	5,385	5,510	4,294	3,720	3,420	65,400
Product TC	('000 tonne)		1,348	1,442	418	429	430	350	367	399	408	380	380	378	267	127	7,121
Product J	('000 tonne)		848	1,579	1,482	1,669	1,760	1,497	1,562	1,245	1,319	1,610	1,358	2,216	1,789	686	20,618
TOTAL	('000 tonne)		4,181	6,885	6,832	7,068	7,418	7,312	7,222	7,190	7,511	7,375	7,247	6,888	5,776	4,233	93,139

### Processing Cost

#### Wet washing

ROM feed volume	('000 tonne)		-	2,200	3,585	3,713	3,738	2,970	3,124	3,325	3,403	3,230	3,167	3,304	2,396	1,270
Unit cost	USD/ROM feed	QP	4.00	4.08	4.14	4.20	4.27	4.33	4.40	4.46	4.53	4.60	4.67	4.74	4.74	4.81
Wet washing cost	USD' million	Calc.	-	8.98	14.85	15.61	15.95	12.86	13.73	14.83	15.41	14.84	14.77	15.64	11.35	6.10

#### Screening

ROM feed volume	('000 tonne)		1,355	4,888	4,903	5,156	5,564	5,910	5,718	5,364	5,670	5,811	5,617	5,548	4,904	3,634
Unit cost	USD/ROM feed	QP	3.00	3.06	3.12	3.18	3.25	3.31	3.38	3.45	3.51	3.59	3.66	3.73	3.73	3.80
Dry processing cost	USD' million	Calc.	4.06	14.96	15.30	16.41	18.07	19.58	19.32	18.48	19.93	20.84	20.54	20.70	18.29	13.83

### Sales

#### Sales Mix

Product SC	('000 tonne)	1,986	3,865	4,933	4,970	5,228	5,466	5,293	5,546	5,784	5,385	5,510	4,294	3,720	3,420	65,400
Product TC	('000 tonne)	1,348	1,442	418	429	430	350	367	399	408	380	380	378	267	127	7,121
Product J	('000 tonne)	848	1,579	1,482	1,669	1,760	1,497	1,562	1,245	1,319	1,610	1,358	2,216	1,789	686	20,618
TOTAL	('000 tonne)	4,181	6,885	6,832	7,068	7,418	7,312	7,222	7,190	7,511	7,375	7,247	6,888	5,776	4,233	93,139

#### Price Forecast - Western Market/Jiayuguan

##### Market Price in RMB/tonne, mine-gate basis

Product SC	RMB/tonne	Fenwei	353	370	387	402	417	433	450	467	485	500	515	531	547	564
Product TC	RMB/tonne	Fenwei	175	182	189	194	199	205	211	216	224	230	237	244	251	259
Product J	RMB/tonne	Fenwei	129	134	139	143	147	152	156	161	166	171	177	182	188	194

**Market Price in USD/tonne, mine-gate basis**

Product SC	USD/tonne	calc.	50.4	52.8	55.3	57.4	59.6	61.9	64.2	66.7	69.3	71.5	73.6	75.9	78.2	80.6
Product TC	USD/tonne	calc.	25.1	26.0	27.0	27.7	28.4	29.3	30.1	30.9	31.9	32.9	33.8	34.8	35.9	36.9
Product J	USD/tonne	calc.	18.4	19.2	19.9	20.5	21.0	21.7	22.3	22.9	23.7	24.5	25.2	26.0	26.8	27.7

**Price Forecast - Eastern Market/Wuhai**

**Market Price in RMB/tonne - mine-gate basis**

Product SC	RMB/tonne	Fenwei	291	307	323	337	350	363	378	392	408	421	434	448	462	477
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**Market Price in USD/tonne, mine-gate basis**

Product SC	USD/tonne	calc.	41.6	43.9	46.1	48.1	50.0	51.9	53.9	56.1	58.2	60.1	62.0	64.0	66.1	68.2
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**Sales Allocation by Market**

Product SC

Western China market	SQR	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Eastern China market	SQR	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Sub-total		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Product TC

Western China market	SQR	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Eastern China market	SQR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sub-total		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Product J

Western China market	SQR	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
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Eastern China market	SQR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sub-total		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

### Revenue by Products

Product SC	USD/tonne	calc.	46.0	48.3	50.7	52.7	54.8	56.9	59.1	61.4	63.8	65.8	67.8	70.0	72.1	74.4
Product TC	USD/tonne	calc.	25.1	26.0	27.0	27.7	28.4	29.3	30.1	30.9	31.9	32.9	33.8	34.8	35.9	36.9
Product J	USD/tonne	calc.	18.4	19.2	19.9	20.5	21.0	21.7	22.3	22.9	23.7	24.5	25.2	26.0	26.8	27.7

<b>Sales proceeds</b>	US\$' million		140.74	254.64	290.95	308.12	335.59	353.65	358.63	381.24	413.30	406.13	420.89	371.20	325.89	278.02
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### Royalty and Mongolian custom duty (\$'million)

Logistics cost from mine-site to Ceke border (excl. custom clearance and other costs)	\$/tonne	SQR	5.7	5.8	5.9	6.0	6.1	6.2	6.2	6.3	6.4	6.5	6.6	6.7	6.7	6.8
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### Reference price for royalty calc.

Product SC/A	\$/tonne		52	54	57	59	61	63	65	68	70	72	74	77	79	81
Product TC/B	\$/tonne		31	32	33	34	35	35	36	37	38	39	40	42	43	44
Product J	\$/tonne		24	25	26	26	27	28	29	29	30	31	32	33	34	34

### Royalty rate

Product SC/A		SQR	7%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Product TC/B		SQR	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Product J		SQR	6%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%

Royalty	US\$' million		10.90	14.40	15.93	16.78	18.22	19.22	19.43	20.76	22.44	21.87	22.74	19.58	17.15	14.93
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Unit custom rate	US\$/tonne	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71	0.71	0.72
Custom duty	US\$ million	2.51	4.19	4.22	4.43	4.72	4.73	4.74	4.79	5.08	5.06	5.05	4.87	4.08	3.04
<b>Taxation</b>															
EBITDA	US\$ million	7	38	89	91	94	133	101	178	206	115	185	121	111	158
Less: depreciation allowance	US\$ million	(40)	(40)	(40)	(40)	(40)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)	(20)
less: intercompany charge (10% on intercompany loan)	US\$ million														
Taxable profit	US\$ million	(33)	(2)	49	51	54	113	81	158	186	95	165	101	91	138
less: utilisation of unused tax loss	US\$ million	-	-	(33)	-										
Net taxable profit	US\$ million	(33)	(2)	16	51	54	113	81	158	186	95	165	101	91	138
Mongolian profit tax rate	US\$ million	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Mongolian Profit tax	US\$ million	-	-	4	13	13	28	20	40	47	24	41	25	23	34
<b>Macroeconomic</b>															
RMB/USD		7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
China inflation		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
US inflation		1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
China inflation - Accumulator		102.0%	104.0%	106.1%	108.2%	110.4%	112.6%	114.9%	117.2%	119.5%	121.9%	124.3%	126.8%	126.8%	129.4%
US inflation - Accumulator		101.5%	103.0%	104.6%	106.1%	107.7%	109.3%	111.0%	112.6%	114.3%	116.1%	117.8%	119.6%	119.6%	121.4%

## NPV of the Ovoot Tolgoi Coal Mine

in US' million

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Net sales proceeds	127	236	271	287	313	330	334	356	386	379	393	347	305	260
less: Mining cost	(107)	(164)	(142)	(154)	(174)	(154)	(190)	(133)	(133)	(216)	(161)	(177)	(151)	(69)
less: Coal processing cost	(4)	(24)	(30)	(32)	(34)	(32)	(33)	(33)	(35)	(36)	(35)	(36)	(30)	(20)
less: Exploration	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(3)
less: Overhead	(8)	(8)	(8)	(8)	(9)	(9)	(9)	(9)	(9)	(10)	(10)	(10)	(10)	(10)
<b>EBITDA</b>	<b>7</b>	<b>38</b>	<b>89</b>	<b>91</b>	<b>94</b>	<b>133</b>	<b>101</b>	<b>178</b>	<b>206</b>	<b>115</b>	<b>185</b>	<b>121</b>	<b>111</b>	<b>158</b>
less: Tax	-	-	(4)	(13)	(13)	(28)	(20)	(40)	(47)	(24)	(41)	(25)	(23)	(34)
less: Capex	(15)	(24)	(17)	(19)	(21)	(19)	(22)	(17)	(17)	(25)	(20)	(21)	(18)	(9)
<b>Cash flow</b>	<b>(8)</b>	<b>14</b>	<b>68</b>	<b>59</b>	<b>59</b>	<b>86</b>	<b>58</b>	<b>122</b>	<b>143</b>	<b>66</b>	<b>124</b>	<b>75</b>	<b>70</b>	<b>114</b>
Discount factor	93%	81%	71%	61%	53%	46%	40%	35%	30%	27%	23%	20%	17%	15%
<b>Discounted cash flow</b>	<b>(7)</b>	<b>11</b>	<b>48</b>	<b>36</b>	<b>32</b>	<b>40</b>	<b>23</b>	<b>43</b>	<b>44</b>	<b>18</b>	<b>29</b>	<b>15</b>	<b>12</b>	<b>17</b>
<b>NPV</b>	<b>360</b>													
Discount rate	15.0%													