

**OYU TOLGOI MINE  
PROJECT**



**IESC REPORT**



**Desktop Audit: May 2019**





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**TABLE OF CONTENTS**

	<u>Pag.</u>
<b>TABLES</b>	<b>4</b>
<b>FIGURES</b>	<b>4</b>
<b>ACRONYMS</b>	<b>5</b>
<b>EXECUTIVE SUMMARY</b>	<b>8</b>
<b>1 INTRODUCTION</b>	<b>15</b>
<b>2 PROJECT OVERVIEW</b>	<b>16</b>
<b>2.1 CONSTRUCTION AND OPERATIONS STATUS</b>	<b>16</b>
<b>2.2 REPORT ORGANIZATION</b>	<b>16</b>
<b>3 ISSUES TABLE</b>	<b>18</b>
<b>4 HEALTH, SAFETY, ENVIRONMENT AND SOCIAL PERFORMANCE MANAGEMENT SYSTEMS</b>	<b>24</b>
<b>4.1 OBSERVATIONS</b>	<b>24</b>
4.1.1 Status of Operational Management Plans	24
4.1.2 Management of Change	24
<b>4.2 RECOMMENDATIONS</b>	<b>25</b>
<b>5 ENVIRONMENT</b>	<b>26</b>
<b>5.1 WATER AND WASTEWATER MANAGEMENT</b>	<b>26</b>
5.1.1 Project Strategy	26
5.1.2 Results of Current Audit	26
5.1.2.1 Precipitation Trends	26
5.1.2.2 Undai River Diversion System Performance	27
5.1.2.3 Undai River Diversion Analysis	32
5.1.2.4 Water Use in the South Gobi	32
5.1.2.5 OT Water Usage and Conservation	33
5.1.2.6 Water Monitoring	33
5.1.2.7 TSF Seepage	35
5.1.2.8 On-going Sealing of Exploration Bores	37
5.1.2.9 Erosion and Sedimentation Studies	37
5.1.2.10 Wastewater Treatment and Potable Water	37
5.1.3 Recommendations	38
<b>5.2 MINERAL WASTE MANAGEMENT</b>	<b>38</b>
5.2.1 Project Strategy	38
5.2.2 Results of Current Audit	39
5.2.2.1 Underground and Open Pit Mine Waste Rock	39
5.2.2.2 WRD Reclamation Planning	39
5.2.2.3 TSF Construction	39
5.2.2.4 TSF Operation and Monitoring	40
5.2.3 Recommendations	41
<b>5.3 NON-MINERAL WASTE MANAGEMENT</b>	<b>41</b>
5.3.1 Project Strategy	41
5.3.2 Results of Current Audit	41
5.3.3 Recommendations	42
<b>5.4 HAZARDOUS MATERIALS MANAGEMENT AND POLLUTION PREVENTION</b>	<b>43</b>
5.4.1 Project Strategy	43
5.4.2 Results of Current Audit	43

5.4.3	Recommendations	44
<b>5.5</b>	<b>AIR QUALITY</b>	<b>44</b>
5.5.1	Project Strategy	44
5.5.2	Results of Current Audit	44
5.5.2.1	Ambient Air Quality	44
5.5.2.2	Dust Control at the COS Facility	45
5.5.2.3	Stack Emission Quality	46
5.5.2.4	Greenhouse Gas Accounting and Energy Efficiency	48
5.5.3	Recommendations	48
<b>5.6</b>	<b>NOISE AND VIBRATION</b>	<b>49</b>
5.6.1	Results of Current Audit	49
5.6.2	Recommendations	49
<b>5.7</b>	<b>EMERGENCY PREPAREDNESS &amp; RESPONSE</b>	<b>49</b>
5.7.1	Project Strategy	49
5.7.2	Results of Current Audit	49
5.7.2.1	Business Resilience and Emergency Response Procedures	49
5.7.2.2	Underground	50
5.7.2.3	Tailings Storage Facility	50
5.7.2.4	Emergency Response Training, Incidents, and Inspection	50
5.7.2.5	Staffing and Resources	50
5.7.3	Recommendations	51
<b>5.8</b>	<b>TRANSPORT MANAGEMENT</b>	<b>51</b>
5.8.1	Project Strategy	51
5.8.2	Results of Current Audit	51
5.8.2.1	Transport Service Providers	51
5.8.2.2	Risk Analysis and Management	52
5.8.2.3	Traffic Incidents, Monitoring and Training Exercises	52
5.8.3	Recommendations	52
<b>5.9</b>	<b>BIODIVERSITY AND ECOLOGICAL MANAGEMENT</b>	<b>52</b>
5.9.1	Project Strategy	52
5.9.2	Results of Current Audit	53
5.9.2.1	Managing Impacts Associated with Power Lines	53
5.9.2.2	Stakeholder Engagement	53
5.9.2.3	Land Disturbance Control and Land Rehabilitation	55
5.9.2.4	Rehabilitation	57
5.9.2.5	Managing Impacts related to Traffic and Transport	58
5.9.2.6	Managing Pollution Impacts	59
5.9.2.7	NPI and Offsets Management Plan	59
5.9.2.8	Biodiversity Monitoring	62
5.9.2.9	Ecosystem Services	63
5.9.2.10	Resources and Staffing	64
5.9.3	Recommendations	65
<b>6</b>	<b>SOCIAL</b>	<b>66</b>
<b>6.1</b>	<b>SCOPE OF SOCIAL REVIEW FOR THIS AUDIT</b>	<b>66</b>
<b>6.2</b>	<b>LABOUR &amp; WORKING CONDITIONS</b>	<b>66</b>
6.2.1	Project Strategy	66
6.2.2	Results of Current Audit	66
6.2.2.1	Recruitment and Manpower	66

6.2.2.2	Management of Worker Relations	67
6.2.2.3	Worker Accommodation	67
6.2.3	Recommendations	67
<b>6.3</b>	<b>RESETTLEMENT, COMPENSATION AND LIVELIHOODS IMPROVEMENT</b>	<b>68</b>
6.3.1	Project Strategy	68
6.3.2	Results of Current Audit	68
6.3.2.1	Economically Displaced Herders	68
6.3.2.2	Pastureland and Livelihood Improvement	69
6.3.2.3	Vulnerable Displaced People	69
6.3.3	Recommendations	69
<b>6.4</b>	<b>STAKEHOLDER ENGAGEMENT</b>	<b>69</b>
6.4.1	Project Strategy	69
6.4.2	Results of Current Audit	69
6.4.2.1	Community Engagement	69
6.4.2.2	Information Disclosure	70
6.4.2.3	Community Grievances	70
6.4.2.4	Tripartite Council and CAO	71
6.4.2.5	Participatory Environmental Monitoring	71
6.4.3	Recommendations	72
<b>6.5</b>	<b>REGIONAL AND COMMUNITY DEVELOPMENT</b>	<b>72</b>
6.5.1	Project Strategy	72
6.5.2	Results of Current Audit	72
6.5.2.1	Cooperation Agreement (CA)	72
6.5.2.2	Induced In-Migration	73
6.5.3	Recommendations	73
<b>7</b>	<b>HEALTH AND SAFETY</b>	<b>74</b>
<b>7.1</b>	<b>WORKER HEALTH</b>	<b>74</b>
7.1.1	Project Strategy	74
7.1.2	Results of Current Audit	74
7.1.3	Recommendations	75
<b>7.2</b>	<b>COMMUNITY HEALTH</b>	<b>75</b>
7.2.1	Project Strategy	75
7.2.2	Results of Current Audit	75
7.2.3	Recommendations	75
<b>7.3</b>	<b>WORKER SAFETY</b>	<b>75</b>
7.3.1	Project Strategy	75
7.3.2	Results of Current Audit	76
7.3.3	Recommendations	79
<b>7.4</b>	<b>COMMUNITY SAFETY</b>	<b>79</b>
7.4.1	Project Strategy	79
7.4.2	Results of Current Audit	79
7.4.3	Recommendations	79
<b>8</b>	<b>CULTURAL HERITAGE</b>	<b>80</b>
<b>8.1</b>	<b>PROJECT STRATEGY</b>	<b>80</b>
<b>8.2</b>	<b>RESULTS OF CURRENT AUDIT</b>	<b>80</b>
<b>8.3</b>	<b>RECOMMENDATIONS</b>	<b>80</b>

**TABLES**

Table 3.1:	Issues Table	19
Table 3.2:	Status of Non-Conformances Identified by the IESC	23
Table 4.1:	Status of Project Notice of Change since the Last IESC Audit	24
Table 5.1:	General Water Quality of Original Bor Ovoo Spring relative to new Bor Ovoo Spring	31
Table 5.2:	December 2017 and March to May 2019 Dust Monitoring Results at COS (mg/m <sup>3</sup> )	46
Table 5.3:	Stack Emission Sampling Results – CHP	47

**FIGURES**

Figure 5.1:	Rainfall in mm at OT Weather Station from 2010 – 2018 (Note 2018 Value slightly Lower than 217 mm recorded through Year End)	26
Figure 5.2:	Rates of diverted Groundwater Flow from May 2014 – May 2019	27
Figure 5.3:	Surface Area over Time of new Bor Ovoo Spring (2013 - Present). Note Growth of Spring in Response to flood Events in Orange	28
Figure 5.4:	Undai River Monitoring Program below Southern cut-off dam. Surface Flow diversion Channel entering from the West.	29
Figure 5.5:	OMB11-45 - Water Level Data (May 2012 - December 2017)	30
Figure 5.6:	Water Level Data from OTMB 11-22 located 5 km below MLA	31
Figure 5.7:	Budagt Spring from 2017 (Left) and 2018 (Right, Post Flooding)	32
Figure 5.8:	Replacement Budagt Spring Monitoring Station	35
Figure 5.9:	Location of Seepages at TSF	36
Figure 5.10:	Waste Recycled in 2018	42
Figure 5.11:	New Chemical Storage Facility at Concentrator	43
Figure 5.12:	Measured SO <sub>2</sub> in Ambient Air (mg/m <sup>3</sup> )	45
Figure 5.13:	Installed Dust Curtains at the Coarse Ore Storage Facility	46
Figure 5.14:	Installed Continuous Emission Monitoring System at CHP	48
Figure 5.15:	Evidences of OT Public Events and Advertising Boards	54
Figure 6.1:	Topics in Community Newsletters (2018-19) (Source: OT, June 2019)	70
Figure 6.2:	(A) Status of agreed Actions at TPC, and (B) Status of Herder Claims (Source: OT, Jun-19)	71
Figure 6.3:	Khanbogd in- and out-migration (Sep-18 to Apr-19) (Source: OT CSP, Jun-2019)	73
Figure 7.1:	Potential Fatal Incident by Critical Risk – 12 Month Rolling Tabulation (Apr. 18 – Mar. 19) (Source: OT HSESC Monthly Report, March-2019)	77
Figure 7.2:	2018 Lost Time Incidents and Medical Treatment Case Incidents for Operations and Underground (Source: 2018 OT Environmental and Social Annual Report)	78
Figure 7.3:	All Injuries Frequency Rate 12-Month rolling Tabulation (Source: OT HSESC Monthly Report, March-2019)	78

## ACRONYMS

<b>AEMP</b>	Atmospheric Emissions Management Plan
<b>AESR</b>	Annual Environmental & Social Report
<b>AQMP</b>	Air Quality Monitoring Plan
<b>ARD</b>	Acid Rock Drainage
<b>ARFFT</b>	Aircraft Rescue and Firefighting Team
<b>BAP</b>	Biodiversity Action Plan
<b>BAT</b>	Best Available Technologies
<b>BIG</b>	Business Innovation Growth Centre
<b>BMEP</b>	Biodiversity Monitoring and Evaluation Programme
<b>BMP</b>	Biodiversity Management Plan
<b>BRMP</b>	Business Resilience Management Plan
<b>CA</b>	Cooperation Agreement
<b>CAO</b>	Compliance Advisor Ombudsman
<b>CBM</b>	Core Biodiversity Monitoring
<b>CCC</b>	Compensation Claim Committee
<b>CCFV</b>	Critical Control Field Verification
<b>CCV</b>	Critical Control Verifications
<b>CEMS</b>	Continuous Emissions Monitoring System
<b>CEO</b>	Chief Executive Officer
<b>CH</b>	Cultural Heritage
<b>CHMP</b>	Cultural Heritage Management Plan
<b>CHMS</b>	Cultural Heritage Management System
<b>CHP</b>	Central Heating Plant
<b>CHSSMP</b>	Community Health, Safety & Security Management Plan
<b>CIC</b>	Community Interaction Centre
<b>COS</b>	Coarse Ore Stockpile
<b>CQA</b>	Construction Quality Assurance
<b>CRM</b>	Critical Risk Management
<b>CSE</b>	Community and Stakeholder Engagement
<b>CSP</b>	Communities and Social Performance
<b>CSP MS</b>	Communities and Social Performance Management System
<b>DSF</b>	Development Support Fund
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>EC</b>	Electrical Conductivity
<b>ECAs</b>	Export Credit Agencies
<b>EDC</b>	Export Development Canada
<b>EFIC</b>	Export Finance and Insurance Corporation
<b>EHT</b>	Elected Herder Team
<b>EPRP</b>	Emergency Preparedness and Response Plan
<b>ERP</b>	Emergency Response Plan
<b>ERPr</b>	Emergency Response Procedure
<b>ERT</b>	Emergency Response Team
<b>ESAP</b>	Environment and Social Action Plan
<b>ESIA</b>	Environmental and Social Impact Assessment
<b>ESMEP</b>	Ecosystem Services Monitoring and Evaluation Plan
<b>ESMP</b>	Environmental and Social Management Plan

## OYU TOLGOI MINE PROJECT

<b>GH</b>	Gunii Hooloi
<b>GHGs</b>	Greenhouse Gas Emissions
<b>GIIP</b>	Good International Industry Practice
<b>HDP</b>	Household Development Plan
<b>HR</b>	Human Resources
<b>HSE</b>	Health, Safety and Environment
<b>HSEC</b>	Health, Safety, Environment and Community
<b>HSEC MS</b>	Health, Safety, Environment and Community Management System
<b>HSESC</b>	Health, Safety, Environment, Security and Communities
<b>IEP</b>	Independent Expert Panel
<b>IESC</b>	Independent Environmental and Social Consultant
<b>IFC</b>	International Finance Corporation
<b>IFIs</b>	International Financial Institutions
<b>IMP</b>	In-migration Management Plan
<b>ITRT</b>	Independent Technical Review Team
<b>IWRC</b>	Interim Waste Recycling Center
<b>KBWMC</b>	Khanbogd Waste Management Center
<b>KPI</b>	Key Performance Indicator
<b>LBAP</b>	Lender Biodiversity Action Plan
<b>LDCRMP</b>	Land Disturbance Control and Rehabilitation Management Plan
<b>LDP</b>	Land Disturbance Permit
<b>LMP</b>	Labour Management Plan
<b>MEGD</b>	Ministry of Environment and Green Development
<b>MIGA</b>	Multi-lateral Guarantee Agency
<b>MLA</b>	Mine License Area
<b>MoC</b>	Management of Change
<b>MUST</b>	Mongolian University of Science and Technology
<b>MWMP</b>	Mineral Waste Management Plan
<b>NAF</b>	Non-acid forming
<b>NNL</b>	No Net Loss
<b>NoC</b>	Notice of Change
<b>NPI</b>	Net Positive Impact
<b>NPPC</b>	Native Plant Propagation Centre
<b>NVMP</b>	Noise and Vibration Management Plan
<b>OMP</b>	Operations Management Plans
<b>OT</b>	Oyu Tolgoi
<b>OT-GS</b>	Oyu Tolgoi – Gashuun-Sukhait
<b>OT-KB</b>	Oyu Tolgoi – Khanbogd
<b>PAF</b>	Potentially acid forming
<b>PEM</b>	Participatory Environmental Monitoring
<b>PLIMP</b>	Pastureland and Livelihoods Improvement Management Plan
<b>PR</b>	Performance Requirement
<b>PS</b>	Performance Standard
<b>RAP</b>	Resettlement Action Plan
<b>RO</b>	Reverse Osmosis
<b>RT</b>	Rio Tinto
<b>RTBS</b>	Rio Tinto Business Solutions



<b>SC</b>	Standard Chartered Bank
<b>SCP</b>	Sustainable Cashmere Project
<b>SEP</b>	Stakeholder Engagement Plan
<b>SGSPA</b>	South Gobi Strictly Protected Area
<b>SLST</b>	Sustainable Livelihood Support Training
<b>SMART</b>	Spatial Modeling and Reporting Tool
<b>SOW</b>	Scope of Work
<b>TARP</b>	Target / Action / Response Plan
<b>TDS</b>	Total Dissolved Solid
<b>TMP</b>	Transport Management Plan
<b>TPC</b>	Tripartite Council
<b>TPD</b>	Tonnes per day
<b>TSF</b>	Tailings Storage Facility
<b>UG</b>	Underground
<b>US EXIM</b>	Export-Import Bank of the United States
<b>VCP</b>	Voluntary Code of Practice
<b>WCS</b>	Wildlife Conservation Society
<b>WMC</b>	Waste Management Centre
<b>WMP</b>	Water Monitoring Plan
<b>WRD</b>	Waste Rock Dump
<b>WRMP</b>	Water Resources Management Plan
<b>WSCC</b>	Wildlife Science and Conservation Center

## EXECUTIVE SUMMARY

This report details the findings of the IESC during the May 2019 audit conducted as a desk-top review. This included review of documentation provided in a data room and teleconferences with OT site and UB office personnel held between the 27<sup>th</sup> May and 3<sup>rd</sup> June, 2019.

OT has recently submitted scoping-level documentation for a planned coal-fired power plant to be located 135 km northwest of the OT site and near the Ukhaa Khudag coal mine (*Scoping Report – Tavan Tolgoi Power Plant ESIA Scoping Report*, June, 2019). The construction of the power plant included as part of the Investment Agreement between OT and the Government of Mongolia. The ESIA for that project should be completed by the end of 2019 and will be addressed by the IESC separately.

The scope of this audit was to review recent environmental, social, health and safety documentation/data associated with current OT Project operations, to highlight any impacts/incidents reported by the Project since the last IESC site visit, and to assess whether established mitigation measures are being implemented as required by management plan commitments. A total of four non-conformances were identified in this review – these included one Class I non-conformance related to Water Resources; two Class I non-conformances related to Air Quality; and one Class II non-conformance related to Biodiversity.

The main observations of this desk-top exercise are summarized as follows:

### ***Environmental and Social Management System***

The Environmental and Social Management System provides for administering the project and meeting the Project Standards, the laws and regulations of Mongolia, permit conditions, the Investment Agreement of 6 October 2009, as well as the environmental, health & safety and social policies, standards and requirements of the IFC and EBRD. The management system and associated Environmental and Social Management Plan (ESMP) include planning, operations, reporting checks, and review elements with a focus on continual improvement. Specific operating plans define the project commitments, key performance indicators and monitoring parameters, and reference specific implementation documents. Also included in the system is a Management of Change (MoC) process, which has been implemented by the Project to address modifications of project plans and commitments. The ESMP was updated in March 2019 to reflect changes in organization structure and updates of laws, regulations, and project standards.

### ***Water and Wastewater Management***

There were multiple significant rain events in Q2 and Q3 of 2018 and total precipitation for calendar 2018 was almost 217 mm, the highest annual total recorded at the OT weather station. This resulted in flooding and the first significant flood event testing the Undai River Diversion system. Undai River Diversion has performed as expected with significant recharge to Undai River alluvials and springs in the region. Water levels in alluvial monitoring bores indicate stable or rising depths to groundwater. Significant erosion has occurred at the confluence of the Diversion with the Undai River channel, and further downstream. The Undai River system naturally changes morphology in response to episodic flood events. The Khukh Khad, Budagt, Buural and Maanti springs down gradient of the OT site were impacted and some spring monitoring points along the Undai River channel were eroded. These monitoring points have been replaced with more fixed positions.

OT withdrew 14.4 million m<sup>3</sup> of water from the GH aquifer in calendar year 2018 (39,452 m<sup>3</sup>/day). Total 2018 overall usage is less than 50% of the permitted amount approved by the Ministry of Environment under a Long-Term Water Contract. OT target raw water usage rate is 696 L/s (60,480 m<sup>3</sup>/day). The Project has been below this target pumping rate since the beginning of operations with average consumption rate in 2018 of 460 L/s. In 2018 OT achieved an 87.7% water recycling efficiency rate.

In 2017, OT achieved a production ratio of 380 L of water consumed/ton of ore processed. This value is well below the target of 550 L/ton-ore and well less than half of the global average usage rate of 1,220 L/ton-ore. Steady improvements in this important metric are primarily related to more effective beaching inside the TSF and on-going efficiency modifications in the process recycling circuit.

Currently the OT internal water monitoring program encompasses a total of 389 points including 292 monitoring wells/boreholes, 86 herder wells and 11 natural springs. This monitoring network includes locations in the Khanbogd, Manlai and Tsogttsetsii *soums* of Ömnögovi *aimag*. Within this program there a total of 35 water monitoring points along the Undai Diversion, including 14 boreholes, 17 drive points, 3 springs and 1 herder well. No direct or indirect OT Project impacts to herder wells or natural springs have been identified in Environment department analysis. OT regularly reports to stakeholders on E&S data including water usage and dust monitoring data through its monthly community newsletter, where for example, 6 of the last 7 editions included reporting on

these indicators. The Participatory Environmental Monitoring (PEM) program is run by the NGO Munkh Nagoon Galba, addressed in the social section of this report.

Treated effluent from the Manlai 1 and Manlai 2 WWTPs show ammonia exceedences of the Project Standard. COD and BOD values were also elevated over Project Standards at the Manlai 2 WWTP. The project suspects that input from septic tanks may be causing these exceedences, and a modification has been made in procedure to slow input of these high COD waters without interrupting normal operations. The issue will be monitored going forward by the IESC to ensure long-term stable testing results that conforms with Project Standards.

### ***Mineral Waste Management***

Mineral waste management associated with the Open Pit, Waste Rock Dump (WRD), and Tailings Storage Facility (TSF) is continuing under the Project strategy as outlined in the Mineral Waste Management Plan (MWMP) which was updated in 2018. Underground mine waste rock is being hauled to the new integrated waste rock dump for potentially acid forming (PAF) materials. Waste rock stockpiled or placed in dumps from the Open Pit is subject to segregation of PAF materials from non-acid forming (NAF) materials, and monitoring under the geotechnical ExPit program and MWMP has been documented. The South WRD Rehabilitation Trial Project on the northern slope of the South Dump has advanced and initial results have indicated that the original design slope of 26 degrees for Lift 3 cannot be achieved with standard equipment available at OT. Flatter slopes of Lift 1 and 2 have been established with intermediate berms or furrows for drainage and erosion control trials.

Tailings from the Concentrator are pumped to the TSF for disposal and recovery of process water. While OT reports that 2018 construction did not achieve projected rockfill levels for the embankment, planning and construction of rockfill, filters, and clay zones are reported on pace in 2019 to meet requirements for continued tailings operation this year. Confirmation testing of materials placed in the NAF zones of the TSF has continued, demonstrating that sufficient neutralization potential is incorporated in the rockfill; a change in the criteria for acceptance of rockfill as NAF was proposed in October 2018. The basis for the proposed change should be documented.

Reclaim water within the TSF has been managed by the barge pump station. The minimum freeboard reported for the March/April 2019 period at the reclaim pond was between 3.4 and 4.5 meters, which is below the design criteria for normal operating conditions of 4.7 meters for 2019. Under the Target Action Response Plan (v 9) criteria, this freeboard is recognized as a Level 1 trigger and does not meet extreme stormwater storage requirements, although it is not considered as a reportable incident until Level 2 trigger of less than 2 meters freeboard. With scheduled embankment construction in 2019, reclaim pond freeboard will increase and can be anticipated to exceed normal operating condition requirements. Seepage emanating from the toe areas along the northeast, east and south perimeters is being collected, monitored, and within design estimates for the facility.

### ***Non-Mineral Waste/Hazardous Waste Management***

The project continues to be self-sufficient in the management of waste produced during operation. The permanent Waste Management Center (WMC), located on the east side of the MLA, continues to be operated by the contractor company Khanbogd Waste Management Center (KBWMC) LLC who relies on a number of smaller recycling/reuse local sub-contractors to manage the final disposal of recyclables including waste oil, waste kitchen oil, scrap metal, waste paper and cables. A trial project to compost organic kitchen waste for use as topsoil in rehabilitation areas started last year.

General waste, sludge, air filters, oily rags, and polluted soils generated at the different project locations are collected daily and buried at the Waste Management Center, which was designed to international best practice standards. Waste was deposited into Cell #1 through Q3 of 2018 which ceased to be used at that time and which remains at 79% of total overall capacity. Waste is now deposited in Cell #2 which as of late Q2 2019 had 6610 tons of waste material. This represents only 9% of the overall storage capacity for this cell. Hazardous waste is currently stored on site until a suitable final disposal location is established. Construction of a hazardous waste cell at the WMC is planned.

### ***Air Quality***

Over calendar year 2018 the project reported a total of 48 non-compliances with applicable ambient air quality Project Standards. The majority of these non-compliances are related to particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) and occurred mainly during the spring and early summer time period, when conditions were particularly windy at the site. A review of the monitoring data shows elevated particulate matter concentrations at the control point to the northwest of the MLA. The IESC recommends using the control values as baseline conditions in future annual reporting, to accurately reflect project contribution to measured values at other monitoring stations. The potential environmental receptor to ambient work quality is the OT workforce, some of whom are on site for extended rotations. Ambient air quality exceedences are episodic and of generally short duration.

OT has recently completed installation of dust curtains at the COS building. The project has observed a noticeable decrease in particulate matter at the COS since installation of the curtains. Importantly the project has requested continuous emission monitoring equipment for better monitoring at the COS and expects to have the equipment available for use sometime before the end of 2019. There was residual dust at the COS facility that was removed in mid-April and surface watering is now performed in the warmer weather. The issue is primarily related to occupational health and safety (OHS) of employees working in the vicinity of the COS, including at the concentrator building. OT is aware of this potential OHS concern and employees in dusty areas are currently required to wear appropriate Personal Protective Equipment (PPE), including respirators. In the IESC's opinion these mitigations are adequate and sufficient to provide for safe respiration of workers although it is recognized that a more permanent solution to excessive dusting would be a more effective long-term mitigation. Progress will continue to be reported on in future audit reports.

Most recent stack emission sampling results reflect non-conformances with the applicable Project Standard. Stack emission sampling has historically widely varying results and questionable levels of accuracy. To address emission monitoring concerns the project recently installed a Continuous Emissions Monitoring System (CEMS) on a single chimneystack from which all emissions of the 130 MW Central Heating Plant (CHP) will discharge. Installation of a CEMS is consistent with international best practice and Project Standards as required for thermal installations of greater than 100 MW capacity. Going forward it is expected that data obtained from the CEMS will allow better evaluation of CHP stack emission quality relative to Project Standards.

OT reports calendar year 2018 total greenhouse gas emissions (GHGs) of 1,514,205 CO<sub>2</sub> (eq). Total GHG emissions for calendar year 2017 were 1,572,355 CO<sub>2</sub> (eq). Of these totals over 80% of GHG emissions generated are related to the purchase of electricity (Scope 2 emissions). Scope 1 direct emissions were 297,673 CO<sub>2</sub> (eq) and mainly associated with the direct consumption of fuel; indirect Scope 3 emissions are negligible. Recent energy efficiency/emission improvements include installation of solar lighting along walk ways and electrical connection of the camp for power supply improvements to the central grid system.

#### ***Emergency Preparedness & Response***

The Emergency Preparedness and Response Plan (EPRP) is supported by Emergency Response Procedures (ERPr) to address potential incidents specific to Project areas/departments where high and critical risks exist. Fifteen ERPr have been prepared to address the general site area or specific areas/departments, and several of these procedures were updated in 2018. As exercises are performed for training under an ERPr, document the exercise, lessons learnt, and response actions, and update the procedure when warranted. Further tailings release modeling to the Javkhilant bag center would likely allow refinements in the emergency coverage area of the ERPr – TSF.

Key risks and issues for security and emergency management were assessed in February 2019, including ongoing major works and impacts on the surface ERT scope and equipment availability, and response to community emergencies. Mine rescue services are being integrated within the Security and Emergency Management Department. Surface and underground training and exercises are being performed consistent with planned schedules, along with meeting activation requirements and response to incidents. The Underground Emergency Response Plan was updated and submitted in January 2019 to the Ministry of Mines; it is recommended that OT's Underground Emergency Response Procedure be reviewed and cross referenced for consistency in guidance and response action.

#### ***Transport Management***

Transport Service Providers have maintained their induction, communities and environmental awareness training programs for copper concentrate truck drivers, and OT has been able to increase payload of trucks from 36 tons to 40 tons in 2019, which helps offset continued delays and congestion at the Chinese border. OT contracts for accommodation facilities in Huafang when congestion or other delays force drivers to overnight in China, and conducts inspections and driver surveys of the conditions of the facilities, with repairs and improvements reported.

The HSES Department conducted a gap assessment for OT Site Transportation in January 2019 to identify safety issues that may be developing on site. Fatigue monitoring is the critical risk identified for OT Logistics, and monitoring of TSP drivers has transitioned to LifeBand technology by SmartCap to improve equipment reliability and facilitate fatigue management. No trial shipments have been conducted or planned for 2019 through the Choir or UB/Erilan routes.

### **Ecological Management and Biodiversity**

No electrocutions or collisions involving priority bird species were reported during 2018. However, one Houbara Bustard incident was reported where a bird hit the concentrator bagging plant. The IESC supports OTs conclusion that its insulation measures are effective. OT has continued to raise general environmental awareness through the engagement of government, NGOs and celebration of national and international environmental events. Targeted stakeholder engagements relating to the four biodiversity offset projects have continued as an integral part of each program and appear fit for purpose. OT's involvement is valued by stakeholders in national level engagement, providing continuity when government personnel change.

OT manages land disturbance on the MLA through the Land Disturbance Control and Rehabilitation Management Plan. OT is meeting its technical and biological rehabilitation targets. OT continues in its efforts to avoid impacts on priority plant species.

The IESC raised a level III non-conformance in the May 2018 Audit with respect to impacts on *Spongiocarpella grubovii* in relation to applicable Lender Standards including Paragraphs 17 of PS6 and 16 of PR6. To date there is still no assurance that OT is on-track to achieving net gain for this species. Germination trials from *S.grubovii* seeds are scheduled to commence in Spring/Summer 2019. However, IESC acknowledges that OT is prioritising activities aimed at propagating this species and has demonstrated reasonable progress through tissue culture trials where the development of roots on propagules has been achieved. IESC has therefore reduced the non-conformance to Level II. However, the non-conformance will remain until such time as successful propagation of *S. grubovii* can be demonstrated in the field as this is a critical factor in OTs ability to give assurance that a net gain is achievable for the species as per OT's plans and procedures and PS6 and PR6 requirements.

WCS continues to make progress in developing population models for the top eight priority plant species associated with the MLA. The IESC recommends that the response indicator and thresholds developed for impacts on priority plants be adjusted to bring them in-line with other species being monitored.

OT reported no road-related wildlife incidents on the OT-GSK road caused by OT vehicles between January and December 2018. There was one gazelle collision with a non-OT vehicle. Since the last audit OT have been using their monitoring data to investigate regional khulan (*Equus hemionus*) access to water and have reported that these data do not indicate any significant impact from current roads and road traffic-levels on access by Khulan to key water points. OT's four offset projects are generally progressing according to plan.

OT decided not to undertake further dust monitoring at this time, due to the absence of impact from the road as per results of the first year of dust monitoring reported in September 2018 report, and the IESC supports this position.

OT monitors four critical ecosystem services (Pasture, Biomass Fuel, Freshwater and Water regulation) in the South Gobi. Positive collaborations with local communities included the involvement of herder families to repair fencing around the Bor Ovoor spring and in the manufacture of pots at NPPC.

The IESC has commented on the absence of thresholds for ecosystem services indicators on previous audits (first raised as an observation in 2014) and although there has been some progress in their development some important thresholds are still lacking. The IESC considers development of these thresholds essential to underpin OT's monitoring efforts and to demonstrate that the flows of priority ecosystem services and the benefits derived are being sustained in line with the requirements of IFC PS6. Since OT has submitted a NOC to Lenders on this topic further comment on the appropriateness of indicators and thresholds will be provided during the next audit.

The IESC is otherwise satisfied with OT's overall monitoring program where indicators and thresholds do exist. OTs BMEP requires it to evaluate indicators and adjust methodology as deemed necessary as well as review its adaptive management thresholds and revise these as necessary every five years. WCS has suggested changes to some of the indicators and the IESC recommends that these be considered by OT and incorporated into the 2021 review so they can be incorporated into future monitoring activities.

Staff resourcing is considered adequate for effective on-site monitoring and risk management. Arrangements with contractors are considered to be appropriate and effective.

### **Labour and Working Conditions**

Key Investment Agreement commitments on labour management are being met. As at 31 December 2018, there were 16,581 workers at the OT operation, including those employed by OT LLC and by contractor companies. 93.49% of the 2,703 OT LLC employees were Mongolian nationals (minimum requirement through the IA is 90%) and 97.55% of the 4,977 "75/25 Contractor Company" employees are Mongolian nationals (requirement is not less than 75%). Of the 8,901 construction workers in the "60/40 Contractor Companies", 89.61% are Mongolian

nationals (requirement is not less than 60%). The number of workers from Ömnögovi has been increasing and now stands at 3,129 workers. Further, 17% of the total workforce were women (almost one quarter of the OT LLC workforce), and 40 different nationalities are now represented in the OT project.

Onsite accommodation and amenities improvements continue, including improvements to food and entertainment facilities, as well as site beautification. Oyut II camp is completing. Rosters will continue to be reviewed and roster types analysed, as this is key to long-term accommodation options.

The OT employees long-term accommodation strategy is currently being prepared, looking at a mix of accommodation options both on site, and in Khanbogd as well as Umnugobi more broadly. Engagement with relevant government stakeholders has commenced and case studies from other soums are being examined, and options which will facilitate management of in- and out-migration. As at Q2/2019, work is also progressing on a Khanbogd Master Plan update and Socio Economic baseline study to inform the Strategy.

Programs to improve conditions and recognition for workers are ongoing. The 'OT Proud Employee Recognition Program' commenced in January 2019 for the year, while Project Safehouse is in progress to provide a safer work environment for all staff. Measures introduced through Project Safehouse include limitations of alcohol use on site; physical security measures and education campaigns. New policies on sexual harassment and domestic violence are due to be developed by the end of September and will be shared with the IESC at that time.

In Q1/2019, there were 28 cases raised through OT's worker grievance mechanism, SpeakOut, relating predominantly to business integrity issues followed by personnel issues (no occupational health cases). These took an average of 21 days to close out, under the 30 day target.

#### ***Resettlement, Compensation and Livelihoods Improvement***

OT has progressed work on the recommendations of the Outcome Evaluation (OE) for economically displaced herder households, commencing with engagement with each of the 89 households, and presentation to the Tripartite Council (TPC) in the second half of 2018. Household Livelihood Improvement Plans (HLIPs) have been developed and signed off in the first half of 2019 with the 11 households that were identified through the OE as requiring follow up support. Development Solutions NGO has been contracted to provide support in HLIPs development and implementation. Action to support the five households that had been identified in the OE as requiring sustainable water access has also been taken. Following joint fact finding and investigation, OT water delivery service ceased for 3 of the households in mid-May 2019, leaving the two remaining households' wells to be completed.

Key actions under the Pastureland and Livelihood Improvement Management Plan (PLIMP) are the Local Agribusiness Support Strategy Project, covering Khanbogd and Umnugobi, intends to support the Food Capability Development Strategy for 2019-2023. The Pastureland Assessment and a pastureland management framework developed for Khanbogd, Bayan-Ovoo, Bayandalai and Tsogt-Ovoo soums has been completed.

OT has worked with the Khanbogd soum on a number of measures to support vulnerable households, including the creation and update of household data. Capacity building training and creation of activities to improve community participation and social networking are ongoing. The IESC notes the importance of maintaining this close work with the soum regarding this stakeholder group and ensuring that vulnerable households are adequately provided for through HLIPs.

#### ***Stakeholder Engagement***

OT continues its substantial efforts in engaging with stakeholders, including analysis of stakeholder attitudes. More than half of the 296 recorded engagements over the six months to April 2019 were for the purposes of consultation, while 13% were for partner collaboration. Almost all engagements are recorded as positive (96%, up from 84% last October). Substantial engagement is associated with cultural activities and celebrations.

Information disclosure continues and is consistent with previous findings: the annual Open Day event provides OT and its contractors with the opportunity to present the Project to interested stakeholders from across the South Gobi. Additionally, OT's Monthly Newsletters continue to provide updates on Project performance through its distribution of 4,400 copies in the region.

There were six community complaints received from October 2018-May 2019, five of which have been resolved within target timeframes. One complaint relates to contractor offroad driving and remains outstanding.

In a major milestone, the dispute resolution process that had been carried out by the TPC and the CAO has been completed. A joint decision was made by TPC members that the Herders' Complaints Resolution Agreements had progressed sufficiently in 2018 and so agreed to close the CAO mediation process. Significantly, the TPC members concluded that closure is a clear indication of strong mutual trust established among the parties and

that a new stage of cooperation had been reached. The CAO close out report is publicly available. The TPC Strategy and Charter is now being revised to reflect a new phase of engagement between the parties.

The Participatory Environmental Monitoring (PEM) program continues through the Munkh Nогоон Galba NGO, and the cohort of participants in the monitoring is increasing. Seventy-eight herders are participating in water monitoring, 20 herders trained for fauna monitoring (to commence June 2019), and 60 more herders engaged to participate in other PEM tasks. The NGO's activities have included environmental awareness raising to stakeholders; 41 days of events were conducted in 2018/19 in 9 areas, reaching 1,280 community members. See the Water section above regarding communication of OT's E&S data. The NGO's three-year strategy includes ongoing staff capacity building and professional training, further increasing herder participation and develop a sustainable operation, and the creation of a publicly accessible database of the NGO's PEM data.

### ***Regional and Community Development***

In February 2019 the DSF Board approved a range of projects covering infrastructure, education and agricultural programs, including the three-year Agriculture and Animal Husbandry development program (2019-2022). A substantial body of work has been completed with the support of DSF funding including Emergency and Surgery support services capacity building and the Khanbogd Kindergarten and School complex. Implementation of the DSF received positive feedback from communities, key stakeholders and local leaders.

New mechanisms for funding have also been introduced, the 'Quota Funding Opportunities', which has been established directly with ten soums and requires disbursement in accordance with the DSF's funding principles and code of conduct. The Quota Funding target beneficiaries are vulnerable groups, disabled, elderly, those with special needs and herders, to support their livelihood, physical and economic wellbeing, to the value of USD \$370,000 in 2018 and USD \$400,000 in 2019.

At the time of the audit, the In-migration Management Plan was under review, due for completion July 2019. The Local Employment Working Group has been progressing actions to facilitate employment opportunities and there are now 1,632 Khanbogd based employees; this is a 28% increase compared to 2017 figures. The Local Procurement Working Group is also active and has facilitated OT Procurement Monthly Information Sessions (10 in Partner soums), Small and Medium Enterprise Development training sessions, and the creation of the Business Innovation Growth Centre (BIG), which opened in April 2019. The Partnership Committee has been key in commencing joint work on the Khanbogd and Umnugobi Development Frameworks, and partner organisations are implementing other projects influencing in-migration outcomes, such as the 2018 Umnugovi Socio Economic Baseline Study by UNFPA and the National Statistics Office.

### ***Worker Health and Safety***

The ramp up in the number of OT and contractor personnel on-site for the underground project has peaked, and health department resources and capabilities have also increased. With the integration of the Underground Project with the OT Operations, the Health and Industrial Hygiene Department updated documents and procedures on medical surveillance and occupational hygiene reporting, and established the UB Health Hub team for medical scheduling and management. In February 2019, the Operations Hygiene group worked with the UG on the hygiene monitoring program to establish synergy and initiate crossover. The Health Team continues to emphasize programs for fatigue management, mental health and wellness through additional training, education and technology.

Through April of 2019 there were 14 identified "significant" health and safety incidents, with eight total actual injuries and two potentially fatal incidents. Of these nine of the total significant H&S incidents were at the underground development, with five at the current operation. Overall on a 12-month rolling basis and through April of 2019 the OT project has maintained an All-In Frequency Rate (AIFR) of safety incidents at 0.13, below the target threshold of 0.21. Underground operations have experienced more safety incidents, with an AIFR of 0.20 which is below the underground-specific target of 0.26. There have been over 40 million man hours worked in underground development, which is approximately 54% complete. For current OT Operations the AIFR is 0.04, below the target of 0.15. Specific details of recorded safety incidents, root causes, and corrective actions will be documented in the next audit report by the IESC, when IESC representatives will have an opportunity to directly liaise with H&S personnel.

### ***Community Health and Safety***

The CHSSMP two-yearly revision was completed in 2018, including incorporation of current target intervention areas reflective of the current health status in Partner soums and the aimag. DSF-supported Community Health programs include: the youth and adolescent-friendly clinic operating and serving 289 young people and peer educators; the Healthy Aging program in Manlai soum; and the Inter-soum Hospital in KB reaching 348 herders using mobile technology to examine health status. The The four-year partnership agreement between the Goviin

Oyu DSF, Unicef, WHO, UNFPA, and the Government of Australia to focus on maternal and child health is ongoing.

A new Road Safety program has commenced in parallel to the completion of the OT-Khanbogd road, to provide training to communities on road safety, to provide road signage and a Risk Demonstration Centre associated with the Khanbogd school. This is a partnership program for 2019 between the aimag and soum Governors offices and the Police Department, with funds from OT and UNFPA.

#### ***Cultural Heritage Management***

The cultural heritage program continues to maintain a zero CH incident status, while providing 625 Community Relations and Cultural Heritage inductions during the audit period. Land disturbance permits continue to be issued with 44 over the audit period.

Key activities undertaken in 2018 in cultural heritage have included training for 160 cultural heritage site rangers, commencement of the Dalanzadgad soum museum, and ongoing work with the Khanbogd Elders Association. In 2018, the Elders provided training for 2,606 pupils and welcomed almost 2,000 local community members, OT employees and visitors welcomed in OT Culture Ger. A three-year contract was signed with the Elders Association in March 2019 to coordinate Culture Ger visits, thus recognizing the strength of commitment and relationship with this highly active, Khanbogd group.



## 1 INTRODUCTION

The Oyu Tolgoi copper/gold mining Project (“the Project” or “OT Project”) is located in the *aimag* of Ömnögovi, in the South Gobi region of Mongolia, approximately 600 km south of the capital city, Ulaanbaatar, and 80 km north of the Mongolia-China border. The mineral resources were discovered in 2001 and consist of a series of deposits containing copper, gold, silver and minor amounts of molybdenum. The project involves a combination of open pit and underground operations, with ore processed through a 100,000 tons per day concentrator and with an expected concentrate production in excess of 500,000 tons per year. Shipment of product to customers commenced in July 2013.

In September 2013, D’Appolonia S.p.A. (from June 5<sup>th</sup>, 2017 RINA Consulting), located in Genoa, Italy, was retained by Oyu Tolgoi LLC to act as the Independent Environmental and Social Consultant (IESC) for the OT Project being developed by Oyu Tolgoi LLC (the “Project Company” or OT), a strategic partnership between the Government of Mongolia, Rio Tinto (RT) and Turquoise Hill Resources. Since 2012 RT has also been appointed as the manager of the project on behalf of the shareholders.

RINA Consulting’s role as the IESC is to support the Senior Lenders<sup>1</sup> by providing an external/independent monitoring evaluation of OT mine project activities with focus on Health, Safety and Environment (HSE) and social aspects during project operation that began on 1<sup>st</sup> September 2013. Within this role, the IESC reports periodically to the Lenders group on conformance with the environmental and social provisions contained within the Operational Management Plans that define how OT will implement the mitigation strategies set out in the ESIA and other relevant project documents. These include an Environment and Social Action Plan (ESAP) with a list of time-bound future commitments and the Operations Phase Environmental and Social Management Plans (ESMPs), which represent the reference documents used by the IESC to monitor the Project Environment, Social, Health and Safety (ESHS) performances.

This report presents a review of the Project’s state as of May 2019, based on a desktop review of the 2018 Oyu Tolgoi Environment and Social Annual Report, information provided in response to IESC requests, and teleconferences with OT site personnel. The report references previous IESC audit reports for background on operational management plans and project history. The report provides an update on the Project status for key topics as well as a follow-up of the status of the non-conformances identified in previous IESC reports. Any topic not covered in this report will be addressed during the next site visit expected to take place in Q4 of 2019.

Specific activities conducted included the following:

- review of the OT’s Annual Environmental & Social Report (AESR) for 2018;
- review of additional HSE and social documentation and other project-related reports provided by OT;
- conference calls held between the 27<sup>th</sup> May and 3<sup>rd</sup> June, 2019 with the project teams responsible for HSE and social compliance monitoring;
- evaluation of implementation of the commitments contained within the Operational Phase ESMPs and the ESAP;
- identification of deviations and/or gaps with respect to the Operational Phase Management Plans and ESAP commitments, including recommendation for possible HSE improvements based on Good International Industry Practice (GIIP); and
- follow-up and closure of findings and observations from the IESC September 2018 Site visit Audit Report<sup>2</sup>.

The information, observations, and opinions presented in this report are those of RINA Consulting and are independent of those of the Project and/or the Senior Lenders. Where topics are not referred to no risks to the Project have been identified.

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<sup>1</sup> The Senior Lenders group includes: the International Finance Corporation (IFC), the European Bank for Reconstruction and Development (EBRD), Export Development Canada (EDC), Export-Import Bank of the United States (US EXIM), Export Finance and Insurance Corporation (EFIC), the Multi-lateral Guarantee Agency (MIGA), Standard Chartered Bank (SC) and BNP-Paribas.

<sup>2</sup> RINA Consulting, “Independent Environmental & Social Compliance Monitoring Report - September 2018 Site Visit”, Doc. No. P0010806-2-H1 Rev. 0, December 2018.

## 2 PROJECT OVERVIEW

### 2.1 CONSTRUCTION AND OPERATIONS STATUS

The Project consists of a series of mineral deposits containing copper, gold, silver, and molybdenum to be mined by a combination of open pit and underground mining techniques, as described in previous IESC reports.

The open pit mine started during Q2 2012 as a conventional truck and shovel operation operating 24 hours per day. The underground mine is being planned as a block cave operation which involves the excavation of material that provides natural support from beneath the ore, causing it to fracture and collapse into the excavated void under the force of gravity. In addition to being a cost-effective underground mining technique, this process allows for the greatest proportion of ore body to be extracted relative to waste rock.

The process design to convert the ore into concentrate is based on conventional milling and flotation technology and proven equipment. The process includes primary crushing with coarse ore stockpiling. Crushed ore from the primary crusher is transferred via a 2.7 km overland conveyor to a stockpile near the concentrator and from here into the grinding circuit where a series of large diameter mills reduce the ore to small particles before either flotation and further processing or recycling to the grinding circuit. The flotation system separates valuable ore from less desirable minerals in large floatation cells where the copper-containing materials are skimmed off for the next stage of the process while the sludge (tailings) are thickened to 60% solids in two thickeners and pumped to the Tailings Storage Facility (TSF) for disposal. Water from the tailings thickeners and TSF are recycled back to the concentrator. The final concentrate containing copper and gold is then thickened and filtered before storage in sealed bags for transport via trucks to the Gashuun Sukhait/Ganqimaodao border crossing with China. In 2018, OT continued to explore alternate shipping routes with trial shipments, such as by convoy to the Choir rail terminal about 450 kilometers northeast of the Project, and through Ulaanbaatar.

After suspension in 2013, underground mining activities under the Restart program resumed in 2016 with ramping up of resources and personnel through 2017 and 2018. Peak underground workforce staffing occurred in Q1 of 2019 with 8,755 site-based employees. These numbers are expected to decrease going forward as construction of surface and underground infrastructure are completed. Much significant infrastructure for the project has been completed, with overall construction progress at 54% at the time this report was prepared. The Central Heating Plant expansion is complete, with commissioning to occur with the onset of colder weather in late 2019. With completion of underground development and cave establishment, the mine plans substitution of open pit ore with higher-grade underground ore beginning in 2020 or 2021 and resulting in significantly increased copper production.

Ancillary facilities that allow operation of the mine include a regional airport, main power supply currently via a dedicated 220 kilovolt (kV) overhead power line from the Inner Mongolian electricity grid in northern China, coal-fired central heating plant (CHP), water supply and treatment systems, maintenance facilities and warehouses, administration buildings, waste disposal facilities, waste rock dumps, fuel storage depots, administration facilities and accommodations camps, roads and transport facilities.

In February 2018, the government of Mongolia notified OT that it purports to cancel the Power Sector Cooperation Agreement. As a result of the cancellation, OT must develop a domestic source for power within four years. The potential development of a coal-fired project Power Plant and the expansion of the concentrator's capacity above 100 ktpd are subject to further environmental and social impact assessment as established in the ESAP.

### 2.2 REPORT ORGANIZATION

Subsequent sections of this report are organized as follows:

- Section 3.0– Issues Table;
- Section 4.0 – Health, Safety, Environment and Social Performance Management Systems;
- Section 5.0 – Environment;
- Section 6.0 – Social;
- Section 7.0 – Health and Safety; and
- Section 8.0 – Cultural Heritage.

The basic findings of the IESC review are presented in the form of observations, comments and recommendations that are generally described within this report. Two types of findings are included:

- non-conformances, included in the Issues Table (Section 3), which refer to issues related to Project commitments included in the Operational Management Plans and/or GIIP; and
- recommendations, included at the end of each section (4 – 8) which are suggestions for the proper implementation of required actions and closure of open issues and which are based on the collective experience and expertise of the IESC team members.

IESC's "recommendations" are not considered mandatory and therefore their implementation is not critical. However, the IESC encourages the Project to consider the usefulness of all these recommendations and incorporate them, as appropriate and if technically/economically feasible, into new management activities.

### 3 ISSUES TABLE

This chapter tabulates a summary of non-conformances identified in this report based on the desktop review (Table 3.1). The table identifies non-conformances with respect to associated commitments as included in the Operational Management Plans, the ESAP, and internal procedures which altogether define how the OT operations manage applicable Lenders' Environmental and Social Standards. The categorization non-conformances is based on the same non-conformance levels defined in the OT ESMP<sup>3</sup> which also reflects the RT Health, Safety, Environment and Community (HSEC) Management System classification.

These include the following descriptions:

- **class IV** - A critical non-conformance, materially inconsistent with the Project Standards or Management Plans, resulting in or reasonably likely to result in irreversible impacts to sensitive receptors or important resources or significant damage or irreversible harm or damage to an ecologically or socially sensitive resource or has the potential for an extreme health and safety incident;
- **class III** - A material non-conformance, materially inconsistent with the Project Standards or Management Plans, that has not resulted in clearly identified impacts to sensitive receptors or important resources or material damage or irreversible harm or damage to an ecologically or socially sensitive resource or have the potential for an extreme health and safety incident, but it is reasonably likely to have such effects;
- **class II** - A material non-conformance with the Project Standards or Management Plans, but not reasonably likely to result in impacts to sensitive receptors or important resources or material damage or irreversible harm or damage to an ecologically or socially sensitive resource or have the potential for an extreme health and safety incident;
- **class I** - An incident not materially consistent with the Project Standards or Management Plans and not reasonably likely to present a threat to the environment, community or worker health and safety.

Action items are identified by the number of the mission (MX.Y), where X is the mission number and Y is the related action item number. It should be noted that the text description of the recommendations could be revised from one visit to the next to better reflect current conditions; however, the original item numbers are retained until closed as they refer to the same main issue.

Each non-conformance identified in the table will require actions from OT and will be followed-up by the IESC in subsequent audits. The table includes a description of the finding, the level of non-conformance assigned, the reference to the Project commitments and/or relevant project document as well as recommendations for improvement based on collective experience and the expertise of the IESC. Please also note that non-conformances not sufficiently addressed, according to IESC opinion, could result in a level increase, independent from the actual material consequences due to the conditions, unless an explanation is provided to justify the decision to avoid any corrective action.

Overall, results of the present audit are as follows:

- no Class IV non-conformances have been identified;
- no Class III non-conformances identified;
- one Class II non-conformances identified; and
- three Class I non-conformances identified.

<sup>3</sup> Environmental and Social Management Plan (ESMP) - Doc. No. OT-10-PLN-0003 dated 01.09.2013.

## OYU TOLGOI MINE PROJECT

Table 3.1: Issues Table

Mission/ Issue No.	Site Visit	Closing Date	Description	Non- Conformance	Reference	Status	Comments / Report Reference
<b>Environment - Water and Wastewater</b>							
M13.1	May 19		BOD, COD, ammonia and phosphorous above Project Standards in treated effluent of Manlai WWTPs	I	Water Management Plan, Annex A	Open	<b>See Section 5.1.2.10.</b> Treated effluent from the Manlai 1 and Manlai 2 WWTPs show recent ammonia exceedences of the Project Standard (values of 29 mg/L and 20 mg/L in January and February 2019, respectively). COD and BOD values were also elevated over Project Standards at the Manlai 2 WWTP (values of 126 mg/L and 48 mg/L in February 2019). The project suspects that input from septic tanks may be causing these exceedences, and a modification has been made to slow input of these high COD waters without interrupting normal operations. The issue will be monitored going forward by the IESC to ensure long-term stable testing results that conforms with Project Standards.
<b>Environment - Air Quality</b>							
M12.1	Sept. 18	May 19	Ambient air quality monitoring results for SO <sub>2</sub> over maximum permissible levels on annual basis	I	Air Quality Monitoring Plan, Appendix A1	Closed	<b>See Section 5.5.2.1.</b> OT has investigated the cause of SO <sub>2</sub> exceedences and not arrived at a conclusive determination of root cause due to the sporadic nature of data distribution. It is suspected that vehicle exhaust influenced the readings of the monitoring equipment at Station # 4. There have been no additional exceedences of the 24-hour daily average since 2018 construction activities were completed. The non-compliance regarding SO <sub>2</sub> concentrations will be removed based on this recent data; however future ambient air quality data will continue to be reviewed by the IESC to spot any return of 24-hour ambient air quality exceedences.

OYU TOLGOI MINE PROJECT

Mission/ Issue No.	Site Visit	Closing Date	Description	Non- Conformance	Reference	Status	Comments / Report Reference
M1.11	Oct.13 April 14 Desktop Audit Aug. 14 Nov. 14 Desktop Audit April 15 Sept. 15 April 16 Aug. 16 May 17 Oct. 17 Sept. 18 Desktop Audit May 2019		Significant dust (particulate) emissions are generated intermittently at the coarse ore stockpile. Particulate monitoring results exceed the Project Standard, which is the non-conformance	I	Atmospheric Emissions Management Plan (AQ05)	Open	<p><b>See Section 5.5.2.2.</b> There has historically been significant dust generation at the coarse ore stockpile (COS) facility. Operational changes and use of a foam dust suppressant have resulting in some reduction in TSP presence within the vicinity of the COS facility. Recently OT has installed “dust curtains” on three sides of the COS building.</p> <p>There has been some improvement in the dusty conditions at the COS, particularly at station DMP-COS02. Measured particulates continue to exceed the Project Standard. However, the sample size of monitoring since installation of the dust curtains is only three events, so trends will need to be established with time.</p> <p>The issue is primarily related to occupational health and safety of working in the COS vicinity, including at the concentrator building. Workers currently wear respirators, which is an effective mitigation but not an ideal long-term solution. Progress will continue to be reported on in future audit reports and future monitoring data will allow closure of this item</p>
M1.13	Oct.13 April 14 Desktop Audit Aug. 14 Nov. 14 Desktop Audit April 15 Sept. 15 Desktop Audit April 16 Aug. 16 May 17 Oct. 17		Stack emission sampling results from boilers at the Central Heating Plant (CHP) do not meet Project Standards.	I	Atmospheric Emissions Management Plan (AM03)  Air Quality Monitoring Plan – Appendix B)	Open	<p><b>See Section 5.5.3.2.</b> Emissions quality of the CHP has been a persistent issue being historically poor relative to Project Standards. A third party Plant Emissions Testing Review identified several flaws with the existing sampling methodology.</p> <p>To address emission monitoring quality concerns the project has installed a Continuous Emissions Monitoring System (CEMS) on a single chimneystack from which all emissions of the CHP will discharge. The CEMS was only recently installed (in May of 2019) and commissioning is expected at the time of writing. Going forward it is expected that data obtained from the CEMS will allow better evaluation of CHP stack emission quality relative to Project Standards.</p> <p>This has been maintained as a Level 1 non-conformance as OT has demonstrated application of Best Available Technologies (BAT) in conformance with applicable Project Standards. However data is still pending from the planned</p>

## OYU TOLGOI MINE PROJECT

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	Sept. 18 Desktop Audit May 2019						CEMS to definitively demonstrate with numeric thresholds contained in the revised Project Standard as adopted in NoC 2017-001.
<b>Environment - Biodiversity and Ecological Management</b>							
M11.2	April 18 Sept. 18 Desktop Audit May 19		Avoidance of impacts on priority plants	II	Land Disturbance Permit Procedure; BAP; BMEP	Open	<p><b>Section 5.9.2.3.</b> OT is committed to net gain for four priority plant species for which the project affected area qualifies as Critical Habitat and no net loss (NNL) for four priority plants associated with Natural Habitat, as outlined in its ESIA biodiversity management and mitigation commitments.</p> <p>Following the mitigation hierarchy, net gain or NNL is to be achieved through a) avoidance or protection of existing plants or habitat (avoidance of impacts), b) relocation/transplanting plants (assuming that the species survives transplanting) when impacts cannot be avoided and c) restoration, relying on effective propagation of new plants from seed or cuttings, or reintroducing plants into suitable conditions and locations and d) research.</p> <p>During the May 2018 audit IESC raised a level III non-conformance with respect to impacts on priority plant species (specifically <i>Spongiocarpella grubovii</i>). Lack of evidence that successful propagation, translocation or restoration can be achieved for this species, means there is insufficient assurance that a net gain can be achieved in line with lender requirements (PS6 and PR6). Germination trials from <i>Spongiocarpella grubovii</i> seeds are scheduled to commence in Spring/Summer 2019. However, IESC acknowledges that OT is prioritising activities aimed at propagating this species and has demonstrated some progress through tissue culture trials where the development of roots on propagules has been achieved. IESC has therefore reduced the non-conformance to Level II. However, the non-conformance will remain until such time as successful propagation of <i>S. grubovii</i> can be demonstrated in the field as this is a critical factor in OT's ability to give assurance that a net gain is achievable for the species. OT's Biodiversity Management Plan commits it to applicable</p>

OYU TOLGOI MINE PROJECT

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							Lender Standards including PS6 & PR6.



Table 3.2 summarizes the status of non-conformances starting from the October 2013 IESC site visit.

**Table 3.2: Status of Non-Conformances Identified by the IESC**

<b>Mission No.</b>	<b>Site Visit</b>	<b>New Non-Conformances Identified</b>	<b>Non-Conformances closed</b>	<b>Non-Conformances remaining open</b>
M1	October 2013	26	N.A.	N.A.
M2	April 2014	11	8	29
M3	Desktop Audit August 2014	2	3	28
M4	November 2014	7	10	25
M5	Desktop Audit April 2015	0	3	22
M6	September 2015	4	6	20
M7	Desktop Audit April 2016	1	9	12
M8	August 2016	4	2	14
M9	May 2017	1	6	9
M10	Desktop Audit October 2017	0	3	6*
M11	Desktop Audit April 2018	1	3	4
M12	September 2018	1	1	3
M13	Desktop Audit May 2019	1	1	4