Oyu Tolgoi LLC

Health, Safety, Environment, Security, and Communities

Atmospheric Emissions Management Plan

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1. INTRODUCTION

1.1 Purpose

The purpose of this Management Plan is to:

- define the scope of the Management Plan and set out applicable management interfaces;
- define roles and responsibilities;
- outline the applicable Project Standards and Guidelines relevant to this Management Plan;
- define Project commitments, operational procedures and guidance relevant to this Management Plan and indicate Oyu Tolgoi (OT) Environmental Policy requirements that this Plan addresses;
- define monitoring and reporting procedures, including Key Performance Indicators (KPIs);
- define training requirements; and
- establish, where necessary, references for supporting materials, system and operating procedures, and other information necessary or relevant to the implementation of this Atmospheric Emissions Management Plan.

1.2 Application

The requirements set out in this Management Plan apply to all OT activities.

This Management Plan is based on the Rio Tinto Air Quality Protection Standard (E12), issued in June 2014.

This Management Plan is owned by the OT General Manager Health, Safety, Environment, Security and Community (HSESC).

1.3 Commencement

This Management Plan applies from 1st September 2013.

1.4 Authority and Management

The OT Executive Committee approved this Management Plan on 1st September 2013.

The OT General Manager HSESC is the custodian of this Management Plan. This Management Plan will be reviewed on a two-year period to determine whether any changes or updates are required to the plan unless a more frequent update is required to reflect changing Project design or procedures. Any requests for changes to this Management Plan must be addressed to this person and will be subjected to the review and approval processes outlined in the MOC procedure.

2. SCOPE

2.1 Scope of this Management Plan

This Management Plan relates to the potential for OT activities to generate emissions to atmosphere. Certain emissions to atmosphere can cause air pollution, affecting community health or causing nuisance from dust or offensive odour. Other emissions, particularly those from fossil fuel combustion, may contribute to climate change (i.e.,greenhouse gases).

The key air emissions from OT activities, in terms of potential impact to air quality, comprise:

- dust emissions together with their impact on human health and their potential to cause nuisance to humans, biodiversity, and ecosystem services;
- emissions of potentially polluting gases: sulphur dioxide (SO_2), oxides of nitrogen (NO_x) and carbon monoxide (CO), and their potential impact on human health; and
- emissions of Green House Gases (GHGs) (principally CO_2).

This Management Plan covers all OT operations, including contractor activities, within and outside the Mine License Area.

2.2 Overlaps with other Management Plans

This Management Plan is part of the overall suite of Operations Management Plans developed for the OT Project and as described in the Environmental and Social Management Plan (ESMP) Framework (OT-10-PLN-0001-E).

This Management Plan has overlaps and cross-linkages to a number of other Management Plans which have air emissions implications, including:

- The Community Health, Safety and Security Management Plan (RD-10-PLN-0001-E), particularly in relation to dust impacts on local communities;
- The Transport Management Plan (OT-10-C3-PLN-0001-E), particularly in relation to the control of dust generation from vehicles movement within and outside of the Mine License Area;
- Land Disturbance Control and Rehabilitation Management Plan (OT-10-E14-PLN-0001-E), particularly in relation to prevention or mitigations of dust nuisance to identified sensitive receptors due to land disturbing activities;
- Contractor Management Framework (OT-07-PLN-0001-E), particularly in relation to ensuring implementation of this management plan by Contractors;
- Biodiversity Management Plan (OT-10-E14-PLN-003), particularly in relation to dust generation from vehicle movements within and outside of Mine License area;
- Mineral Waste Management Plan (OT-10-E-PLN-0001-E), particularly in relation to compliance with the project standards;
- Environmental and Social Management Plan (OT-10-PLN-0003), the AEMP is a part of the ESMP;
- Hazardous Materials Management Plan (OT-10-E15-PLN-0001-E), particularly in relation to waste inventory for GHGE inventory;
- Pastureland and Livelihood Management Plan (OT-10-PLN-0013-E), particularly in relation to dust impact on pastureland.

3. ROLES AND RESPONSIBILITIES

3.1 Key Roles and Responsibilities for Management Plan Implementation

Principal roles and responsibilities for the implementation of this plan are outlined below.

Table 1: Key Roles and Responsibilities

Role	Responsibilities
HSESC General Manager	• Ensuring that adequate human and equipment resources are provided to allow implementation of air quality monitoring, mitigation, research, and development activities. • Responsible for ownership and overall implementation of this plan and ensuring Contractors implement applicable elements of this plan.
Manager Environment & Biodiversity	• Overall ownership and responsibility for submitting and implementing annual Environmental Protection and Monitoring Plans. • Overall ownership and responsibility for the development of Annual Environmental Reports that presents environmental, including air quality, achievements during the course of the year. • Ensuring that all implementation teams within the Environment Department are appropriately staffed and supported.
HSESC Compliance team	• Monitor and communicate changes in national legislation on air protection
Environmental Monitoring Team	• Ensuring that an annual Environmental Protection and Monitoring Plan is developed and implemented for air quality, and provide information to the relevant contractor and operations management where ambient air quality parameters' concentrations exceed the standards. • Developing air quality sections of the Annual Environmental Report that describe research, monitoring, and impact mitigation activities for submission to the Ministry of Environment, Green Development, and Tourism. • Regular tracking of Key Performance Indicators (KPIs) of this Management plan and circulating updates to the relevant stakeholders • Attendance at routine meetings with local *soum* representatives, including herders, on air quality related topics and issues.
Health Department	• Maintain and develop the risk register to identify health hazards arising from the operational emissions.
Social Performance team	• Monitor and communicate air quality complaints to ensure appropriate management.
Operational and Procurement Department Managers and Principal	• Ensure that relevant management controls are undertaken in accordance with this Management Plan, related Procedures, and risk assessment reports. • Develop appropriate procurement specifications for the purchase of new

Role	Responsibilities
Contractors	equipment, and use control technologies to demonstrate that project air quality standards are met. Specifications for plant and equipment will be developed and implemented in terms of the Emission Control Specification. • Identify air risks and impacts during management of change and technical and financial evaluation of capital projects. • Ensure that department personnel are fully trained in air quality management practices. • Ensure incident[1] investigations are undertaken and reported. • Implement necessary corrective actions following up on environmental notifications and/or reports on ambient air quality. • Provide area-specific data for monthly reporting to Rio Tinto HSEC on OT performance in greenhouse gas emissions.
Workplace Supervisors / Superintendents	• Provide oversight and conduct routine work area inspections to ensure relevant activities are in accordance with this Management Plan and related Procedures. • Report all hazards including ambient air quality risks, non-conformances with this management plan commitments/requirements and incidents.
All employees and contractors	• Report any activities which are causing unnecessary dust or emissions. • Avoid performing activities which unnecessarily generate dust or emissions.

3.2 Key Interfaces

Key interfaces in the implementation of this Management Plan (i.e., roles with responsibility for delivering elements of this Management Plan) include:

- Infrastructure Department, particularly in relation to control of dust from infrastructure, roads, and emissions from diesel generators, coal fired boilers, Central Heating Plant, and Waste Management Center facilities;
- Open Pit Department, particularly in relation to control of dust from open pit roads, the waste rock dumps, ore stockpiles, soil stripping, and blasting activities;
- Concentrator Department and Tailings Management Team, particularly in relation to the control of dust from the Tailings Storage Facility, Primary Crusher and Coarse Ore Storage;
- Procurement Department (including both Operations and Underground), particularly in relation to specification of control measures and emissions limits to plant and equipment;
- Logistics Department (including both Operations and Underground), particularly in relation to mitigations of emissions from materials transportation both inbound and outbound; and
- Construction Departments (including both Construction Engineering and Underground), particularly in relation to mitigations of emissions from construction activities.

[1] Incidents are defined by reference to the Project finance documents and OT HSE Management System.

4. PROJECT STANDARDS

Applicable Standards must be complied with for all Project activities (the "Project Standards"). Project Standards comprise:

- applicable Mongolian National Standards;
- Detailed Environmental Impact Assessment (DEIA) requirements;
- other commitments to and requirements of Mongolian Government authorities;
- applicable Lender standards and guidelines;
- applicable Rio Tinto standards; and
- other industry guidelines with which OT has committed to comply.

4.1 Applicable Mongolian Laws and National Standards

***Law on Air* (In force 23 June 2012)**

This revised law regulates the protection of air and prevention of air pollution in order to maintain a healthy and safe environment, and maintain environmental balance for present and future generations. The law establishes a licensing system for certain sources of stationary pollution and imposes fees for certain levels of pollution. Licences must be obtained from the local Governor.

***Law on Air Pollution Fee* (In force 24 June 2010, amended 23 June 2012)**

This law imposes an air pollution payment and a payment collection process.
Emissions monitoring and a pollution mitigation technology, including greenhouse gas mitigation technology, is required in all new or expanded facilities in line with international standards. The legislation also provides for a fee payment system with respect to emissions released into the atmosphere.

This law also regulates the discharge of emissions. Under the tax stabilisation provisions of the OT Investment Agreement, the OT Project is exempted from the operation of the Law on Air Pollution Fee. However, this Plan will help to ensure long-term compliance with this law in terms of standards for air pollution.

National Standards

Applicable Standards must be complied with for all Project activities (the "Project Standards"). Mongolian environmental quality standards applicable to the protection of air quality include:

- MNS (ISO) 4226:2000 *Air Quality - General Aspects - Units of measurements*.
- MNS 4585:2016 *Mongolian National Air Quality Standards – Air Quality Parameters*.
- MNS 6298:2011 *Mongolian National Standard of Maximum Acceptable Level and Measuring Method of Air Pollutants in Flue Gas of New Thermal Power Plant and Thermal Plant.*
- MNS 5043:2016 *Mongolian National Standard for Hot-water boilers with heating capacity to 4.2 MW. General technical requirements.*

Although the Mongolian National Air Quality Standard (MNS 4585:2016) is intended for urban areas, rather than remote rural areas in that it states "*This standard applies to reconnaissance, assessment and monitoring of the quality of indoor and outdoor air during planning and utilisation of town and settlements, residential housing, offices, entertainment and public service facilities and civil constructions*", it is recognised that personnel do reside within the Mine Lease Area (MLA) and that the Standard does have applicability to the

Oyu Tolgoi operations. The Mongolian National Air Quality Standard (MNS 4585:2016) has thus been incorporated within the scope of this Management Plan.

In addition, compliance of the Project with MNS 6298:2011 has been adopted in relation to emissions from the Central Heating Plant.

Compliance of the Project with MNS 5043:2016 has been adopted in relation to emissions from the coal-fired boiler which is operated at Khanbumbat airport.

For a full summary of current legislation applicable to this operational management plan please refer to the OT Environmental Legal Register.

4.2 DEIA requirements

Air emissions management and monitoring requirements set out in Environmental Protection Plans and Environmental Monitoring Plans which accompany DEIAs are incorporated into annual revisions of the Air Quality Monitoring Plan (AQMP), which is a sub plan to this Management Plan.

4.3 Other Commitments to and Requirements of Mongolian Government Authorities

NA

4.4 Applicable International Standards and Guidelines

Ambient Air Quality Standards

The international standards which OT will implement are those set by the International Finance Corporation (IFC) and by the European Bank for Reconstruction and Development (EBRD). These include:

- *IFC Performance Standards on Environmental and Social Sustainability* (2006) (particularly PS1: Social and Environmental Assessment and Management Systems and PS3 Pollution Prevention and Abatement).
- *IFC Environmental, Health, and Safety General Guidelines* (April 2007),
- EBRD Performance Requirements (2008) (particularly PR1: *Environmental and Social Appraisal and Management* and PR3: *Pollution Prevention and Abatement*).
- EU air quality requirements from Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

The EBRD's Performance Requirement 3 requires that projects be designed to comply with applicable EU environmental requirements. The updated EU ambient air quality standards[2] are cited in the IFC General EHS Guidance as a recognised international standard. The Project Air Quality Standard has thus been established based on the most stringent of the EU ambient Air Quality Standard and the Mongolian National Air Quality Standard, MNS 4585:2016, discussed above.

Emission Limits

IFC provide general and sectorial guidance covering emission sources that are operated by OT. Specifically:

[2] EU air quality requirements from Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

- IFC *General EHS Guidelines* (2007), covering fuel burning equipment such as diesel generators;
- IFC *EHS Guidelines for Thermal Power Plants* (2008), covering the coal fired central heating plant (CHP) and future power plant, if constructed; and
- EU *Directive 2010/75/EC on industrial emissions (integrated pollution prevention and control) (Recast) of 24 November 2010*, covering coal fired CHP and the future power plant, if constructed.

The Project Emission Standards have been established based on the most stringent of the IFC EHS Guidelines for Thermal Power Plants, and MNS 6298:2011, the Mongolian National Standard of Maximum Acceptable Level and Measuring Method of Air Pollutants in Flue Gas of New Thermal Power Plant and Thermal Plant, discussed above. Derogation against the requirements of EU Directive 2010/75/EC on industrial emissions has been agreed on the basis that:

- The Project emission standard meets the IFC standard for PM and is significantly lower for SO2 and NOx.
- The Project emission standard is significantly lower than the Mongolian Standard requirements for NOx and the remote area definition requirements for SO2 and PM.
- It has been demonstrated using air dispersion model that the expected Ground Level Concentrations (GLC's) associated with the existing 72 MW_{th} plant and expanded 130MWth plant is less than 1.40% of the ambient air quality requirements defined in EU Directive 2008/50/EC.
- The CHP expansion to 130MWth would require flue gas desulphurization and de-nitrification technologies to be implemented in order to achieve the EU requirements for a 100-300MW facility. These technologies would also have to be retrofitted to the existing 72MW plant.
- The implementation of flue gas desulphurization and de-nitrification technologies would not provide any meaningful human health exposure improvement given that GLC's are already demonstrated by ADM to be less than 1.4% of the applicable EU ambient air quality limits and less than 2.5% of the Mongolian National air quality standard.
- The implementation of flue gas desulphurization technology would result in increased greenhouse gas emissions and increased water consumption, which are adverse environmental outcomes that conflict with the project water conservation and GHG reduction objectives.
- The implementation of de-nitrification technology would require the use of toxic ammonia additive, which is considered to be undesirable from a health, safety and environmental management perspective.
- The equipment suppliers have provided performance guarantees for the 130MWth CHP expansion that meet the Project Standard.

4.5 Applicable Rio Tinto Standards and Guidelines

The primary Rio Tinto Standard that applies to air quality protection management is E12 Air Quality Protection Standard (June 2014).

Other applicable Rio Tinto documents include:

- HSEQ Management System Standard
- Land disturbance and rehabilitation control Standard (E14).

4.6 Summary of Applicable Project Standards

OT will comply with Mongolian national standards, applicable lender standards (except as noted and explained) and applicable Rio Tinto Standards, with the more stringent standards representing the Project Standards.

Emission Limits

Project Standards for exhaust emissions are set out below. Point source emission Project Standards are provided in Annex A of the AQMP.

Table 2: Project Standards for Atmospheric Emissions from Stationary Sources

Source	Pollutant	Standard (mg/m^3) unless stated otherwise				Comments
		Project Standard	**Mongolian**	**IFC[6]**	**EU**	
Diesel generators	NO_X	1460[1] 1,850[2]	NA[7] NA	1460[1] 1,850[2]	N/A[5]	Note that Project generators are rated at 2MW and below and hence below IFC threshold (3-50MW). Note diesel generators are an emergency back-up supply and are planned to operate <500hrs per year.
	Particulate Matter (PM)	50[3]	NA	50[3]		
	Fuel S content (%)	Lowest practicably available	NA	1.5%		
Central Heating Plant[9] [10]	NO_x as NO_2	300	450-1100	510	200-300	Mongolian range is based on volatile content in coal (NO_x) and urban/remote definition (SO_2 and PM) IFC values based on a non-degraded air-shed. EU range is based on 50-100MW facility (current) and 100-300MW facility (after expansion) Corrected to 1013mBar 273K, dry gas at 6% Oxygen. NOx expressed as NO_2
	SO_2	400	400-600	900-1500	250-400	
	PM	50	50-200	50	25-30	
Coal-fired boilers	NO_X	450	450	650	400[8]	The localised boilers have been decommissioned. One boiler remains operational at Khanbumbat airport, which is of a capacity of 0.5MW and hense below the IFC threshold (3.50MW) as well as the EU threshold (50-100MW)
	SO_2	800	800	2000	850	
	PM	500	500	50[4]	100	

Source	Pollutant	Standard (mg/m^3) unless stated otherwise				Comments
		Project Standard	Mongolian	IFC[6]	EU	

Notes

[1] *bore size diameter [mm] < 400*
[2] *bore size diameter [mm] > or = 400*
[3] *up to 100 if justified by Project specific considerations*
[4] *up to 150 if justified by environmental assessment*

[6] *IFC figures for generators and boilers are applicable to thermal ratings of 3-50MW*

[8] *EU Directive 2001/80/EC Large Combustion Plant Directive*
[9] *EU Directive 2010/75/EU Industrial Emissions Directive*
10 MNS 6298:2011 Mongolian National Standard of Maximum Acceptable Level and Measuring Method of Air Pollutants in Flue Gas of New Thermal Power Plant and Thermal Plant
11 MNS 5043:2016 Mongolian National Standard for Hot-water boilers with heating capacity to 4.2 MW. General technical requirements.

Emission limits applicable to each emitting appliance or equipment, and frequency of monitoring for compliance purposes, is described in the *Air Quality Monitoring Plan*. Facilities and equipment covered by this management plan and their emission are presented in the following table.

Table 3: Key Emission Sources

Source	Emissions of Primary Concern
Emergency Diesel Power Generators	Oxides of nitrogen (NO_X), sulphur dioxide (SO_2), Carbon dioxide (CO_2), Particulates
Waste Management Center	Particulates and methane
Local Coal-Fired Boilers	NO_X, SO_2, CO_2, Particulates
Central Heating Plant : Coal-fired Circulating Fluidized Boilers (CFB)	NO_X, SO_2, CO_2, Particulates
Operational vehicles on and off site (including inbound/outbound logistical transportations)	NO_X, SO_2, CO_2, Particulates (exhaust-generated), dust (wheel generated)
Dust-Generating Works, including: • Soil stripping and excavations • Waste Rock Dump Operations and Ore stockpiling • Open pit operations (including blasting, excavations and hauling) • Primary Crusher Operations • Coarse ore transportation on overhead conveyor and storage • Tailing Storage Facility Operations and dam constructions • Road grading and general site traffic • Transport of coal and ash to and from Central Heating Plant/Power Station • Coal and ash handling at Central Heating Plant/Power Station	Dust

Ambient Air Quality Standards

Table 4 below provides ambient air quality guidelines for the OT Project, based on Mongolian and EU standards.

Table 4: Project Ambient Air Quality Standard

Parameter	Averaging Period	Project Standard (µg/m^3)	Mongolian Standard [5] (µg/m^3)	EU Standard [3] (µg/m^3)	Permitted Number of Exceedences per Year[3]
Sulphur dioxide (SO_2)	1 hour 24 hours	350 50	- 50	350 125	24 3
Carbon monoxide (CO)	8 hours	10,000	10,000	10,000	N/A
Nitrogen dioxide (NO_2)	1 hour Annual	200 40	- 40	200 40	18 N/A
Ozone (O_3)	8 hours	100	100	120	25[4]
PM_{10}[1]	24 hours Annual	50 40	100 50	50 40	35 N/A
$PM_{2.5}$[2]	24 hours Annual	50 25	50 25	- 25	NA N/A
Lead	24 hours Annual	1 0.5	1 0.5	- 0.5	NA N/A
Benzo a pyrene	24 hours Annual	0.001 0.001	0.001 -	- 0.001	N/A

Notes:

1: PM_{10} denotes particulate matter of less than 10 microns in diameter

2: $PM_{2.5}$ denotes particulate matter of less than 2.5 microns in diameter

3: EU air quality requirements from Directive 2008/50/EC on Ambient Air Quality

4. 25 days per calendar year averaged over three years

5. Mongolian National Air Quality Standard MNS4585:2016

6. Summary of "Permitted Number of Exceedences per Year" is 105

The ambient air quality monitoring network has been developed to be representative of areas of potentially high impact activities or operations in relation to sensitive receptors. Monitoring locations for dust and gaseous emissions are set out in Annex C (Monitoring Network Locations) of the OT *AQMP*. Monitoring will identify any exceedences of Project Standards which will be assessed as outlined in the OT *AQMP*.

From a compliance perspective, environmental standards apply within the OT mine licence area. Worker accommodation is subject to Project Standards for environmental rather than occupational exposure levels representing the unavoidable and 24-hour nature of exposure in an onsite worker camp. Occupational exposure limits will apply at all other workplace locations.

5. MANAGEMENT CONTROLS

5.1 General Approach to Air Emissions

The general intent of this management plan is to ensure that air pollutant emissions and the potential impacts from mine operations activities are identified and minimised. This is accomplished by evaluating and prioritising according to the significance of their impact, and taking effective measures to design and implement appropriate controls of emissions to ensure the protection of ambient air quality.

This management plan covers emissions from all sources, including fugitive emissions, during exploration, mining, mineral processing, materials handling, and transport.

Controls relating to the prevention or minimisation of impacts from emissions to atmosphere are provided in *Table 5,* below.

5.2 Implementation

Mitigation measures will be implemented by means of Procedures that reflect the requirements of the Key Management Controls as described in *Table 5.* The Procedures follow the relevant Rio Tinto Standard/s to ensure consistency with Rio Tinto policy.

AQMP *(*OT-10-E12-PLN-0002-E) is a sub-plan for air emission management and details the activities and tasks to be undertaken to systematically manage the activity and/or process required to implement the Key Management Controls. This also includes the developed Emission Inventory and GHG Inventory.

This Management Plan is also supported by a number of other Procedures, which present more details on specific aspects of the day to day air quality management activities at OT:

- Waste Management Centre Operations Procedure (OT-10-E15-PRC-0001-E); and
- OT Journey Management System - off-road vehicle movement control (OT-10-C3-PRC-0003-E).
- Land Disturbance Permit Procedure
- Topsoil Handling Procedure

Other procedures may be developed, as required, to support this Atmospheric Emissions Management Plan in addition to those mentioned above.

Table 5: Key Management Controls

ID	Applicability / Activity	Control Description	Responsible Parties	Means of verification
AQ01	Ambient Air Quality Monitoring	Monitoring of air quality determinants as part of the regular ambient air monitoring undertaken by OT, and enabling the early identification of potential hazards. Ambient air quality monitoring to be undertaken in terms of AQMP that follows the Rio Tinto Air Quality Protection Standard (E12). Monitoring results, especially exceedances, communicated to the relevant management for improved controls by the relevant management to mitigate the non-compliances.	Environment Department Operations Departments Infrastructure Department Logistics Department Underground Project	Air Quality Monitoring Reports Exceedance mitigation actions register
AQ02	Emission Inventory	Establish an emissions inventory that identifies and characterises emissions from all significant sources including fugitive emissions, and their method of release into the environment. The inventory is updated and managed through the implementation of the AQMP.	Environment Department Key Interfaces	Emissions Inventory
AQ03	Risk Register	Maintain and develop the risk register to identify ambient air quality hazards (and nuisance) arising from the operational and construction activities. Prioritise emission controls and abatement targets on the basis of risk levels determined through documented risk assessments. The Risk Register is updated and managed in terms of Risk Register Procedure. The Community Health, Safety and Security Management Plan (RD-10-PLN-0001-E) also provides procedures to manage community-related hazards and nuisance.	Environment Department Key Interfaces Health Department	Risk Register
AQ04	Emission Control	Develop appropriate procurement specifications for the purchase of new equipment, and use control technologies to demonstrate that Project air quality standards are met. Specifications for plant and equipment will be developed and implemented in terms of the Emission Control Specification. Consider and document air risks and impacts during management of change, including opportunities to avoid or reduce impact, prior to	Operations Departments Procurement Department Underground Project Underground Procurement	Equipment Specifications Scope of Works for procurement Management of Change register

ID	Applicability / Activity	Control Description	Responsible Parties	Means of verification
		implementing a change. Consider and document air risks and impacts as part of the technical and financial evaluation of capital projects.	Department	
AQ05	Dust Control	Implement appropriate control measures for activities, operations and sites where potential for dust generation is significant (Dust-generating activities listed in Table 3), on highly trafficked roads and especially for activities near sensitive receptors. The Transport Management Plan (OT-10-C3-PLN-0001-E) and the Land Disturbance Control and Rehabilitation Management Plan (OT-10-E14-PLN-0001-E) will also provide requirements to control off-road vehicle access. The Land Disturbance Permit Procedure (OT-10-E14-PRC-0003-E) includes requirements for identification of sensitive receptors and implementation of mitigation controls for dust generation activities (e.g. borrow pits/quarry activities) that involve land disturbance.	Infrastructure Department Open Pit Department Concentrator Department Logistics Department Underground Project Environment Department	GPS vehicle tracking system Air Quality Monitoring Audits Community complaints Contractors' Monthly HSES Scorecard records

ID	Applicability / Activity	Control Description	Responsible Parties	Means of verification
AQ06	Facilities and Vehicles Emission Management	Emissions limits and performance specification are specified for the following facilities in their respective design documentation: • Central Heating Plant • Coal-fired boiler at Khanbumbat airport Air emissions will be managed in terms of the AQMP (OT-10-E12-PLN-0002-E) which covers the above facilities. All mobile plant and vehicles will be maintained to meet Mongolian standards. All vehicles/equipment will be used and maintained in accordance with good international industry practice. *Information Note: The emergency diesel power generators are infrequently used, so OT estimates emissions from fuel use of these facilities and they are therefore monitored through the ambient air quality monitoring network.* *Onsite coal-fired boilers ceased use in 2014 when facilities were connected to central heating system.*	Infrastructure Department Environment Department	Design documentation Air Quality Monitoring Reports Equipment and vehicles regular maintenance records
AQ07	GHG Emissions	Calculation of GHG emissions will be implemented for all Project facilities, equipment, and activities. The GHG emission inventory will be updated annually. The GHG emissions inventory is maintained as part of the AQMP (OT-10-E12-PLN-0002-E)	Environment Department	GHG Emissions Inventory
AQ08	Fuel Quality	The lowest sulphur content diesel practically and economically available from local fuel suppliers will be used in the diesel generators	Procurement Department	Records of fuel quality
AQ09	Energy Efficiency	Identify, assess and document GHG emission reduction and energy efficiency improvement opportunities. GHG emission reduction and energy efficiency initiatives implemented where necessary.	Infrastructure Department Procurement Department Environment Department	EEO logsheet

ID	Applicability / Activity	Control Description	Responsible Parties	Means of verification
AQ10	Workplace Inspections	Daily inspections will be carried out by area superintendents / supervisors.	All main workplaces	Daily work area inspection sheet
AQ11	Subject Matter Expert Inspections	Routine inspections will be carried out by HSESC Department Subject Matter Experts using an Environmental Inspection Checklist; Any incidents will be reported to the incident management system.	All main workplaces	Completed SME inspection sheets

6. IMPLEMENTATION SCHEDULE

6.1 Review and Revision of this Management Plan

This Management Plan will be reviewed at least every two years or more frequently when operational or environmental conditions so dictate.

Review and revision of this Management Plan is the responsibility of OT General Manager HSESC.

If material changes to operating procedures are required (as identified through the Management of Change procedure contained within the OT HSE Management System), this Management Plan may be updated on an "as required" basis.

Any revisions to this Management Plan will be uploaded to the OT Portal to ensure that all OT staff has access to the latest version of this Management Plan.

7. MONITORING

7.1 Overview of Monitoring Requirements

The Monitoring measures to be implemented during the operations phase to assess compliance with Project Standards (see Section 4: Project Standards) are described in the section.

In the event that monitoring identifies non-conformance with Project Standards, these will be investigated and appropriate corrective actions identified (see Element 14 Non-conformance incident and action management of the OT HSESC MS).

7.2 Key Performance Indicators

The KPIs which will be used by OT to assess its performance with regard to dust and air emissions are presented in *Table 6,* below.

Table 6: Key Performance Indicators

ID	KPI	Target	Monitoring measure
AQ-KPI01	National and legal non-conformance	Target: 0 per year.	Number of reported air quality related national and legal non-conformances per year
AQ-KPI02	Non-Compliance with Air Quality Standards	Target: 0 per year. Threshold[3]: 105 per year with agreed mitigation (Refer to Table 4, column 6).	Number of measured non-compliances with Project air quality standards that are not caused by natural weather conditions.

[3] The threshold concept is used to reflect the operational realities that exceedances will occur from time to time. The threshold is used to provide an indication of when a possible trend of non-compliance is developing and so OT can investigate further". This will also reflect the text in p4 of the EHS Guideline that discusses the use of the 95th percentile concept. This will provide flexibility to accommodate changes in operational circumstances and performance.

ID	KPI	Target	Monitoring measure
AQ-KPI03	Community Complaints	Minimise and continued improvement in number of air quality related community complaints.	Number of reported air quality related community complaints per year

7.3 Key Monitoring Activities

The monitoring measures to be implemented during operations to ensure compliance with the Project Standards (see *Section 4.6*) are described in *Table 7,* below. In the event that monitoring results identify exceedances of any Project Standards, these will be investigated and corrective actions identified (see the ESMP Framework Document for further details).

The Project will develop and implement an annual Environmental Protection and Monitoring Plan to verify compliance with applicable DEIA requirements and Project Standards outlined in Section 4.6.

OT's environmental team will create a register (Emission Inventory) to record each significant atmospheric emissions source on the Project along with their thermal capacity. This inventory shall be updated periodically to ensure it is always up-to-date and used for the monitoring of emission sources and checking the performance of the Project against the applicable Project Standards.

Specific monitoring requirements detailed in *Table 7,* below. The key monitoring activities will focus on four areas:

- visual observation of significant dust, supplemented with direct readings of dust concentrations;
- ambient air quality monitoring;
- emissions within certain equipment exhausts (stacks/chimneys); and
- sensitive receptors monitoring.

Table 7: Key Monitoring Measures

ID	Topic/Aspects	Parameters	Methods	Periodicity	Location	Comments
AM01	Meteorology	Temperature, Pressure, Humidity, Rainfall, Wind speed and direction, Evaporation / Sublimation	Campbell Scientific Weather Station Kestrel Portable Weather Station Evaporation Pan	Continuous (Campbell) Routinely (Kestrel and Evaporation Pan)	OT Weather Station (Campbell and Evaporation Pan) Selected off-site locations (Kestrel)	See AQMP for further details on locations
AM01	Dust and fine particulate matter	TSP	Dust deposition gauge. Analysis of weight and composition of dust for metals.	Routinely	Various, including baseline and fixed monitoring stations and potentially dust generating sites	See AQMP for further details on locations
	Fine Particulate Matter	PM_{10} $PM_{2.5}$	AQM65 continuous monitoring equipment DustTrak 8533 monitoring equipment.	Continuous Routinely	Various, including baseline and fixed monitoring stations and potentially dust generating sites	See AQMP for further details on locations
AM02	Air pollutant gases	, CO, CO_2, CH_4, NO_2, SO_2, NH_3,	AQM65 continuous monitoring equipment Dragger X@m 5000	Continuous Routinely	Various	See AQMP for further details on periodicity and locations

ID	Topic/Aspects	Parameters	Methods	Periodicity	Location	Comments
AM03	Stack Emissions	O_2, CO, CO_2, NO_x, SO_2, Ash/Particulates	Testo 350 XL Gas Analyser (CHPand Boiler) Stack CEMS (CHP, after expansion) *Note: Refer to Annex G of the Air Quality Monitoring Plan for full details*	Gas Analyser: Monthly at Khanbumbat boiler when in operation Monthly at CHP CEMS: Continuous – daily averaging	Coal-fired boiler at Khanbumbat CHP	CHP Stack CEMS to be installed as part of 130MW expansion.

8. TRAINING

8.1 Overview

All training is provided as part of induction (to provide general awareness) and job-specific training as necessary.

8.2 Induction Training

All employees of OT and Contractors working at OT will be provided with general induction, site specific induction, and Environmental awareness training.

8.3 Job-Specific Training

Specific training will be provided to roles responsible for or impacted by this Management Plan.

8.4 Other Training Requirements

All employees of OT and Contractors to OT responsible for dust control activities shall be provided with toolbox training that outlines the mitigation measures identified in *Table 5*.

Toolbox shall be provided to plant operators and key personnel involved in activities which involve land clearance or construction activities and in the application of Land Disturbance Permits.

Specialist training will be provided to operators of the diesel generators and the CFB to ensure compliance with the applicable requirements of *Table* 4.

General aspects of environmental management will be included in induction training to be provided to all employees.

9. AUDITING AND REPORTING

9.1 Internal Auditing

Periodic inspections will be carried out by operational area superintendents / supervisors and HSESC personnel covering HSESC aspects.

Any incidents identified during these inspections will be reported to the incident management system (Element 14).

Conformance will be monitored via annual internal audit program in accordance with Element 16 Performance Assessment and auditing. This will be undertaken to assess broad compliance with requirements of HSE management system (including ESIA and management plans).

All incidents and non-conformances identified during these inspections, as well as in air quality monitoring results, are reported as per the requirements of the OT HSE Management System as described in the Environmental ESMP Framework Document.

9.2 External Auditing

Conformance with this plan will be subject to periodic assessment as part of the Rio Tinto HSE Business Conformance Audit programme and by Project Lenders.

9.3 Record keeping

Records of audits, inspections, and incidents will be managed in accordance with Element 8 Documentation and Document Control and Element 15 Data and Records Management.

Rio Tinto Business Solution shall be used to record Internal and External Audit findings and related actions and Incidents and related investigation and actions.

10. DOCUMENT CONTROL

File Name	OT-10-E12-PLN-0001-E-Atmospheric Emissions Operating Management Plan
Description	Atmospheric Emissions Operating Management Plan
Original Author(s)	Land and Monitoring team
Creation Date	2013.09.01
Approved By	Mark Slater, GM HSE
Approval Date	2013.09.01
Change Record Number	#

Risk Ranking	Assessment Date	Risk Assessor	Review Schedule	Next Review Date
Moderate	2013.09.01	Tsetsegsuren Luvsan, Supervisor Land and Monitoring team	2 Yearly	2020.03.16

Version	Revision Date	Author(s)	Approved by	Revision Notes
1.0	2013.09.01	Land and Monitoring team	Mark Slater, GM HSE	Approved version.
1.1	2013.11.23	Munkhtsatsral.L	Mark Slater, GM HSE	Corrected document numbers and completed document control section.
1.2	2015.07.10	Tsetsegsuren. L Dennis H Mahoney D	Kerrie Edwards GM HSESC	NOC 2015-11 Periodic review to align to reviewed RT standards, Responsibilities added, references updated in line with RT new Environmental Standards, requirement to monitor dioxin and furans in the incinerator stack emissions removed as per MOC accepted by the project Lenders, Mitigation of non-compliances added in the description of AQ01 management control, and stack emissions testing locations updated.
1.3	2017.08.01	Mark Newby	GM HSESC	Recognition of updated Mongolian National Air Quality Standard Project Standard for Ambient Air Quality updated Increased discussion and definition of Mongolian, IFC and EU emission standards for CHP Project Standard for CHP emissions updated Inclusion of continuous stack emissions monitoring system for CHP
2.0	2018.03.16	Tsetsegsuren	Murray Swyripa	Updated the list of the overlapping

		Luvsan Uuganbayar Buyantogtokh		management plans, key interfaces, dust-generating works and of the supporting procedures. MNS5043:2016 added in the list of the National standards and relevant changes made in the standard values. Removed references of incinerator through the document and air quality monitoring points. Updated the Responsible parties in Table 5. Key Management Controls. Changed AQ-KPI01 as “National and Legal non-conformance”. Updated the threshold for AQ-KPI02.