Oyu Tolgoi LLC

Health, Safety and Environment Management System Procedures

Landfarm Operating Procedure

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1. PURPOSE

This procedure is intended to be followed by persons at Oyu Tolgoi environmental management team responsible for waste and pollution control, site personal responsible for the use, service and upkeep of the landfarm. The purpose of this procedure is to set guidelines for basic landfarm design, standard operating of the landfarm, and the landfarm operator's responsibilities.

2. SCOPE

This procedure applies to the landfarm facility for the OT project and addresses:

- Basic design of landfarm facility;
- Health and Safety aspects of working at the landfarm;
- Adding waste material to landfarm;
- Routine maintenance of treatment piles;
- Aerating of landfarm soils;
- Excess waste water management;
- Organic enrichment of landfarm;
- Acceptable and unacceptable waste hydrocarbons; and
- Employee responsibilities.

3. ROLES AND RESPONSIBILITIES

Role	Accountabilities
Employees, Contractors and Visitors	• Having proper WHMIS and TDG training. • Complying with these procedures and relevant WHMIS and TDG regulations. • Ensuring all hazardous materials is stored in a safe and organised manner, which minimizes or eliminates the potential for spills, accidents, incidents or hazards. • Consulting their supervisor or designate with any questions about storage or handling of hazardous materials. • Informing their supervisor or designate immediately when a spill occurs. • If it is safe to do so and appropriate PPE is worn, beginning immediate clean up of a spill with absorbent material. • Operating the landfarm in accordance with this procedure. • Communicating unusual events or concerns to their supervisors and the environment personnel.
HSE Team Leader	• Monitoring the implementation of this procedure.
Leader Once Removed (LOR) / Manager	• Ensuring the implementation of this procedure is monitored. • Initiating the Spill Response Plan.

(Environment)	
Department General Managers	• Ensuring that a system and all its components are in place and managed for access by all site workers and that procedures are implemented and maintained.
OT Environment Department	• Working with the operators to ensure the facility is functioning as designed. • Inspecting contaminated soil storage and treatment. • Carrying out appropriate environmental sampling and communicating results and implications to operators. • Facilitating transportation and removal of contaminated soils from the site, as required with Site Services and Materials Management personnel.
OT HSE Director	• Reviewing and approving the landfarm operating procedure. • Ensuring the procedure is implemented.
Training Department	• Ensuring on-site personnel have up-to-date Waste and Hazardous Material Information Systems (WHMIS) training, and where applicable, Transportation of Dangerous Goods (TDG) training.
Site Services Supervisors	• Implementing this procedure. • Labelling annual batch piles of waste material at the start of each active season (April) with site service personnel. • Surrounding previous year's piles with orange snow fencing if necessary to avoid accidental material mixing. • Aerating the current year's pile once per month. • Monitoring and managing the area of deposition for new material.

4. PROCEDURE

The landfarms' intended purpose is to speed up the biodegradation rates of petroleum based products in contaminated sands, gravels and soils by providing an environment that optimizes biological decomposition through mechanical aeration.

4.1. Soil Addition to Landfarm

Contaminated soils must be added to the appropriate biocells in the landfarm. Specific biocells can be designated for breakdown of contaminants during summer months.

4.1.1. Treatment piles:

- Separate and mark treatment piles well according to their year of use;
- Each pile should be approximately 20m in length 20m in width and no more than 0.5m in height

- Approximately six piles will fit into each cell with an expected remediation period of two to three years
- Only light hydrocarbons (see specifications below) can be treated by landfarm. Heavy hydrocarbons may be temporarily stored in landfarm but will have to be shipped off site.

4.1.2. Treatable and untreatable hydrocarbons for landfarm:

- Heavy petroleum based products will not be readily degradable and may remain in contaminated soils for extended periods.
- Other potentially contaminated soils that cannot be remediated by land farming (or other feasible treatment) will be placed within the tailings impoundment for encapsulation within the tailings.

Treatable by Landfarm Process ***Light hydrocarbons***	**Untreatable by Landfarm Process** ***Heavy hydrocarbons***
- Gasoline - Diesel - Kerosene - Other refined, pure and semi-volatile petroleum based products	- Motor and lubricating oil - Hydraulic waste oils - Other waste oil

4.2. Aerating Soils and Organic Enrichment

Aeration and adding of nutrients must be undertaken on the treatment piles to enhance the volatilization and biodegradation process of carbon-hydrates in the polluted soils.

4.2.1. Landfarm Aeration:

- Mechanical tilling or ventilation piping is required where soil thickness is greater than 30 cm;
- Season: From May to September or when the soil is not frozen
- Climate: The aeration should not be carried out on days with high wind speed;
- Equipment: A small bulldozer blade or bobcat (or equivalent) for the aeration of the current years pile;
- Frequency: Once per month (unless ground is frozen);
- Ensure that piles remain moist but material is not kept too wet and soggy for successful bioremediation; and
- Moisture: For good microbial growth, the moisture level should be at 40-85% of the soil's holding capacity 2 (slightly damp to the hand and little bit cohesive).

4.2.2. Organic Enrichment:

Certain types of soil nutrients can be added to the treatment files to enhance the bioremediation process. Fertilization of the landfarm may come from the addition of nitrate-rich seepage collection water.

- Frequency: Lab results and testing from the environment department will be done to verify the fertilization frequency, but it is likely that fertilization events may take place from once a year to once a month.
- Watering: Clean water should be added to the landfarm as needing to maintain adequate moisture throughout the summer. If available, use water which is high in nitrates and able to stimulate microorganisms in the soil.

4.3. Removal of Excess Waste Water

Excess water in the treatment cells shall be removed for preventing leakage and enhancing the volatilization and biodegradation process:

- Season: Spring melt water that builds up in cells will have to be pumped out or collected from the leachate sumps, taken to the storm water storage pond and then treated in the waste water treatment plant. Other excess waste water that builds throughout the season will be likewise removed and treated.
- Collected oil: Any phase-separated oil identified in water in the landfarm will be collected, placed in labelled waste barrels and shipped off site for disposal.

4.4. Sampling

Sampling procedures (to be developed) will include the following minimum information:

- Collecting a soil sample at the beginning, middle and end of each of the active season for hydrocarbon analysis.
- Collecting samples bi-weekly for in-house analysis of moisture and nutrients.
- Using lab and in-house testing results to determine whether or not fertilizer should be added to piles.

5. DEFINITIONS

OT - Oyu Tolgoi LLC

PPE - Personal Protective Equipment

Liner - A continuous layer of low permeability material, either synthetic or compacted fingrained soil, constructed as the base of a soil treatment cell to restrict downward or lateral movement of substances.

Berm - An earthen embankment used for containment constructed around the landfarm facility

6. REFERENCES AND RELATED DOCUMENTS

Mongolian Laws and national standards concerning waste management are as follows:

- The Mongolian Law on Waste, 2012 which regulates the collection, transportation, storage, reuse and disposal of waste(s). Waste is classified as a) household waste and b) dangerous waste (harmful to human and animal health and environment). Hazardous waste must be disposed of in designated central waste facilities in accordance with prescribed techniques and/or technologies. Under this law waste recycling and reprocessing is encouraged. Citizen

and business entities conducting activities such as recycling and the re-use of wastes have the right to own the end product. The Aimag/Capital city Governor oversees waste management which is undertaken by licensed organisations;

- Law on Hazardous and Toxic Chemicals, 2006 (amended in 2011) which addresses the import, export, transportation, storage, use, and control of toxic chemicals. It imposes measures to prevent the impact of toxic and hazardous substances on human health and the environment;
- Law on Sanitation, 1998 (amended in 2011) which sets forth the obligations and responsibilities of citizens and business entities on soil sanitation, waste disposal, sewage facilities, water holes and lavatories as well as the disposal of hospital waste, radioactive and toxic chemicals.
- Government Resolution #135 of 2002 which addresses the procedures of the classification, collection, packaging, transportation, treatment, storage, and disposal of the Hazardous Waste.
- Joint Order #A-320/305 of Minister of Nature, Environment and Tourism[1] and Minister of Health of 2011 which address the procedures of the disposable of medical wastes; and
- Minister's Order # 404 of 2006 of Ministry of Nature, Environment and Tourism which address the procedure of the disposal, landfill of the individual and business entity and landfill and disposal of the waste.

The following international good practice guidance and legislation have been taken into account:

- IFC EHS Guidelines for Mining, 2007;
- IFC General EHS Guidelines, 2007;
- IFC Performance Standard 3 - Pollution Prevention and Abatement (2006); and
- EBRD Performance Requirements (particularly PR1: Environmental and Social Appraisal and Management and PR3: Pollution Prevention and Abatement).

Waste management facilities and practices at the OT site have also been designed to comply with EU and international waste management standards including:

- EU Directive 99/31/EC, 1999 (on the landfilling of waste);
- EU Directive 2000/76/EC of 4 December 2000 (on the incineration of waste);
- WHO Safe Healthcare Waste Management: Policy Paper and fact sheet No 281, (Health-care waste management);
- Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (the Basel Convention, ratified by Mongolia in 1997); and
- US EPA standards CFR 258 (Criteria for Municipal Solid Waste Landfills)
- Rio Tinto Standard E5 Hazardous materials and contamination control standard;
- Rio Tinto Standard E8 Mineral waste management standard;
- Rio Tinto Standard B4 Hazardous substances standard (Occupational Health);

[1] Ministry of Environment and Green Development, since August 2012

7. DOCUMENT CONTROL

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