

December 3rd 2017 – Diesel Fuel Release at Meliadine Exploration Gen-Set Fuel Tank

Spill Summary:

On December 3, 2017 a 7,500 liter spill occurred at the Meliadine Gold Mine. The source of the spill was controlled and investigation and remediation efforts commenced. Select soil samples were collected on December 19th and shipped to Maxxam on December 20th for laboratory analysis of hydrocarbon parameters.

Spill description:

On December 3rd, a diesel spill occurred at the Meliadine exploration camp gen set (generator). At approximately 20:00 the spill was noticed by the night security personnel and was immediately reported to the Energy and Infrastructure and Environment departments. The source of the spill was controlled and investigation and remediation efforts commenced.

As of December 17th 692 m³ of material was removed from the spill area to ensure contaminated material was removed on the lake side of the spill (Figure 1).

Figure 1: Photo of gen-set building and excavation (looking south)



Spill cause:

On December 3rd when the gen-sets were being re-fueled the float switch was broken and a manual start was used as the automatic mode was not functioning. Following re-fuel, the operator went to shut off the fuel supply switch but got distracted through conversation with another co-worker. As a consequence, the operator forgot to close the valve and fuel pumping continued until it was noticed by the night security at 20:00.

Cause of the spill was determined to be the following:

- 1) Manual mode remained engaged – human error
- 2) The float switch was broken – defective equipment
- 3) Spare parts were unavailable to maintain automatic mode. The part was not delivered as per scheduled delivery date – inadequate purchasing

Spill Clean-up:

Spill clean-up and excavation of contaminated soil continued through the night of December 3 to December 16, 2017. A surveyed volume (692 m³) of soil was removed from the spill location and transferred to the Type A Water Licence Landfarm. Observed fuel (free product) was pumped to collection drums and estimated at 1,230 liters. Soil samples were collected at six separate locations (shown on Figure 2) to confirm that the excavated area was cleaned. Throughout the course of the clean-up confirmation was made that contamination had migrated beneath the gen-sets used for the exploration camp. In order to clean this location the sea cans in which the generators are situated would have to be moved. This would result in the electricity for the exploration camp being shut down for a lengthy period of time, which would remove heat from the camp, and furthermore freeze the plumbing resulting in a major overhaul of the entire camp infrastructure. For this reason it was decided to take a phased approach to the remediate the area which is affected by this spill.

Moving Forward:

The slope near the gen-set building will be backfilled to provide additional support to the building foundation. A trench will be excavated and lined with PVC liner on downstream side of spill exploration site fill area to ensure any migrating fluid will be collected and can be managed from one location. A culvert that will be slotted with a grinder and wrapped with geo-membrane to allow for fluid permeability will be installed vertically at the lowest elevation of the lined trench to be used as a pumping well if fuel migrates to the liner. Fuel that accumulates at the lined trench will be pumped and disposed of appropriately. Six piezometers will be installed for future monitoring and the trench and spill exploration site will be backfilled with clean esker materials.

The phased approach for remediation is summarized in Table 1.

Table 1: Summary of Phased Approach Remediation:

Phase	GOAL	Actions	Start	Estimated Completion	Status
1	Protect Meliadine Lake	Create a trench on downstream side of exploration site fill area to ensure any migrating fluid will be caught and can be managed in one location	December 15, 2017	December 15, 2017	Completed
2	Delineate the spill area through excavation; SE of gen-sets	Excavate all contaminated materials south east of gen-set spill. Work from gen-sets to the trench area. All material contaminated to be hauled to Type A Landfarm.	December 3, 2017	December 17, 2017	Completed
3	Condemnation sampling of excavation	Sample ¹ excavated area to ensure all contaminants have been removed. Samples to be collected from floor of excavation, the horizon where the explo pad meets the tundra, and various composites for the walls. These points will be GPS and also marked on a photo to ensure future follow up should any results return positive for contamination.	December 19, 2017	December 20, 2017	Completed
4	Backfill excavation and line trench on downstream side	The excavation will be back filled (including the trench) leaving an opening immediately SE of the gen-sets to allow for collection of any seepage from the remaining contamination under the gen-sets. The downstream side of the opening that is left will have a PVC liner installed to deter any further migration of fuel towards the lake. The liner will be covered with backfill and a slotted culvert will be installed vertically to allow for pumping contaminants accumulated on the liner. Piezometers will be installed and used as observation wells (Figure 2 and 3).	December 28, 2017	February 2018	Not Initiated
5	Delineate the	Exploratory excavations to take place to determine if any	January	February 2018	Not Initiated

¹ Samples will be required to meet Water License criteria and also CCME soil quality guidelines.

	spill area through Excavation and drilling; NW of gen-sets	contamination has moved NW of gen-set area. Potential to use drills to help delineate in wider range or close to buildings if it appears contamination has spread NW. If no contamination is found condemnation samples of each location should be obtained to back up findings. <i>No major excavation at this point; just exploratory.</i>	2018		
6	Preparation and Plan for excavation below Gen-sets	Site Services will determine a plan for relocation of gen-sets to allow for clean-up underneath. Ideally completed in the summer months when the camp only requires one gen-set to function. This will include moving 3 gen-sets, day tank, yellow fuel tank and all associated infrastructure.	January 2018	May 1 st 2018	Not Initiated
7	Gen-set reposition and excavation of contamination below gen-sets and any contaminated areas NW of Gen-set area	Excavate all contaminated materials underneath and NW of gen-set spill. Work from lined containment towards the camp area. All material contaminated to be hauled to Type A Landfarm.	EST: August 2018	September 2018	Not Initiated
8	Backfill excavation	Once sample results are obtained meeting criteria ¹ , the excavation will be back filled.	EST: September 2018	September 2018	Not Initiated

Figure 2: Plan View – Spill Monitoring Locations

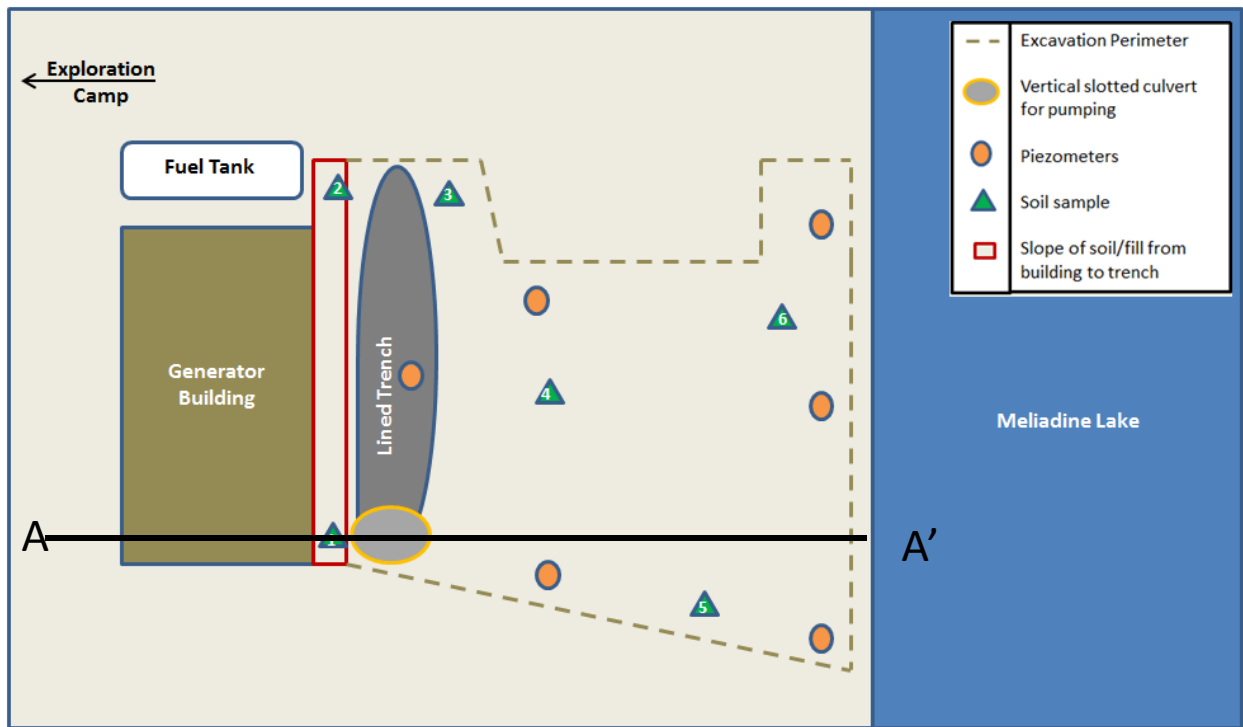


Figure 3: Cross Section View – Backfill, slotted culvert, trench and PVC liner (fuel resistant membrane)

