2021-09-08 MBK AWAR Coolant & Oil

GN reference #: 2021-387

Please find the following information as a follow up to the spill report, submitted September 8, 2021 by Agnico Eagle Meadowbank division. This detailed report is submitted to the Inspector in compliance with the conditions under the Nunavut Water Board License 2AM-MEA1530, Part H, Item 8c.

Spill Description

During operations at the Meadowbank Mine Complex, a tractor-trailer, operated by Arctic Fuel Services, transporting one shipping container with coolant, and one with transmission oil, tipped over near KM 103 of the AWAR. Upon the impact with the ground, the containers and part of the cargo were damaged, causing a leak of 9,000L of coolant, 2,600L of oil and 50L of diesel fuel.

Figure 1. General View of the Incident Location (2021-09-09)

Spill location: 65 02’56” 96 06'05" on IOL.

There was no discharge to any receiving watercourse. Distance to the closest water body is 160 meters to the unnamed lake near the Meadowbank Emulsion Plant. It is important to note the presence of the access road to the Emulsion Plant, which significantly reduces the chances of surfaces runoff towards the lake.

Cause of Spill

The spill was caused due to the loss of control of the tractor-trailer, which was caused by excessive speeds.

Remediation and Monitoring Actions

- Code 1 was immediately called to mobilize the emergency response team, and the emergency response plan was initiated.
- A containment plan was put in action to minimize the impact on the environment, and consisted of the deployment of spill response materials, recovery of liquid contaminant by vacuum truck, and manual excavation of trenches by the first responder. A total of 23,000L of contaminated liquid was retrieved, of which 3,000L were brought back to the South Cell Tailings Pond and 20,000L stored in totes.
- Sumps and trenches were mechanically excavated to encourage containment, as well as easing the pumping of contaminated oil and coolant.
- The tractor-trailer and the contaminant source were retrieved and relocated.
- Contamination area was visually delimited and reviewed with a KivIA regulatory representative. This individual was also present for the coolant volume estimation.
- 425m^3 of contaminated soil was excavated on September 11th-12th, and temporarily stored on the Portage RSF, as described in the Landfarm Design and Management Plan. A PID was used to help determine excavation delimitation.
- Due to upcoming rainfall warnings, till backfill was performed on September 12th, with the satisfaction of the KivIA regulatory representative. This was discussed with a CIRNAC inspector on September 9th and 10th.
- Following soil sample results, additional excavation was deemed necessary in a smaller location between soil sample results #2 and #5.

Monitoring measures at the KM 103 spill area were initiated immediately on September 8th and included daily water quality sampling from September 8th – 16th and weekly until freeze-up, visual inspections and soil sampling within the excavated area. Certain initial soil sampling results were not satisfactory, therefore, additional excavation of the soil was initiated on September 26th for the areas identified. Samples were taken following the re-excavation and were again above CCME guidelines for industrial soil. Consequently, further excavation was re-initiated to reach. Soil samples will be collected once excavation is completed, and further remediation may be necessary based on results. Water analysis results demonstrate the spill was well contained in the immediate area and did not reach the lake. Sample analysis results are presented in tables 1 through 4.

Corrective measures

1. Redesign of certain slopes/curves along the AWAR to be completed in 2022.
2. Temporary re-sloping of the EMR hill completed in September 2021.
3. Temporary signage installed at EMR blind hill indicating to slow down and warning of the sharp curve ahead until the redesign of the EMR road section is completed.
4. Review and reinforced road safety policies, procedure, and practice with all AWAR drivers.

Closure

We trust that the above details described appropriately the spill incident that occurred at the Meadowbank Complex on September 8th, 2021 and the remediation & monitoring activities. Please contact the undersigned should you have any questions.

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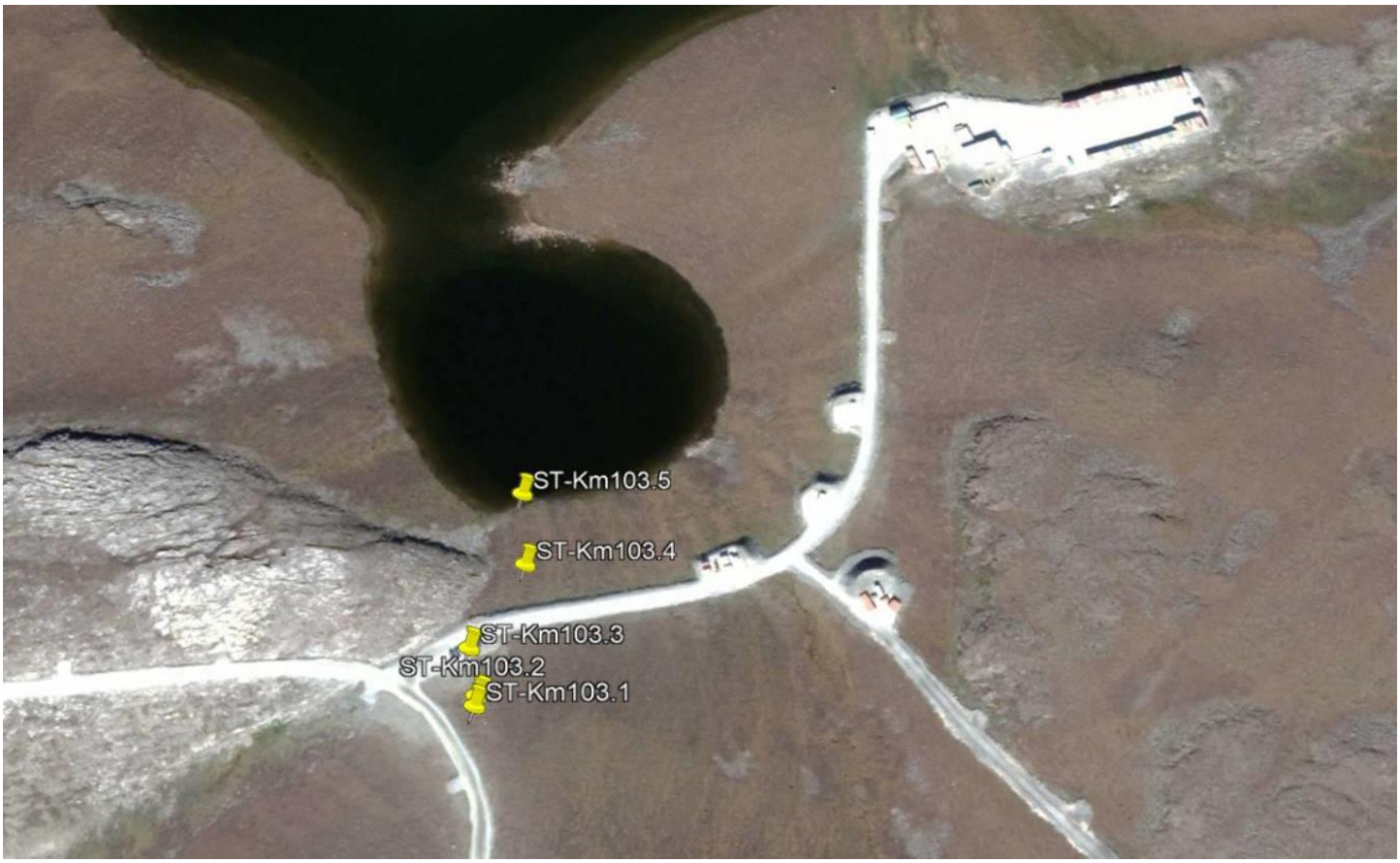

Figure 2. EMR Area, Water Sample Location

Figure 3. EMR Area, Soil Sample Location

Figure 4. Handling of the Contaminant Source (2021-09-09)

Figure 5. Sump, Trench & Berm Containing Contaminated Runoff (2021-09-09)

Figure 6. Excavation of Contaminated Soil (2021-09-10)

Figure 7. Use of PID and soil sampling following excavation (2021-09-11)

Figure 8. Incident Location Backfilled with Till Material (2021-09-12)

Figure 9. Additional Excavation - Spill KM103#2 & 5(2021-09-26)

	Sample date	2021-09-09	2021-09-09	2021-09-09	2021-09-10	2021-09-10	2021-09-10	2021-09-11	2021-09-13	2021-09-14	2021-09-15	2021-09-16
	Sample name	ST-KM103.1	ST-KM103.2	ST-KM103.3	ST-KM103.1	ST-KM103.2	ST-KM103.3	ST-KM103.2	ST-Km103.3	ST-KM103.3	ST-KM103.3	ST-KM103.3
Parameter	**Unit**											
WQ02- Conventional Parameters												
TSS	**mg/L**	570	130	3	640	100	22	98	12	8	12	4
WQ04- Nutrients and Chlorophyll a												
Total Ammonia (NH3), calc	**mg/L**	0.98	0.78	0.38	-	-	-	-	-	-	-	-
Total ammonia-N	**mg/L**	0.81	0.64	0.31	0.53	< 0.050	0.34	1.0	0.35	0.21	0.19	0.19
WQ05- General Organics												
Total oil and grease	**mg/L**	110	< 0.50	< 0.50	17	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.60
Total Glycols	**mg/L**	-	-	-	14300	199	417	74	1300	2170	891	1170
Ethylene Glycol	**mg/L**	-	-	-	14300	199	417	74	1300	2170	891	1170
Diethylene Glycol	**mg/L**	-	-	-	< 300	< 5	< 5	< 5	< 30	< 30	< 10	< 30
Propylene Glycol	**mg/L**	-	-	-	< 300	< 5	< 5	< 5	< 30	< 30	< 10	< 30
WQ06- Total Metals												
Arsenic	**mg/L**	0.0407	0.0193	0.00395	0.0263	0.00888	0.00315	0.00679	0.00655	0.00163	0.00192	0.00203
Copper	**mg/L**	0.062	0.0332	0.00385	0.0423	0.0150	0.00408	0.0122	0.00199	0.00190	0.00209	0.00220
Lead	**mg/L**	0.0179	0.00836	< 0.00020	0.0133	0.00315	0.00081	0.00273	0.00026	0.00025	< 0.00020	< 0.00020
Nickel	**mg/L**	0.093	0.0494	0.0096	0.0671	0.0223	0.0087	0.0222	0.0088	0.0058	0.0072	0.0074
Zinc	**mg/L**	< 0.10	0.0410	< 0.0050	0.062	0.0175	0.0052	0.0141	< 0.0050	< 0.0050	< 0.0050	< 0.0050
WQ10- Volatile Organics												
Benzene	**mg/L**	0.00027	< 0.00020	< 0.00020	0.00022	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Ethylbenzene	**mg/L**	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Toluene	**mg/L**	0.00057	< 0.00020	< 0.00020	0.00057	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Xylenes	**mg/L**	< 0.00040	< 0.00040	< 0.00040	0.00082	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040
m,p-Xylenes	**mg/L**	< 0.00040	< 0.00040	< 0.00040	0.00082	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040
o-Xylene	**mg/L**	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020

Table 1. Water samples results in the spill location

	Sample date	2021-09-09	2021-09-08	2021-09-09	2021-09-10	2021-09-11	2021-09-12	2021-09-13	2021-09-14	2021-09-15	2021-09-16
	Sample name	ST-KM103.4	ST-KM103.5	ST-KM103.5	ST-KM103.5	ST-KM103.5	ST-KM103.5	ST-Km103.5	ST-KM103.5	ST-KM103.5	ST-KM103.5
Parameter	**Unit**										
WQ02- Conventional Parameters											
TSS	**mg/L**	8	< 1	< 1	< 1	< 1	< 1	< 1	1	1	< 1
WQ04- Nutrients and Chlorophyll a											
Total Ammonia (NH3), calc	**mg/L**	< 0.061	0.30	0.14	-	-	-	-	-	-	-
Total ammonia-N	**mg/L**	< 0.050	0.25	0.12	0.17	0.078	0.074	0.28	0.22	0.29	0.20
WQ05- General Organics											
Total oil and grease	**mg/L**	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.6	< 0.50	0.60
Total Glycols	**mg/L**		-	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylene Glycol	**mg/L**		-	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Diethylene Glycol	**mg/L**		-	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Propylene Glycol	**mg/L**		-	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5
WQ06- Total Metals											
Arsenic	**mg/L**	0.00072	0.00041	0.00045	0.00041	0.00045	0.00045	0.00039	0.00044	0.00040	0.00038
Copper	**mg/L**	0.00223	0.00124	0.00156	0.00137	0.00125	0.00147	0.00125	0.00156	0.00134	0.00127
Lead	**mg/L**	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Nickel	**mg/L**	0.0045	0.0030	0.0045	0.0031	0.0031	0.0035	0.0030	0.0031	0.0034	0.0031
Zinc	**mg/L**	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
WQ10- Volatile Organics											
Benzene	**mg/L**	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Ethylbenzene	**mg/L**	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Toluene	**mg/L**	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Xylenes	**mg/L**	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040
m,p-Xylenes	**mg/L**	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040	< 0.00040
o-Xylene	**mg/L**	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020

Table 2. Water samples results downstream of spill location

	Sample date	2021-09-11	2021-09-11	2021-09-11	2021-09-11	2021-09-11	2021-09-11	2021-09-11	2021-09-11	2021-09-11	2021-09-11	2021-09-11
	Sample name	Spill km103 #1	Spill km103 #2	Spill km103 #3	Spill km103 #4	Spill km103 #5	Spill km103 #6	Spill km103 #7	Spill km103 #8	Spill km103 #9	Spill km103 #10	Spill km103 #11
Parameter	**Unit**											
F2-F4 Hydrocarbons												
Total oil and grease	**ug/g**	< 100	< 100	410	< 100	310	370	470	< 100	470	570	560
F2 (C10-C16)	**ug/g**	19	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
F3 (C16-C34)	**ug/g**	73	82	90	< 50	< 50	52	79	< 50	< 50	< 50	< 50
F4 (C34-C50)	**ug/g**	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Glycol												
Total Glycols	**mg/kg**	< 10	1400	< 10	520	7500	860	30	36	470	630	250
Ethylene Glycol	**mg/kg**	< 10	1400	< 10	520	7500	860	30	36	470	630	250
Diethylene Glycol	**mg/kg**	< 10	< 20	< 10	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10
Propylene Glycol	**mg/kg**	< 10	< 20	< 10	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10
BTEX & F1 Hydrocarbons												
Benzene	**ug/g**	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.040	< 0.040	< 0.040
Ethylbenzene	**ug/g**	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.040	< 0.040	< 0.040
Toluene	**ug/g**	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.040	< 0.040	< 0.040
Xylenes	**ug/g**	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.080	< 0.080	< 0.080
m,p-Xylenes	**ug/g**	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.080	< 0.080	< 0.080
o-Xylene	**ug/g**	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.040	< 0.040	< 0.040

Table 3. Soil sample results following contaminated soil excavation

Sample date		2021-09-27	2021-09-27	2021-09-27	2021-09-27
Sample name		Spill KM103 #2a	Spill KM103 #2b	Spill KM103 #5a	Spill KM103 #5b
Parameter	**Unit**				
F2-F4 Hydrocarbons					
Total oil and grease	**ug/g**	< 100	< 100	< 100	< 100
Glycol					
Total Glycols	**mg/kg**	6800	1600	350	490
Ethylene Glycol	**mg/kg**	6800	1600	350	490
Diethylene Glycol	**mg/kg**	< 100	< 20	< 10	< 10
Propylene Glycol	**mg/kg**	< 100	< 20	< 10	< 10
BTEX & F1 Hydrocarbons					
Benzene	**ug/g**	< 0.0060	< 0.0060	< 0.0060	< 0.0060
Ethylbenzene	**ug/g**	< 0.010	< 0.010	< 0.010	< 0.010
Toluene	**ug/g**	< 0.020	< 0.020	< 0.020	< 0.020
Xylenes	**ug/g**	< 0.020	< 0.020	< 0.020	< 0.020
m,p-Xylenes	**ug/g**	< 0.020	< 0.020	< 0.020	< 0.020
o-Xylene	**ug/g**	< 0.020	< 0.020	< 0.020	< 0.020

Table 4. Soil Sample results following additional excavation