2021-09-10 Environmental Discharge

GN reference #: 2021-392

Please find the following information as a follow up to the Spill report submitted September 10, 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, and subsection 38(7) of the fisheries act.

Spill Description

Background information

- Every year, water from snow melt and rainfall accumulates in secondary containments of Agnico's Baker Lake Tank Farm.
- As per Nunavut Water Board license NWB-2AM-MEA1530 part F Item 9, 10 & 13, these water accumulations are either pumped to land (tundra) or brought to the Meadowbank (Storm Water Management Pond) depending on water quality. Discharge to land also requires 10 days notice & erosion protection measures at a distance of at least thirty-one (31) metres above the ordinary high-water mark of any water body.
- In 2021, water accumulation in the secondary containment of tanks 5 & 6 was planned to be brought to Meadowbank as it was presenting a minor visible sheen (likely remaining from 2020 tank 5 leak).
- On September 10th, 2021 employees arrived at Baker Lake to prepare loading the water from secondary containment of tanks 5 & 6 with the objective of transporting the water to Meadowbank. The employees noticed that the containment was almost dry (which was not the case few days before).
- The Environment department was notified, and an investigation was immediately initiated.

Investigation highlights

On September 8th and 9th, a contractor working for Agnico transferred contact water from secondary containment of tanks 5 & 6 (ST-40.1) towards secondary containment of tanks 3 & 4 (ST-40.2) to perform electrical & piping connections for the new tank 8 construction (approved by NWB on Jan 28, 2019). Transfer of water between approved site infrastructures (secondary containment) is part of normal operations and would not have resulted in a spill if performed adequately.

Further investigation performed on September 10th presented evidence that a portion of the flow transferred between the secondary reservoirs had migrated towards the tundra due to misplacement of the discharge pipe.

Out of the estimated 621m^3 of water pumped out from tanks 5 & 6 secondary containment, up to 280 m^3 of water could have reported to the tundra rather than tanks 3 & 4 secondary containment.

Volume estimates are based on photo interpretation of the containment reservoirs (dated August 15th), surveying information (performed September 11th) and accumulated precipitation (with no evapotranspiration) which occurred at the Baker Lake Airport between the period the photos were taken and the moment the situation was identified. Therefore, these estimates are conservative and represent upper bounds in terms of volumes.

Following the identification of this issue, water samples were taken on September 11th, 2021 of the remaining water in the secondary containment of tanks 5 & 6 and presented an average total oil and grease value of 1.55mg/L, which is under the discharge criteria (5 mg/L) set out in the Nunavut Water Board license NWB-2AM-MEA1530. Except for the minor visible sheen, no analyzed parameter in the secondary containment of tanks 5 & 6 was above discharge criteria. Based on intake location – in the bottom portion of the reservoir – the surface sheen is not expected to have been pumped. Additional water and soil samples were taken to evaluate environmental impact.

Initial communication of the spill was done through the Spill Hotline.

Figure 1. Aerial view of the spill location (2021-09-11)

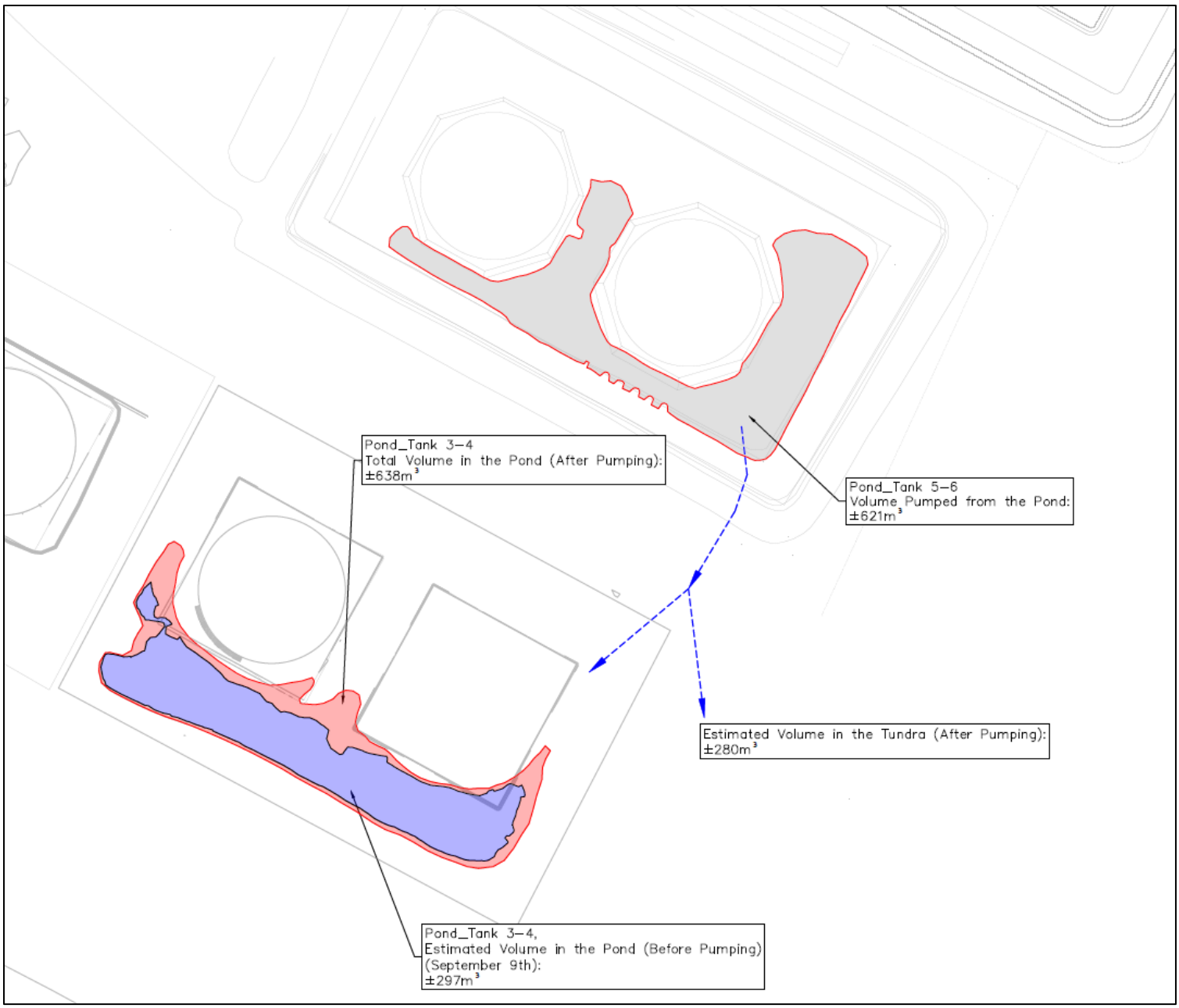

Figure 2. CAD representation of event

Spill location: 64’18’24” 95’56'40" on IOL.

Distance to the closest water body is about 400 meters to Baker Lake. While no sign of erosion, flow path or other evidence along the shoreline presented evidence of significant inflow into the water body, the possibility remains. The Baker Lake was sampled and analyzed for acute lethality to *Daphnia Magna* and *Rainbow Trout*, as well as petroleum hydrocarbons and metals.

Cause of the spill

The spill was caused due to the misplacement of the discharge pipe of water transfer between ST-40.1 and ST-40.2. The employee intended to place the discharge pipe in an area for the water to report directly into the secondary containment of tanks 3 & 4, but the actual water flow did not fully report there.

Remediation and Monitoring Actions

Hydrocarbon spill booms and woodchip turbidity booms were deployed in 2 visible streams to minimize potential impact on the Environment. Monitoring actions at the Baker Lake tank farm began on September 10th and included, petroleum test strip testing, soil sampling downstream of the discharge point, and sampling of water stations ST-40.1 and ST-40.2. Further monitoring actions along the Baker Lake shoreline included an acute lethality of effluent to Daphnia Magna and Rainbow Trout analysis, and daily water quality sampling from September 10th – 15th, excluding the 13th, and weekly until freeze-up thereafter. An internal investigation was initiated.

As per the water quality results presented in Table 1 & 2 below, there have been no observed impacts on water quality. Preliminary acute lethality analysis of water quality in Baker Lake have demonstrated no toxicity to daphnia and to rainbow trout. All soils sediments are below the industrial CCME guidelines for every parameter analysed, see Table 3 below.

Water remaining in secondary containment of Tank 3 & 4 will be dealt according to site protocol.

Corrective measures

Two key corrective actions were identified following the internal investigation:

- Develop and implement a fuel, liquids or hazardous material policy and associated verification procedure requiring supervisor authorization prior to engaging in water activities during construction.
- Develop and implement Environmental awareness content to be added to the general on-boarding process, including content pertaining to the transfer of water/hazardous material.

Closure

We trust that the above details described appropriately the spill incident that was observed at the Meadowbank Complex on September 10, 2021 and the remediation and monitoring activities. Please contact the undersigned should you have any questions.

AGNICO EAGLE

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Figure 3. Baker Lake Tankfarm, Baker Lake Shoreline and Sediment sampling locations (Satellite picture 2019)

Figure 4. Aerial of Baker Lake Tankfarm (2021-09-11)

Figure 5. Discharge Area in Secondary Containment of Tanks #3-4 (2021-09-11)

Figure 6. Baker Lake Shoreline (2021/09/11)

Figure 7. Woodchip and Hydrocarbon boom (2021/09/11)

Figure 8. Pump Intake in Secondary Containment of Tanks #5-6 (2021/09/10)

Figure 9. Water Elevation/Depth Survey in Secondary Containment of Tanks#3-4 (2021-09-11)

Analysis results of the sampling are shown in tables 1 to 4 below and official certificates are attached.

RESULTS OF ANALYSES OF WATER				
Sampling Date		2021/09/11 14:30	2021/09/12 15:40	
				Maximum Average Concentration (MAC)
	UNITS	ST-40.1	ST-40.1	
Inorganics				
Total Ammonia-N	mg/L	0.58	1.1	6.0
Total Suspended Solids	mg/L	4	3	15
Field Mesurement				
pH	pH	7.89	7.98	6.5-9.0
Metals				
Total Arsenic (As)	mg/L	0.00074	0.00070	0.50000
Total Copper (Cu)	mg/L	0.00407	0.00407	0.30000
Total Lead (Pb)	mg/L	<0.00020	<0.00020	0.1
Total Nickel (Ni)	mg/L	<0.0010	<0.0010	0.5
Total Zinc (Zn)	mg/L	<0.0050	<0.0050	0.5
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	1.4	1.7	5 and no visible sheen
BTEX & F1 Hydrocarbons				
Benzene	ug/L	<0.20	<0.20	370
Toluene	ug/L	0.88	0.46	2.00
Ethylbenzene	ug/L	0.69	0.32	90.00
o-Xylene	ug/L	7.4	5.6	
p+m-Xylene	ug/L	3.7	1.6	
Total Xylenes	ug/L	11	7.2	

Table 1. ST-40.1 Sampling Results – MAC taken from NWB-2AM-MEA1530

RESULTS OF ANALYSES OF WATER						
Sampling Date		2021/09/10 13:20	2021/09/11 15:10	2021/09/12 14:30	2021/09/14 13:30	2021/09/15 07:00
	UNITS	BL SHORE	BL SHORE	BL SHORE	BL SHORE	BL SHORE
Inorganics						
Total Ammonia-N	mg/L	0.27	0.24	0.44	0.064	<0.050
Total Suspended Solids	mg/L	2	1	2	2	3
Field Mesurement						
pH	pH	8.24	7.72	7.44	7.58	7.4
Metals						
Total Arsenic (As)	mg/L	0.00017	0.00014	0.00012	0.00015	0.00016
Total Copper (Cu)	mg/L	0.00079	0.00069	<0.00050	<0.00050	0.00069
Total Lead (Pb)	mg/L	<0.00020	<0.00020	0.00021	<0.00020	<0.00020
Total Nickel (Ni)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Zinc (Zn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Petroleum Hydrocarbons						
Total Oil & Grease	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
BTEX & F1 Hydrocarbons						
Benzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20
o-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40
Total Xylenes	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	99	100	100	97	101
4-Bromofluorobenzene	%	92	94	97	92	90
D10-o-Xylene	%	101	101	102	94	86
D4-1,2-Dichloroethane	%	105	106	104	103	98

Table 2. Sampling Results at Baker Lake Shoreline

PETROLEUM HYDROCARBONS (CCME)										
Sampling Date		9/11/2021	9/11/2021	9/11/2021	9/11/2021	9/11/2021	9/11/2021	9/11/2021	9/11/2021	9/11/2021
	UNITS	BLSOIL.1	BLSOIL.2	BLSOIL.3	BLSOIL.4	BLSOIL.5	BLSOIL.6	BLSOIL.7	BLSOIL.8	BLSOIL.9
BTEX & F1 Hydrocarbons										
Benzene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
p+m-Xylene	ug/g	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Total Xylenes	ug/g	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
F2-F4 Hydrocarbons										
Total Oil and Grease	ug/g	380	<100	<100	390	360	530	<100	360	<100
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	380	<50	<50	<50
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	100	<50	<50	<50

Table 3. Bake Lake Sediment Sampling

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

PRELIMINARY

ACUTE LETHALITY REPORT SUMMARY

Work Order : 246418

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Baker Lake NU
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RESULTS

Substance	Date Collected	Date Tested	Species / Test	LC50	Mortality in 100% Concentration (%)
BL Shore	2021-09-12	2021-09-16	RBT LC50	>100%	0
	2021-09-12	2021-09-16	Dm LC50	>100%	0

RBT = rainbow trout
Dm = *Daphnia magna*
* = pH Stabilized
SC = single concentration

Test Protocols

Reference Method for Determining Acute Lethality of Effluents to Daphnia magna. Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments)

Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments) .

Although test results are generated under strict QA/QC protocols, the results provided herein, along with any unsigned test reports, faxes, or emails are considered preliminary.

Table 4. Baker Lake Shoreline Toxicity results (preliminary)