APPENDIX B

RESIDENT ENGINEER'S LETTER REPORT:

Information Requested in <u>Part B - General Conditions</u>, and <u>Part D – Conditions Applying to Waste Disposal</u> of Water Licence #1BR-SIM0813 including:

- **Volumes of Raw Water taken;**
- **Volumes of Sewage Generated;**
- **Sewage Effluent Quality;**
- **Waste Disposal Approaches;**
- **Monitoring Program Stations SIM-1 and SIM-2;**
- **Spill Details; and**
- **Others**

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May 30, 2012

Dele Morakinyo
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Dear Mr. Morakinyo:

Project No: 60149115

Regarding: Water Licence Reporting Requested Information
CAM-D DEW Line Site, Simpson Lake, Nunavut

The following bullets present a summary of the information requested and correspond with Part B – General Conditions, Section 1 of Water Licence #1BR-SIM0813 (incorporating modifications from Amendment No. 1).

a. The monthly and annual quantities of freshwater obtained are as follows;

2010 Construction Season	Quantity (m^3)	2011 Construction Season	Quantity (m^3)
2010, June	42	2011, June	12
2010, July	62	2011, July	62
2010, August	62	2011, August	62
2010, September	60	2011, September	46
2010, October	18	2011, October	-
2010 Annual Total =	**244**	**2011 Annual Total =**	**182**

b. The monthly and annual quantities of sewage generated as follows;

2010 Construction Season	Quantity (m^3)	2011 Construction Season	Quantity (m^3)
2010, June	42	2011, June	12
2010, July	62	2011, July	62
2010, August	62	2011, August	62
2010, September	60	2011, September	46
2010, October	18	2011, October	-
2010 Annual Total =	**244**	**2011 Annual Total =**	**182**

c. All combustible domestic waste generated as a result of camp operation was destroyed in a dedicated incinerator. Non-combustible material, such as aerosol cans, used batteries, light bulbs and hazardous waste, was collected for backhauling and/or treatment at the conclusion of the project.

d. All hazardous waste and non-combustible waste was segregated during the 2010 and 2011 construction seasons. Partial backhauling was completed in 2011; confirmation of destruction of hazardous materials has not been received by AECOM. The remainder of the material will be backhauled at the completion of the project in 2012.

e. Sewage waste at CAM-D was pumped through a water treatment "Bionest" system installed outside the north boundary of camp. Prior to complete installation of the treatment system, wastewater was directed to the two lined lagoons which were constructed adjacent to the "Bionest". Once installation was complete, the wastewater collected in the lagoons was introduced into the "Bionest" for treatment. Composite samples of the effluent were collected from the treatment system outlet once per month during periods of discharge and submitted to the laboratory for analysis in accordance with the discharge parameters in the Water Licence. Once acceptable results were received, the treated effluent was discharged to land at the approved location (SIM-2) on a continuous basis. Analytical results of the treated effluent discharged at SIM-2 are provided in **Table 1**.

   During camp winterization, at the end of the 2010 construction season, the remaining untreated wastewater was transferred to the lagoons for winter storage and reintroduced into the "Bionest" at the start of the 2011 construction season.

   At the completion of the 2011 construction season, the sediment in the lagoons was sampled, tested and packaged together with the liners for shipment off site. The area was then reshaped to match the surrounding terrain.

   The following photograph shows the CAM-D camp area. The temporary sewage lagoons and the "Bionest" treatment system are located in the northwest (top left of the photo) corner of the camp.


Lagoons and Bionest

f. The following table presents a summary of the data collected during the 2010 and 2011 construction seasons.

Table 1. Monthly Treated Effluent Analysis Results

Parameter	Maximum Average Concentration	Units	Sampled By					
			Kudlik	Kudlik	Kudlik	AECOM	Kudlik	Kudlik
		Date Sampled	7-Jul-10	1-Sep-10	4-Oct-10	4-Oct-10	5-Jul-11	29-Jul-11
BOD	120	mg/L	40	24	9	14	70	67
Total Suspended Solids	180	mg/L	19	13	9	19	57	36
Fecal Coliforms	100,000	CFU/100 mL	66	210	1,900	1,700	**18,000,000**	2,000
pH	6.0 to 9.0	pH units	7.7	7.9	7.5	7.67	7.2	7.72
Oil and Grease	no visible sheen	mg/L	<1	<1	<1	<2	<2	<2

g. Analytical results for the "Bionest" effluent sample collected by Kudlik on July 5, 2011 were received on July 18, 2011. All parameters except fecal coli forms met the effluent quality limits specified in the terms and conditions of the Water License (refer to **Table 1**). The Contractor was immediately instructed by AECOM to stop continuous discharge and redirect the effluent to the lagoons until acceptable results had been received. The Contractor believed that the UV bulb was not working. As a result, the bulb was replaced, and the effluent within the lagoons was allowed the opportunity to circulate through the repaired treatment system; the effluent was re-sampled by the Contractor on July 29, 2011. A review of the analytical results revealed all parameters met the effluent quality limits. Kudlik resumed continuous discharge of the waste effluent to the pre-approved discharge location on August 15, 2011. It should be noted that all wastewater generated between July 18 and August 15, 2011 was temporarily stored in the lagoons pending treatment and not released to the tundra.

h. Five marine containers were filled with hazardous materials (i.e. items painted with lead and/or PCB amended paint, PCB oil-containing electrical equipment, fluorescent light ballasts etc.) generated during remediation activities in 2010. In addition to the marine containers, 308 superbags (approx 1 m^3 capacity) and 48 wooden seacans (approx 2.4 m^3 capacity) were filled with contaminated soil which required shipment off-site. The marine containers, superbags and seacans were relocated to the temporary storage area at Shepherd Bay during the winter 2011 CAT train in preparation for final demobilization.

During the 2011 construction season, two marine containers were filled with hazardous materials. In addition to the marine containers, 123 superbags and 45 wooden seacans were filled with contaminated soil which required shipment off-site. In addition to the 123 superbags containing contaminated soil, three superbags were required for ashes from domestic garbage burning and/or the incineration of unpainted/untreated wood at the upper site; the inflatable pools were deflated and packaged in four superbags; six superbags contain used absorbents, two superbags were required for soil excavated from spills around the construction camp (uncharacterized); and one contains tar from barrel processing activities at the Main Dump. The marine containers, superbags and secans were relocated to the temporary storage area at Shepherd Bay during the winter 2012 CAT train in preparation for final demobilization.

i. The following paragraphs provide a summary of the remediation operations completed during the 2010 and 2011 construction seasons;

In 2010, approximately 17,650 m^3 of borrow material was quarried from Borrow Area No. 2, of which 14,400 m^3 was borrowed and used for haul road improvements, on-site non-hazardous waste landfill (NHWL) berm construction and general fill (where required). Restoration of Borrow Area No. 2 was completed in 2010. The remaining volume of borrow material (estimated 4,000 m^3 of Type 2 and 1,700 m^3 of Type 3) sufficient to meet the requirements of the specifications (final cap on the NHWL and final site regrading) was hauled and stockpiled at the upper site at the close of the 2010 construction season to facilitate site closure activities in 2011.

Construction of the NHWL was completed over the 2010 and 2011 seasons. The berms were constructed to their final grade in 2010, and once all site debris and hydrocarbon impacted/Tier I contaminated soils were disposed of in the NHWL, the landfill was capped. Construction of the NHWL was finalized by September 2011. In July 2011, groundwater monitoring wells were installed on each of the four sides of the NHWL. The monitoring wells will be accessed during future monitoring events.

With the exception of POL Tank No. 5, which was demolished and containerized in September 2011, all major structures were demolished in 2010 and either disposed of in the NHWL or containerized for shipment offsite. Demolition activities involved PCB amended paint (PAP) and lead based paint removal and containerization for shipment off-site; asbestos abatement; and the removal and disposal of inert debris (i.e. concrete, fibreglass insulation, and scrap metal) in the NHWL.

All hydrocarbon, heavy metals and PCB soil excavations were excavated to the full extent of the contamination (established based on analytical results from confirmatory soil samples). Two waste streams were generated from the excavation of impacted and contaminated soils: the Hydrocarbon Impacted soils and Tier I metals and PCB contaminated soils were suitable for disposal in the NHWL; and the Hydrocarbon Contaminated and Tier II metals and PCB contaminated soils required containerization and offsite disposal. In an effort to reduce the volume (and concentration) of Hydrocarbon Impacted soils being disposed in the NHWL, a landfarm treatment area was developed in 2011. No further soil excavation activities are required at CAM-D.

Remediation of buried debris areas included in the original contract involved removal of surface debris; excavation of debris to full extent; sorting and separation of debris into different waste streams (non-hazardous debris, hazardous debris and soil); disposal of non-hazardous waste into the NHWL and containerization of hazardous waste for offsite disposal; and stockpiling intermixed soil for sampling to determine disposal requirements.

Buried debris excavations were initiated in September 2010 and finalized in August 2011. Capping of the three buried debris lobes at the Main Dump was completed in July and August 2011. All hazardous materials and Tier II metals and PCB contaminated soil generated from the buried debris excavations are currently stored at the camp area awaiting offsite disposal.

Non-hazardous waste and Tier I soils were disposed of in the NHWL. No further buried debris excavations are required at CAM-D.

Collection of surface debris from the 14 previously identified Site Debris Areas was a work activity that extended throughout the 2010 and 2011 construction seasons. Included in the debris collection were the nearly 10,000 barrels that were located across the site. All site debris areas have been inspected and no further debris collection is required.

With all on-site construction activities complete, final inspection has been tentatively scheduled for September 2012.

j. No studies were requested by the Board that relate to waste disposal, water use or reclamation and no future studies are planned.

k. The following table presents a summary of all unauthorized discharges and the associated corrective actions taken during the 2010 and 2011 construction seasons. All quantities were below the reportable limit.

Table 2. CAM-D Spill and Unauthorized Discharge Summary

Date of Occurrence	Description of Spill/Unauthorized Discharge	Related Equipment	Product Spilt	Quantity (L)	Corrective Action Taken
July 26, 2010	Stained soil observed near CAT Challenger 855D in Main Station Temporary Storage Area.	Unknown	Hydraulic Fluid	<1 L	The impacted soil was excavated and placed into a barrel which was disposed of in the NHWL.
July 29, 2010	Hydraulic hose disconnected and sprayed the ground surface in the heavy equipment parking adjacent the garage.	Komatsu WA500 Loader	Hydraulic Fluid	1-2 L	Repaired the hose and cleaned the surface of the machine. The impacted soil was excavated into a pail and placed in the NHWL.
August 2, 2010	Broke radiator half-way on haul road; leaked slowly along road to the garage.	Contractor's Ford F350 Crew Cab Truck	Anti-Freeze (ethylene glycol)	3 L	The remaining fluids in the radiator were drained (~3 L) into a spill pan and the radiator was replaced. The impacted soil was excavated into a pail and disposed of in the NHWL.
August 24, 2010	Lubricant dripped from hinge and emulsified with ponded water at the Airstrip.	Compactor	Lubricant	<1 L	Cleaned the ground surface using absorbent pads and installed a drip collection pan underneath the parked compactor.
September 6, 2010	Stained soil observed adjacent garage at Camp Site.	Unknown	Diesel Fuel	<1 L	Impacted soil was excavated onto a polyethylene membrane. The stockpile was sampled by AECOM and then placed in the NHWL when acceptable results were received.
September 6, 2010	Stained soil observed in Borrow Area No. 2.	Unknown	Hydraulic Fluid	< 1L	Impacted soil was excavated onto a polyethylene membrane. The stockpile was sampled by AECOM and then placed in the NHWL when acceptable results were received.
September 7, 2010	Hydraulic hose was damaged and fluid sprayed on the equipment and the ground surface in Borrow Area No. 2.	Komatsu PC300 Excavator	Hydraulic Fluid	1-2 L	Repaired the hose and cleaned the surface of the machine (and the ground surface) using absorbent pads. No soil excavation was required. The used absorbents were incinerated on-site.
October 1, 2010	New diesel fuel barrel was damaged during transport from barrel cache to the main storage tank at the Camp Site. Barrel fell from the sleigh used for transport and was partially crushed. The partially crushed barrel leaked on the frozen ground. Two other barrels also fell to the ground and were damaged; however, they were not punctured and did not leak.	CAT Challenger 855D and Sleigh	Diesel Fuel	20-30 L	Contents of the damaged barrel were pumped into an empty fuel barrel. The fuel on the frozen ground was completely absorbed with bulk absorbent. The fuel soaked absorbent was placed into an open-top barrel and incinerated on-site. The contents of the other two barrels were pumped into the main storage tank.
Winter 2010/2011	The compactor was parked along the east side of the airstrip at the end of the 2010 construction season for the duration of the winter. The leak was observed once the snow had melted on June 25, 2011.	Compactor	Hydraulic Fluid	15 L	Snow and ice in the area of the spill made it difficult to access the underlying soil. As a result, the spill was cleaned over two days (i.e. June 25 and June 27, 2011). All the fluid was recovered using bulk absorbent and absorbent pads. The used absorbents were incinerated on-site.
June 27, 2011	New lubricating oil barrel was damaged while manoeuvring a marine container with the loader. The container wall and a barrel stored inside that container were punctured with the forks of the loader. Most of the spill was contained inside the	Komatsu WA500 Loader	Lubricating Oil	< 25 L	A sand dyke was constructed around the container to contain the spill. All the lubricating oil was recovered using bulk absorbent and absorbent pads. No soil excavation was required. The used absorbents were incinerated on-site.

Date of Occurrence	Description of Spill/Unauthorized Discharge	Related Equipment	Product Spilt	Quantity (L)	Corrective Action Taken
	container. A small volume was spilled onto the ground.				
July 7, 2011	During the excavation of Main Dump - Lobe 1 Buried Debris, a buried canister (presence unknown until the incident) of grease (similar characteristics to BR-145) was crushed by a rock truck circulating in the area.	Rock Truck	Grease	< 10 L	The grease and underlying soil were excavated by hand into plastic bags and consolidated into an open top barrel with the contents of BR-145. Used absorbents were consolidated together with used absorbent material from barrel processing activities and packaged for shipment off-site.
September 19, 2011	During the barrel consolidation activities in the northeast end of the camp, a portion of the south wall of the containment pan (erected on the work platform) fell while installing the duct work (used to warm up the barrels to be drained). Approximately 20 L of lubricating oil and fuel was spilled on the ground surface.	Containment Pan	Lubricating oil and Fuel	20 L	The wall of the containment cell was rapidly put back in place. All the spilled fluid was recovered using bulk absorbent and absorbent pads. The ground surface was brushed and all stained soil was excavated into a lined superbag for off-site shipment and disposal. Used absorbents were consolidated together with used absorbent material from barrel processing activities and packaged for shipment off-site.

l. **Contaminated Soil**

The provision for the treatment/aeration of PHC impacted soils was introduced in between the 2010 and 2011 construction seasons to minimize the requirement for disposal of all of the remaining impacted soil in the NHWL.

As a result, all material excavated during the 2011 construction season was relocated to the landfarm for ex-situ treatment by aeration to reduce the PHC concentrations to meet the current guidelines. Following the treatment of impacted soil within the landfarm treatment cell, approximately 576 m^3 of treated soil was removed from the landfarm area and used as the final lifts of intermediate fill in the NHWL (i.e. not the landfill cover). The remaining treated soils were left in place and the area was reshaped to provide positive drainage.

Main Dump

The Main Dump was identified in the Contract Documents as Site Debris Area 1 (which encompassed surface debris to a depth of 0.5 m); however, the amount of debris remaining in the soil after preliminary surface debris removal revealed that combing the area to remove visible debris at surface would not be sufficient to address the debris issue at the Main Dump.

As a result a test pitting investigation was completed, which identified four lobes of previously unidentified buried debris (i.e. Lobes 1 through 4) within the limits of the Main Dump. Typical debris found within the lobes consisted of crushed and/or partially crushed barrels, scrap metal, wood, cables and machine parts mixed together with soil. Results of the test pitting investigation coupled with supplementary information regarding soil quality, confirmed the need to re-evaluate the previously recommended remedial approach. Subsequently, recommendations were presented for each of the four lobes based on the level of environmental risk associated with each lobe. It was recommended that Lobes 2, 3 and 4 be covered in place and Lobe 1 be excavated fully, the debris sorted and disposed of appropriately, and the residual soil stockpiled and sampled in accordance with the applicable guidelines.

m. No revisions were made to the site specific Spill Contingency Plan.

n. No trenches or sumps were excavated.

o. Public consultation/participation report to be provided by AANDC.

p. The only deficiency/recommendation identified by the Land Use Inspector (2010) was the lack of secondary containment for the fuel storage. Since the fuel was stored in individual 205 L drums (<230 L) they are not regulated and no secondary containment was constructed.

q. Executive summary to be provided by AANDC.

r. No other details were requested by the Board.

I trust the information presented herein meets your expectations for the Water License annual reporting requirements. If you have any questions or concerns please contact me by email priya.handa@aecom.com or phone at 780-486-7671.

Sincerely,
AECOM Canada Ltd.

Priya Handa
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Encl.
cc: Matthew McElwaine (PWGSC), Greg Wright (AECOM),