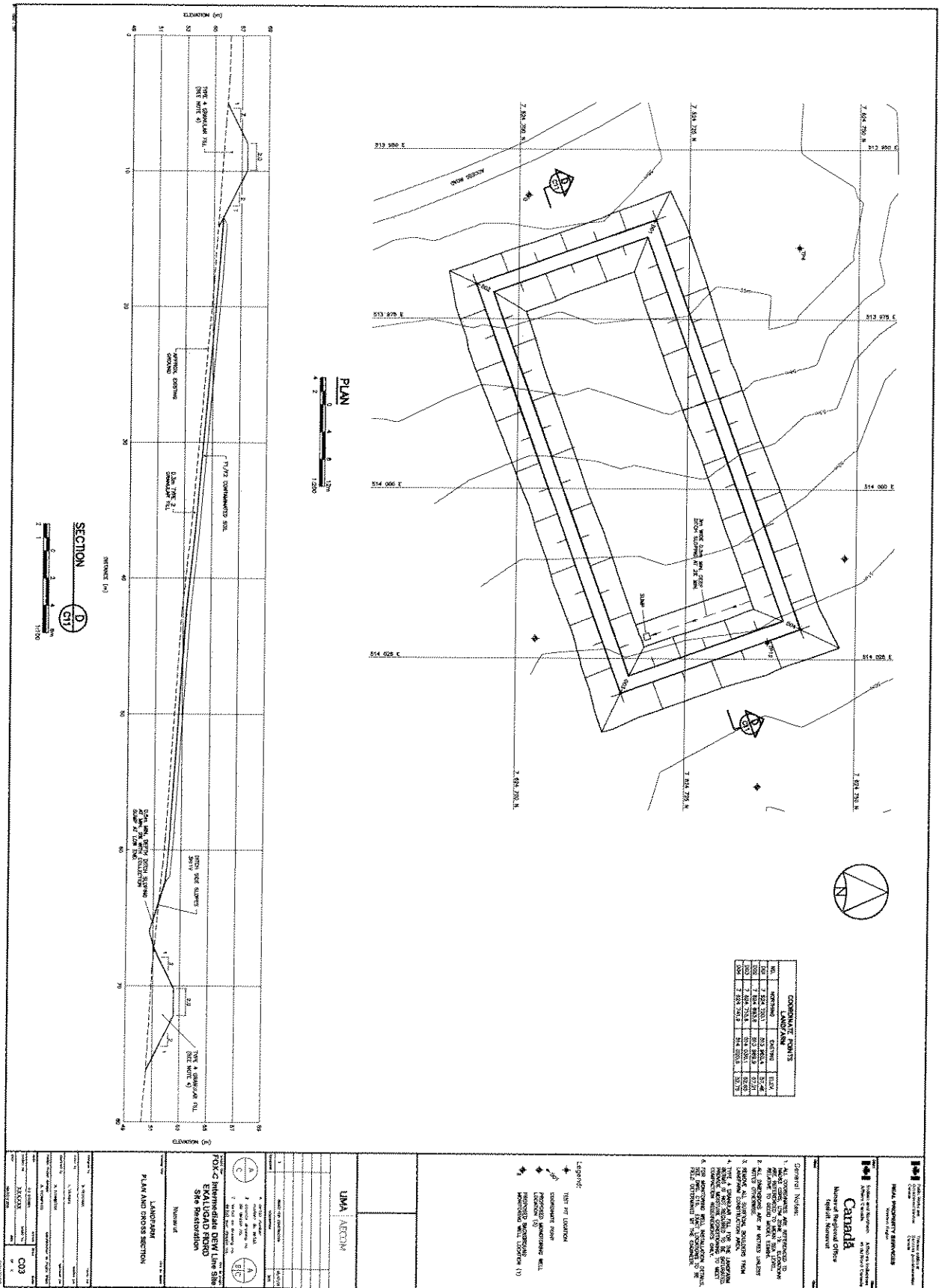
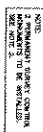
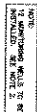


REAL PROPERTY SERVICES Canada Heritage Regional Office 1000 Avenue du Parc Québec, Québec G1P 1A8		Project No.: 235335 Date: 2002
Legend: + TEST PIT LOCATION - LOCATION OF REMOVED STRUCTURE - REMOVED STRUCTURE - REMOVED STRUCTURE - REMOVED STRUCTURE		
UMA / AECOM		
FOX-C Intermediate DEW Line Site 8th Division Lower Site Camp Area SITE PLAN		
Prepared by: [Name] Checked by: [Name] Drawn by: [Name] Scale: 1:500 Date: 2002		

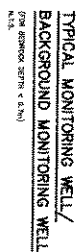




TYPICAL PERMANENT SURVEY
CONTROL MONUMENT (BENCHMARK)
K17.9



TYPICAL MONITORING WELL /
BACKGROUND MONITORING WELL
(from 602200000 DNR TN to 6170000)
46 T.S.

[illegible]

UMA Engineering Ltd.
17007 107 Avenue
Edmonton, Alberta T5S 1G3
T 780.486.7000 F 780.486.7070 www.uma.aecom.com

May 30, 2006

File Name: 2977-301-05-02

Mr. Brad Thompson, P.Eng.
Senior Project Engineer, Western Region
Public Works and Government Services Canada
Telus Tower North
5th Floor, 10025 – Jasper Avenue
Edmonton, AB T5J 1S6

VIA EMAIL: Brad.Thompson@pwgsc.gc.ca

Dear Mr. Thompson:

**Re: Restoration of FOX-C and CAM-F Intermediate DEW Line Sites
Application for a Water License from the Nunavut Water Board (NWB)
Response to NWB Outstanding Issues for the Water License Applications**

UMA Engineering Ltd. (UMA) has been retained to provide services to support the application for Water Use Licenses for the environmental restoration at the CAM-F, Sarcpa Lake and FOX-C, Ekalugad Fiord Intermediate DEW Line sites. The Nunavut Water Board (NWB) has submitted a letter, dated May 26, 2006, outlining outstanding issues for these water license applications. The purpose of this letter is to provide a response to the NWB issues. This response letter is structured to follow the format of the NWB letter.

RESPONSES RELATIVE TO BOTH APPLICATIONS (1BR-SAR & 1BR-EKA)

1. Justification of the Wastewater Discharge Criteria:
 - a. The Environment Canada reference document: "An Approach for Assessing and Managing Wastewater Effluent Quality for Federal Facilities" (2000) has been pulled from circulation; however, this does not affect the wastewater discharge criteria, as there are other guidelines to back up each parameter (see response to 1 d).
 - b. The Wastewater Discharge Criteria parameters are the same for both the 1982 and 1992. The guideline comparison table (see response to 1 d) has been updated to reference the 1992 Guidelines.
 - c. Attached to this letter are the specification pages with the corresponding Wastewater Discharge Criteria from the current DND Clean Up Sites (FOX-5, FOX-M and DYE-M).
 - d. I have updated and attached Table 1 – Comparison of Project Wastewater Criteria to other Canadian and Northern Standards – to show that each parameter has a match to an existing environmental guideline.
2. PWGSC to respond to QA/QC plan issues.

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RESPONSES RELATIVE TO APPLICATION 1BR-SAR

3. PWGSC to provide response for the fuel storage facility based on communications with the Contractor.

RESPONSES RELATIVE TO APPLICATION 1BR-EKA

1. The total requirement for water, including camp and construction activities, is estimated at 30 cubic metres per day.
2. The volume of solid waste that will be generated by the camp is estimated at 150 kg per day. All combustible waste will be incinerated and the ash/residual will be disposed of in the on-site non-hazardous waste landfill.
3. It is not expected that there will be any hazardous waste generated from the camp and laboratory. Any hazardous waste generated from construction, camp or laboratory will be containerized appropriately and shipped off-site for disposal at a licensed hazardous waste disposal facility.
4. PWGSC to provide response for the fuel storage areas based on communications with the Contractor.
5. PWGSC / INAC to forward Landfarm Questionnaire Response.
6. PWGSC to provide response for wastewater storage based on communications with the Contractor.

OTHER ISSUES

Total Petroleum Hydrocarbons (TPH) and BTEX constituents have not been included in the Wastewater Discharge Criteria for CAM-F, FOX-C or any of the DND DEW Line Sites.

The hydrocarbon contamination at the FOX-C and CAM-F sites are typically the result of diesel fuel and/or lubricating oil spills. These hydrocarbon products consist of heavy end hydrocarbon chains, rather than the lighter end, such as the BTEX constituents, and are not very soluble in water. In addition, the hydrocarbon contamination at these sites occurred during the operational timeframe (from the mid-1950's to the mid-1960's) before the sites were closed. As such, there would be little, if any, BTEX present in the soils, as they are easily volatilized. Therefore, the most meaningful and practical parameter to monitor in the wastewater would be oil and grease. Previously, we have monitored this by the presence/absence of a visible sheen. On occasion, the water has been sampled for oil and grease. The visible sheen is an indication of phase-separated hydrocarbons and can easily be dealt with by skimming the surface or filtering the wastewater with a hydrophobic, sorbent boom or blanket.

For the PCB concentration in wastewater, we propose a criterion of 1 ppm (mg/L), which is derived from the Chlorobiphenyls Regulations (1991). Section 5 (2 b) from this regulation states that: "the concentration that may be released is 5 ppm by weight of the liquid in respect of an application to a road surface". We have chosen the criteria of 1.0 mg/L to provide a slightly more conservative value than CEPA requires.

For the zinc concentration in wastewater, we propose to lower the criteria from 1 mg/L to 0.5 mg/L to match the 1992 NWT Guidelines for Municipal Wastewater Discharge.

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CLOSURE

We trust this meets your current requirements. If you require additional information or clarification, please call me on my direct line at (780) 486-7624.

Respectfully Submitted,

UMA Engineering Ltd.



Barry Fedorak, P.Eng.
Senior Project Engineer
barry.fedorak@uma.aecom.com

BWF:js

cc: Jared Buchko, PWGSC - via email: jared.buchko@pwgsc.gc.ca

Encl: Table 1 - Comparison of Project Wastewater Criteria to other Canadian and Northern Standards
Wastewater Discharge Criteria for FOX-5, FOX-M and DYE-M
Water Quality Results from the Site Clean Up at PIN-3, Lady Franklin Point

Table 1: Comparison of Project Wastewater Criteria to other Canadian and Northern Standards

Parameter	Construction Wastewater Discharge Criteria (µg/L)	NWT Guideline, 1992 (µg/L)	Nunavut Effluent Guidelines, Sept. 2002 (µg/L)	CCME Interim Irrigation Criteria, 1991 (µg/L)	Chlorobiphenols Regulations (1991)
pH	6 - 9 (unitless)	N.G.	N.G.	6.5 - 9.0 (unitless)	N.G.
Oils and Grease	5000	5000 / none visible	N.G.	N.G.	N.G.
Arsenic (total)	100	50	500	100	N.G.
Cadmium (dissolved)	10	5	1.7	10	N.G.
Chromium (dissolved)	100	100	890 (trivalent)	100	N.G.
Cobalt (dissolved)	50	100	N.G.	50	N.G.
Copper (dissolved)	200	200	N.G.	200 - 1000	N.G.
Lead (dissolved)	50	50	N.G.	200	N.G.
Mercury (dissolved)	0.6	0.6	10	N.G.	N.G.
Nickel (dissolved)	200	300	N.G.	200	N.G.
PCB (total)	1000	N.G.	N.G.	N.G.	5000
Zinc (dissolved)	500	500	3000	N.G.	N.G.
¹ Guideline numbers derived from Table 4.2					
² Guideline numbers derived from Table 6.2 "Fresh Water Maximum Concentration"					

<u>Parameter</u>	<u>Maximum Allowable Level</u>
pH	6 to 9
Oil and Grease	5 mg/L & None Visible
Arsenic (total)	100 µg/L
Cadmium (dissolved)	10 µg/L
Chromium (total)	100 µg/L
Cobalt (dissolved)	50 µg/L
Copper (dissolved)	200 µg/L
Lead (dissolved)	50 µg/L
Mercury (total)	0.6 µg/L
Nickel (dissolved)	200 µg/L
PCB: discharge to barren area	50 µg/L
PCB: discharge to vegetated area	5 µg/L
Phenols	20 µg/L
Zinc (total)	1,000 µg/L

- .2 Dispose of any liquid effluent not conforming to these guidelines as hazardous material in accordance with Section 02090 - Hazardous Waste Material.

5 Sewage Disposal Requirements

- .1 An existing sewage lagoon services the Hamlet of Qikiqtarjuaq. The Contractor is required to use this sewage lagoon for disposal of all sewage related to this contract, unless capacity or other issues disallow use.
- .2 Comply with the requirements of this section, unless written application has been made to and written permission has been received from the Hamlet. Provide proof of same to Engineer.
- .3 If capacity or other issues disallow use of Hamlet's sewage lagoon, discharge sewage into two temporary lagoons within the DND reserve. Provide the necessary piping to ensure the lagoons can be operated independently.
- .4 Size each of the two temporary lagoons to provide capacity for 45 days of wastewater storage or one-half the duration of the construction season, whichever is less. The maximum fluid depth shall not exceed one metre.
- .5 Locate the temporary lagoon area:
- .1 A minimum of 100 m from the construction camp, Engineer's Office, and/or other temporary facilities.
 - .2 A minimum of 100 m from drainage paths.
 - .3 A minimum of 450 metres from water bodies supporting aquatic life.
 - .4 Downwind of the construction camp based on the prevailing wind direction.
 - .5 Within the DND reserve.

- .2 Submit one complete copy of all submittals and agency approvals to the Engineer.

4 Wastewater Discharge Criteria

- .1 Wash water, meltwater collection, rinse water resulting from the cleaning of fuel tanks and pipelines, and/or any other liquid effluent stream shall be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses, and shall conform to the following guidelines:

<u>Parameter</u>	<u>Maximum Allowable Level</u>
pH	6 to 9
Oil and Grease	None Visible
Arsenic (total)	100 µg/L
Cadmium (dissolved)	10 µg/L
Chromium (total)	100 µg/L
Cobalt (dissolved)	50 µg/L
Copper (dissolved)	200 µg/L
Lead (dissolved)	50 µg/L
Mercury (total)	0.6 µg/L
Nickel (dissolved)	200 µg/L
PCB: discharge to barren area	50 µg/L
PCB: discharge to vegetated area	5 µg/L
Phenols	20 µg/L
Zinc (total)	1,000 µg/L

- .2 Dispose of any liquid effluent not conforming to these guidelines as hazardous material in accordance with Section 02090 - Hazardous Waste Material.

5 Sewage Disposal Requirements

- .1 An existing sewage lagoon services the Hamlet of Hall Beach. The use of this lagoon is subject to the Contractor receiving approval from the Hamlet.
- .2 Comply with the requirements of this section, unless written application has been made to and written permission has been received from the Hamlet. Provide proof of same to Engineer.
- .3 Comply with the requirements of the Land Use Permit, the Water License and the Public Health Act (Nunavut).
- .4 If an existing sewage lagoon is not available discharge sewage into two temporary lagoon areas constructed within the DND reserve. Provide the necessary piping to

<u>Parameter</u>	<u>Maximum Allowable Concentration</u>
pH	6 to 9
Oil and Grease	5 mg/L and None Visible
Arsenic (total)	100 µg/L
Cadmium (dissolved)	10 µg/L
Chromium (total)	100 µg/L
Cobalt (dissolved)	50 µg/L
Copper (dissolved)	200 µg/L
Lead (dissolved)	50 µg/L
Mercury (total)	0.6 µg/L
Nickel (dissolved)	200 µg/L
PCB: discharge to barren area	50 µg/L
PCB: discharge to vegetated area	5 µg/L
Phenols	20 µg/L
Zinc (total)	1,000 µg/L

- .2 Dispose of any liquid effluent not conforming to these guidelines as hazardous material in accordance with Section 02090 - Hazardous Waste Material.

5 Sewage Disposal Requirements

- .1 Comply with the requirements of the Land Use Permit, the Water License and the Public Health Act (Nunavut).
- .2 For each camp location, discharge sewage into two temporary lagoon areas constructed within the DND reserve. Provide the necessary piping to ensure the lagoons can be operated independently.
- .3 Size each of the lagoons to provide capacity for 45 days of wastewater storage or one half the duration of the construction season, whichever is less. The maximum fluid depth shall not exceed one metre.
- .4 Locate the temporary lagoon area:
- .1 A minimum of 100 m from the construction camp, Engineer's Office, and/or other temporary facilities.
 - .2 A minimum of 100 m from drainage paths.
 - .3 A minimum of 450 metres from water bodies supporting aquatic life.
 - .4 Downwind of the construction camp based on the prevailing wind direction.
 - .5 Within the DND reserve.

- .5 Treat all sewage to meet the following Minimum Sewage Discharge Criteria:

<u>Parameter</u>	<u>Maximum Average Concentration</u>
Oil and Grease	None Visible
pH	6 to 9
BODs	120 mg/L
Total Suspended Solids	180 mg/L
Faecal Coliforms	10 000 CFU/dL

Table 2: Summary of 2003 Water Quality Results at PIN-3

Parameter	pH	Oil & Grease mg/L	Total Arsenic mg/L	Dissolved Cadmium mg/L	Total Chromium mg/L	Dissolved Cobalt mg/L	Dissolved Copper mg/L	Dissolved Lead mg/L	Total Mercury ug/L	Dissolved Nickel mg/L	Total Zinc mg/L	PCBs ug/L	Phenols ug/L
Units	pH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	ug/L
MAC: 6.0 - 9.0	No visible sheen	0.1	0.01	0.1	0.05	0.2	0.05	0.6	1	5 or 50	20		
Beach POL Pad (12408631 E, 7596518 N)													
30/06/2003	8.22	None visible	<0.003	<0.001	<0.005	<0.003	0.006	<0.010	<0.4	<0.005	0.018	<3.0	<1.0
Sewage Outfall													
06/07/2003	7.21	None visible	0.004	<0.001	<0.005	<0.003	0.005	<0.010	<0.4	<0.005	0.036	<3.0	<1.0
West Module Train Holding Pond - North (12409012 E, 7598256 N)													
08/07/2003	7.48	None visible	<0.003	<0.001	<0.005	<0.003	0.005	<0.010	<0.4	<0.005	0.014	<3.0	<1.0
West Module Train Holding Pond - South (12409012 E, 7598256 N)													
08/07/2003	7.25	None visible	<0.003	<0.001	<0.005	<0.003	<0.005	<0.010	<0.4	<0.005	<0.010	<3.0	<1.0
Field Blank													
08/07/2003	6.59	None visible	<0.003	<0.001	<0.005	<0.003	<0.005	<0.010	<0.4	<0.005	<0.010	<3.0	<1.0
Travel Blank													
08/07/2003	5.40	None visible	<0.003	<0.001	<0.005	<0.003	<0.005	<0.010	<0.4	<0.005	<0.010	<3.0	<1.0
East Module Train Holding Pond - North (12409240 E, 7598259 N)													
10/07/2003	7.48	None visible	<0.003	<0.001	<0.005	<0.003	0.007	<0.010	<0.4	<0.005	0.025	<3.0	<1.0
East Module Train Holding Pond - North (12409240 E, 7598259 N)													
10/07/2003	7.92	None visible	<0.003	<0.001	<0.005	<0.003	0.006	<0.010	<0.4	<0.005	<0.010	<3.0	<1.0
7/10/2003*	8.01	None visible	<0.003	<0.001	<0.005	<0.003	0.008	<0.010	<0.4	<0.005	0.010	<3.0	<1.0
Beach POL Pad Excavation #1 (12408653 E, 7596461 N)													
05/08/2003	8.01	None visible	0.004	<0.001	0.005	<0.003	0.006	<0.010	<0.4	<0.005	<0.010	<3.0	1.0
Beach POL Pad Excavation #2 (12408630 E, 7596450 N)													
05/08/2003	7.95	None visible	0.005	<0.001	<0.005	<0.003	0.007	<0.010	<0.4	<0.005	0.010	<3.0	1.9
Hanger Excavation (12408221 E, 7597322 N)													
05/08/2003	8.06	None visible	<0.003	<0.001	<0.005	<0.003	0.006	<0.010	<0.4	<0.005	0.040	<3.0	<1.0

NOTE: ¹ Target Maximum Acceptable Concentrations as proposed in the Monitoring Plan
^{5,4} Exceeds Guideline Criteria
* Duplicate Sample