INTERNAL	
PC	
MA	
FO	
LA	
BS	
ST	
TA1	
TA2	
RC	
ED	
CH	
BRD	
EXT.	

March 31, 2004

Project No.: FOX-5 (3.6)

Ms. Phyllis Beaulieu
Licensing Administrator
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0A 1J0

Dear Ms. Beaulieu:

RE: 2003 Annual Report for Water Use License #NWB5QIK0207

UMA Engineering Ltd. is submitting the following annual report as per the requirements of Part B.1 of the above noted water use license. The report is being submitted on behalf of Defence Construction Canada and the Department of National Defence.

The contractor arrived at the FOX-5 site in August 2003. The following is a summary of the work completed at FOX-5 in 2003:

- Set up of the construction camp and supporting facilities were started.
- Gravel hauling began in preparation of the construction of the Tier II Soil Disposal Facility, Non-Hazardous Waste Landfill and the Landfarm.

The work plan for 2004 will be to continue with the clean up activities as described in the project description. An overall site plan is included to show the locations of the various work areas described in this report.

The contractor is using municipal facilities for water and sewage disposal. Therefore, no quantities of water used or sewage discharged for recorded. Also, there were no unauthorized spill incidents at FOX-5 to report.

A community meeting was held in Qikiqtarjuaq on March 12, 2003 to discuss the clean up program at FOX-5. A copy of the presentation and meeting notes is attached to this report.

The information requested as part of the Spill Contingency Plan in your letter dated March 12, 2004 will be addressed under separate cover.

UMA Engineering Ltd. 2540 Kensington Road NW Calgary Alberta T2N 3S3 Canada
telephone (403) 270-9200 facsimile (403) 270-0399 web site www.umagroup.com

We trust the information provided is consistent with the requirements of Water Use Licence #NWB5QIK0207. Please feel free to contact the undersigned if you have any questions or comments.

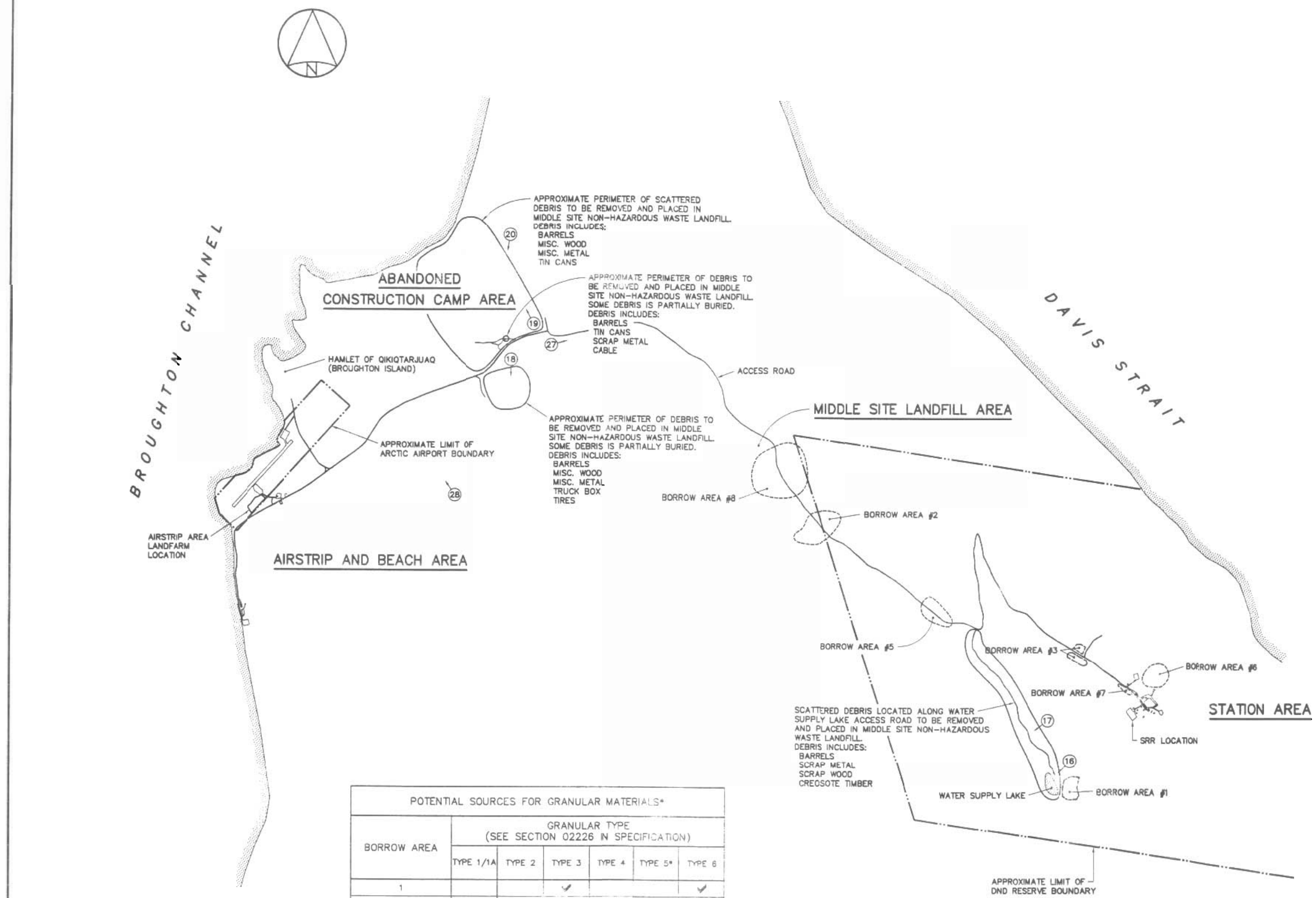
Sincerely,

UMA ENGINEERING LTD.

Eva Schulz, P.Ag.
Environmental Scientist
eschulz@umagroup.com

Encl. Overall Site Plan
Community Meeting Presentation and Notes

cc: Jim Wall, NWB
Phil Warren, DCC



POTENTIAL SOURCES FOR GRANULAR MATERIALS*						
BORROW AREA	GRANULAR TYPE (SEE SECTION 02226 IN SPECIFICATION)					
	TYPE 1/1A	TYPE 2	TYPE 3	TYPE 4	TYPE 5*	TYPE 6
1			✓			✓
2		✓	✓			✓
3	✓		✓			✓
5		✓	✓			✓
6	✓	✓	✓			✓
7	✓	✓	✓			✓
8	✓	✓	✓	✓	✓	✓
INFRASTRUCTURE FILL		✓				✓

* REFER TO GEOTECHNICAL INFORMATION IN APPENDIX E IN SPECIFICATION.

National Defence / Défense nationale

Headquarters
Quartier général

General Notes:

1. ALL NON-HAZARDOUS WASTE FROM UPPER SITE SOURCES TO BE PLACED IN STATION AREA NON-HAZARDOUS WASTE LANDFILL.
2. ALL NON-HAZARDOUS WASTE FROM SOURCES TO THE WEST OF AND ALONG THE WATER SUPPLY LAKE ACCESS ROAD TO BE PLACED IN MIDDLE SITE NON-HAZARDOUS WASTE LANDFILL.

Legend:

- (16) PHOTOGRAPHIC VIEWPOINT
- BODY OF WATER
- APPROXIMATE EXTENT OF DEBRIS AREAS
- APPROXIMATE EXTENT OF BORROW AREAS
- APPROXIMATE LOCATION OF PROPERTY BOUNDARIES

No.	DATE	REVISION	REVISION	APPR.

DRAFT

uma | SRR

SCALE - ECHELLE 400 200 0 400 800 1200m

PROJECT - PROJET
FOX-5 BROUGHTON ISLAND

DEW LINE CLEAN UP

TRADE - METIER	DATE
SITING	2003-01-14

SUBJECT - SUJET

OVERALL SITE PLAN

PRODUCTION	CONCURRENCE - ASSENTIMENT	
DESIGNED / ETUDIE BWT		DES OFF / AGENT CONCEPT
DRAWN / DESSINE CAE		SECT HD / CHIEF SECT
CHECKED / VERIFIE LEM		DES MGR / GEST CONCEPT
COORDINATION SMS	REVIEWED - REVU	

DWG. NO. - DESSIN NO.
H-8233/1-9101-101

Canada

DEW Line Clean Up Project
Community Meetings 2003

March 11th- 12th 2003

Hall Beach (FOX-M)

Gjoa Haven (CAM-2)

July 3rd, 2003

Qikiqtarjuaq (FOX-5)

Community Meetings 2003

Community Meetings

March 11th – 12th, 2003

Hall Beach (FOX-M)
Gjoa Haven (CAM-2)

July 3rd, 2003

Qikiqtarjuaq (FOX-5)

Representatives:

Suzanne Belanger-Fontaine, Department of National Defence
Allison Lobsinger- Department of National Defence
Scott Hamilton, Defence Construction Canada
Nick Monteiro, Defence Construction Canada
Wayne Ingham, Environmental Sciences Group
Daniela Loock, Environmental Sciences Group
Roland Merkosky, UMA Group
Barry Fedorak, UMA Group
Randy Wheeler, SGE-Acres Group
Tania Guty, Public Works and Government Services Canada

Community Meetings for the New Starts in 2003

During the week of March 10th, 2003, public meetings were held at Hall Beach and Gjoa Haven, followed by a public meeting in Qikiqtarjuaq on July 3, 2003. The purpose of these meetings was to update the communities on our site work plan for the summer of 2003. This document contains a copy of each presentation delivered, the minutes of the meetings, as well as pictures of the events and the communities themselves.

Hall Beach –March 11th, 2003
Meeting at 7 pm - Hamlet Council Chambers, Hall Beach
Presenters: Scott Hamilton, Nick Monteiro, Wayne Ingham, Randy Wheeler
Support: Daniela Loock,

Gjoa Haven – March 12th, 2003

Meeting at 7 pm – Community Hall, Gjoa Haven
Presenters: Scott Hamilton, Daniela Loock, Roland Merkosky
Support: Nick Monteiro, Wayne Ingham, Randy Wheeler

Qikiqtarjuaq – July 3rd, 2003

Meeting at 7:00- Avviuujaq Gymnasium
Presenters: Suzanne Belanger-Fontaine, Scott Hamilton, Wayne Ingham, Barry Fedorak, Tania Guty.
Support: Daniela Loock, Allison Lobsinger

Qikiqtarjuaq Community Meeting (Fox-5)

Avviujaq Gymnasium, Qikiqtarjuaq 7:00 p.m.-12:00a.m.

Attendance

There were approximately 45-50 members of the community in attendance, as people entered the gymnasium they signed an attendance sheet, the following is a list of those people.

Jaloo ?, Russ Brandon, Stevie Kakka, Jaypated Hookiguak, Robby Nukiguak, Jopee ?, Julqe Nooluguak, Eliyah Kakudulk, Meeka ?, Ina Sanguga, Davidee Nunkiuguik, Allan Nauyavik, Rosie Alikatuktuk, Koalie Kooneelsie, Harry Alookic, Yakipa Audlakiak, Sam Nookiguak, Enookie Alookie, Larry J Poisey, Aaron Audlakiak, James Koksiak, Daisy Nuqingaq, Veronica Nauyavik, Selina Nookiguak, John Ayaruaq.

In addition 20 members of the community who either signed-in in syllabics or did not sign-in.

Translators: John Ayaruaq and Lavinia Curley

Brief Agenda

1. Introduction and prayer by a member of the hamlet of Qikiqtarjuaq. In the Mayor's absence, Loasie Audlakiak, local representative of the Qikiqtani Inuit Association, opened the meeting.

2 Thomasie Alikatuktuk addressed the community in his function as a representative of Nunavut Tunngavik Incorporated.

3. Presentations:

- General Introduction to the DLCU Project - Suzanne Bélanger-Fontaine (DND)
- Overview of the structure of the DLCU team - Scott Hamilton (DCC)
- Overview of environmental investigations conducted at FOX-5 - Dr. Wayne Ingham (ESG)
- Overview of engineering component of the cleanup at FOX-5 - Barry Fedorak (UMA)
- Overview of land transfer process-Tania Guty (PWGSC), Note: Due to time constraints this was not presented but poster boards were hung in the gymnasium and Tania was able to respond to questions.

Door Prize: A pair of binoculars was awarded at the end of the meeting.

4. Group Discussion Highlights
Detailed meeting notes can be found in Appendix A page .

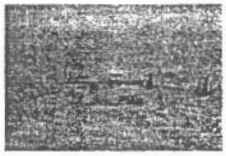
5. Pictures taken at the meeting and of the community can be found in Appendix B page

2. Presentations

DEW LINE CLEAN UP (DLCU)

National Defence / Défense nationale

QIKIQTARJUAQ PUBLIC MEETING
FOR FOX-5 (Broughton Island)
July 3, 2003



Defence Construction Canada / Construction de Défense Canada

Purpose of the meeting

- To inform the residents of Qikiqtarjuaq about the DEW Line Clean-Up project
- To provide information on the work to be done at Qikiqtarjuaq over the next few years, starting this summer

National Defence / Défense nationale

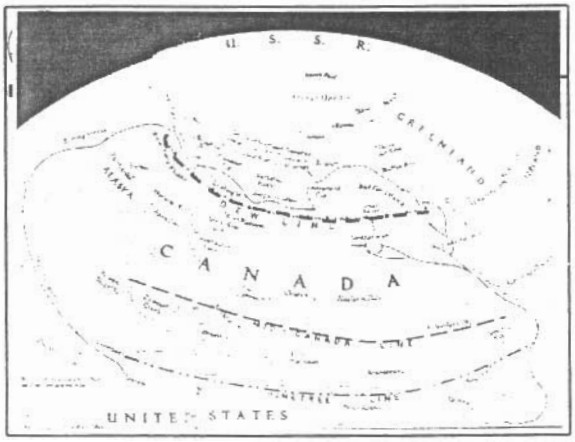
So, what's a DEW Line?

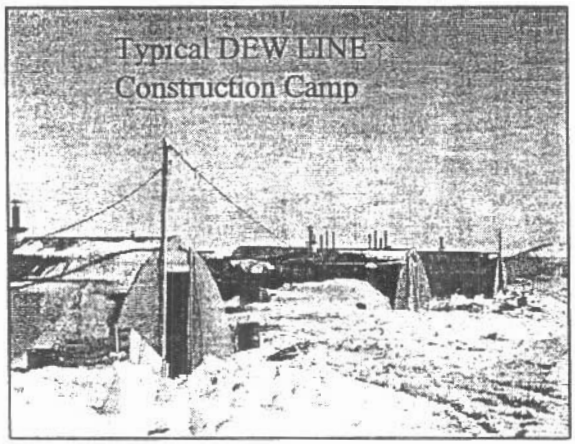
Main Stations Spaced at About 500 Miles
- 40 Civilians
- USAF Compliment

"Aux" Sites at 100 Mile Intervals Between Main Sites
- 20 Technicians and Mechanics

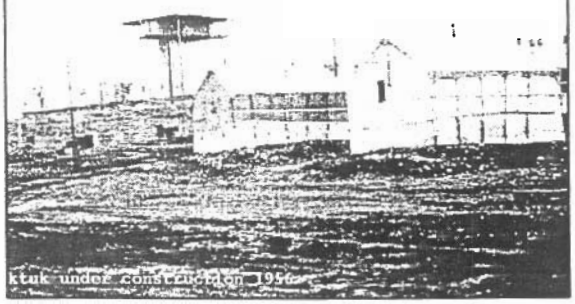
"I Sites" Fill in the Gaps
- 3 Person Crew
- No Search Radar Equipment

National Defence / Défense nationale





BAR-3 Radome Construction
(Tuktoyaktuk), 1956

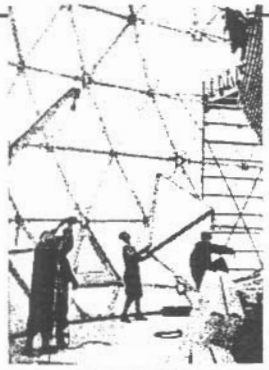


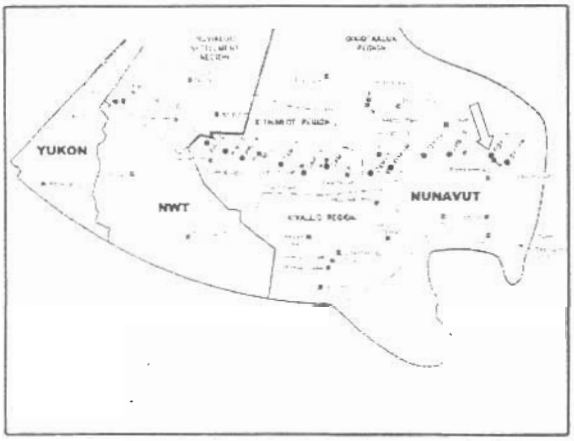
Some Early Photos of DYE-M

Sea Lift

Lower Camp

Reflector Towers & Radar Arrays





Project Aim

At 21 DEW sites;

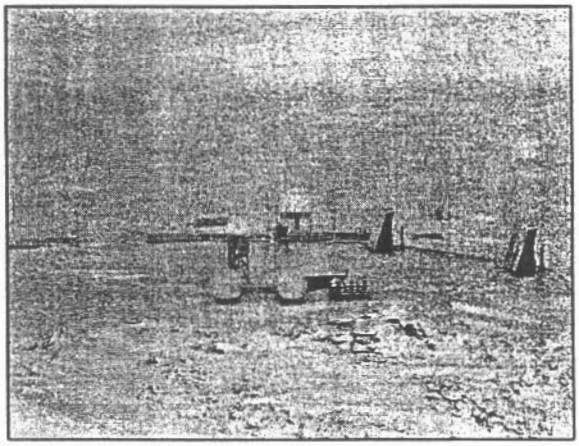
- Return sites to an environmentally safe condition
- Stop migration of contamination from the sites into the food chain
- Dispose of surplus infrastructure
- Remediate existing landfills

National Defence / Défense nationale

Highlights

- DND retains long term environmental responsibility
- Monitoring program
- Cooperation Agreements with IRC and NTI
- 10 year implementation plan
- 25 year monitoring program

National Defence / Défense nationale



Agreements between DND and NTI

1998: Environmental agreement signed by DND and NTI in Cambridge Bay – Addresses environmental issues and how the clean-up will be carried out within Nunavut.

- Ensure that clean-ups result in a safe environment for the Inuit and wildlife;
- Wanted the sites near communities to be cleaned-up first if possible

2001: Economic agreement signed by DND and NTI in Iqaluit in August 2001

- To ensure that Inuit obtain maximum benefits possible in employment and contracting from the clean-ups;
- The Economic Agreement is based on Article 24 of the Nunavut Land Claim Agreement administered by NTI.

National Defence / Défense nationale

The work at Qikiqtarjuaq was delayed for 2 years but the negotiations between the Hamlet, the NTI and DND have resolved the problem . Thanks to the following people:

NTI/QIA:

James Eetoolook, Thomasie Alikatuktuk, Loasie Audlakiak,Charlie Evalik, Joe Ohokanoak, Geela S Kooneeliusie

Hamlet Council:

Mayor Lootie Toomasie and Deputy Mayor Gamailee Nookiguak, and councillors Loasie Alikatuktuk, Mary Killiktee, Rhoda Koksiak, Jukie Nookiguak, Loasie Audlakiak, Toomasie Newkingnak, Peteroosie Kopalie

And all the staff at the Hamlet Office and the PMO

National Defence / Défense nationale

Main issues that were negotiated:

- Land
- Employment and contracting
- Better communications

National Defence / Défense nationale

Land transfer

- Transfer of land to the municipality:
- DND has hired consultants to start the process and the discussions with the Nunavut Government and the Minister of Indian and Northern Affairs;
- They will work in collaboration with the Hamlet to facilitate the transfer process.

National Defence / Défense nationale

Employment and contracting

- NTI signed the agreement under Article 24 of the Nunavut Land Claim, and NTI negotiated the following for FOX-5:
- Minimum Inuit Employment level of 77.5%. This means that at least 77.5% of the person days worked on the clean-up must go to Inuit, and the final level could be higher.
- Minimum level for Inuit contracting. This means that 72% of the overall dollar value of the contract must go to Inuit firms, and the final level may be higher

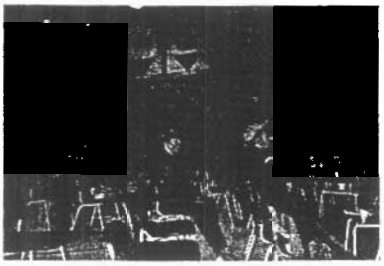
National Defence / Défense nationale

Better communications

- The PMO will communicate with the Hamlet any major changes to the project. We all hope that better communications will make this a great success for the community.

National Defence / Défense nationale

July 24, 2001



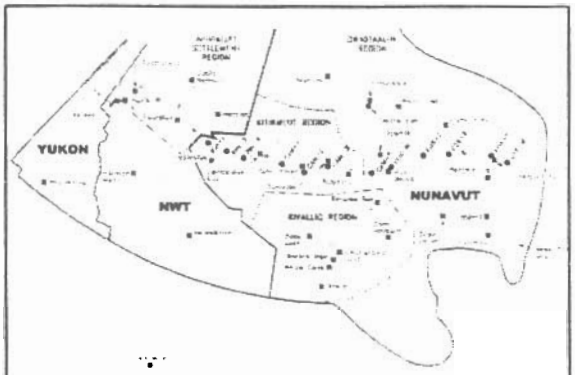
Presentation Outline

DEW Line Clean up:

- The Project Team and Typical Clean up Activities - Scott Hamilton
- Site Investigation Findings - Dr. Wayne Ingham
- Clean Up Plans - Barry Fedorak,P.Eng
- Transfer of DND Reserve Land - Tania Guty
- The Contracting Process and Expected Timelines For Clean up -Scott Hamilton

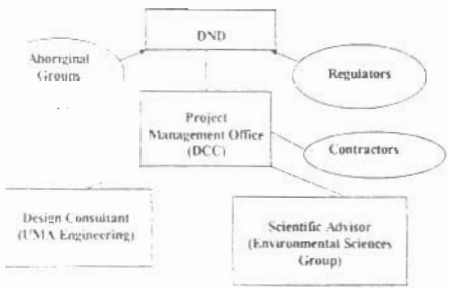
Questions

Defence Construction Canada / Construction de Défense Canada



The Project and Who We Are

DEW Line Clean Up Team



Project Management Office (PMO)

- Responsible to DND for overall implementation of the project
- PMO consists of a project manager, 3 associate project managers, project engineers, a contract manager and an environmental/ quality assurance officer, planning officer.
- Generates and oversees implementation of project (from start to finish)

Defence Construction Canada / Construction de Défense Canada

Project Team

Environmental Sciences Group (ESG)
- RMC (DND organization)
- lead in protocol development
- act as scientific advisor
- conduct on site delineation work
- confirmatory testing

UMA Engineering Limited
- engineering consultant/ advisor
- on site surveys of landfills and infrastructure
- prepare site specific designs and cost estimates
- support during implementation

Defence Construction Canada | Construction de Défense Canada

Typical DEW Line Clean up Activities

- Demolition of Surplus Infrastructure
- Clean up of Contaminated Soils
- Clean up of Old Landfills
- Construction of New Landfills

Environmental Cleanup at the Broughton Island (FOX-5) DEW Line Site

Dr. Wayne Ingham & Dr. Daniela Loock
Environmental Sciences Group Kingston, Ontario

Role of ESG

- To carry out an environmental investigation of the site
- To provide scientific advice for the cleanup
- To ensure appropriate removal of contaminated soils and materials during the cleanup

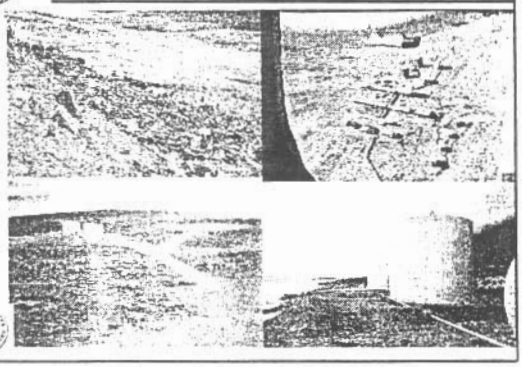
Activity Phases of the DLCU

Sampling Phases

Assessment | Investigation | Construction | Monitoring

FOX-5: 1990 1998-2002 *2003-2006* *2005-2030*

Assessment



Initial Assessment

1990

Two independent assessments of FOX-5

- Environmental Sciences Group sponsored by Department of National Defence
- UMA Engineering sponsored by United States Air Force

The DEW Line Clean Up Protocol

- To restore sites to an environmentally safe condition
- To prevent migration of contaminants into the arctic ecosystem
- *Includes the DEW Line Cleanup Criteria*
- Cleanup plans for individual sites

The DEW Line Clean Up Criteria: Soil

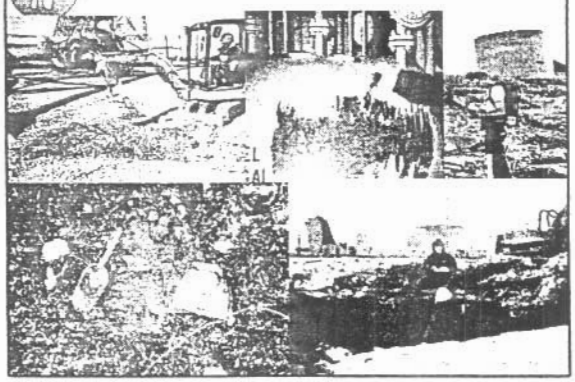
Contaminant	Low Levels (Tier I) (ppm)	Moderate Levels (Tier II) (ppm)
Arsenic		30
Cadmium		5.0
Chromium		250
Cobalt		50
Copper		100
Lead	200	500
Mercury		2.0
Nickel		100
Zinc		500
Polychlorinated Biphenyls (PCBs)	1.0	5.0

Fuel and lube oil based on site-specific evaluations

Hazardous Materials

- PCBs in excess of 50 ppm are regulated by Federal Government
- Materials which can release certain contaminants into water are regulated by Federal Government

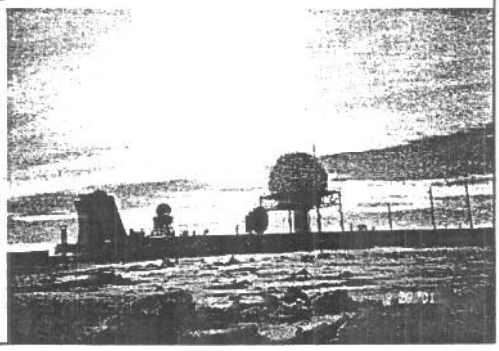
Investigation



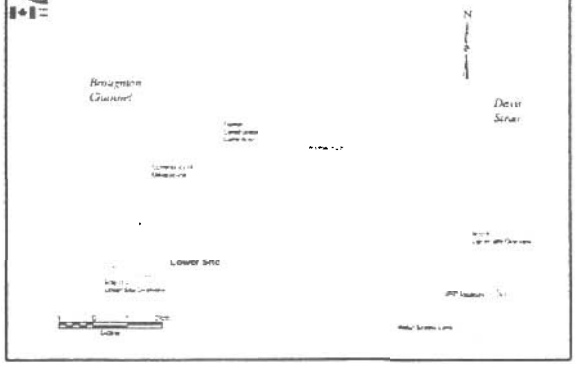
Investigation Phase

- Determine the extent of contamination
- Assess landfills
- Inspect and test buildings, facilities and debris

Investigation of the FOX-5 DEW Line Site

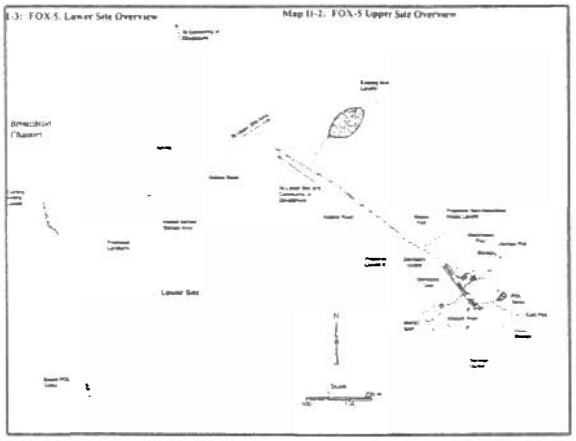


Map II-1: FOX-5, Qikiqtaryuaq Site Overview

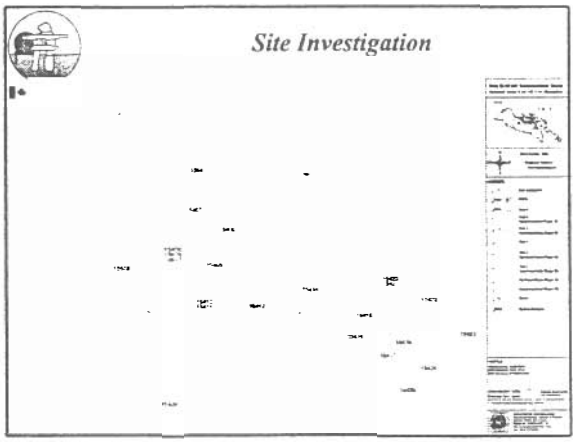


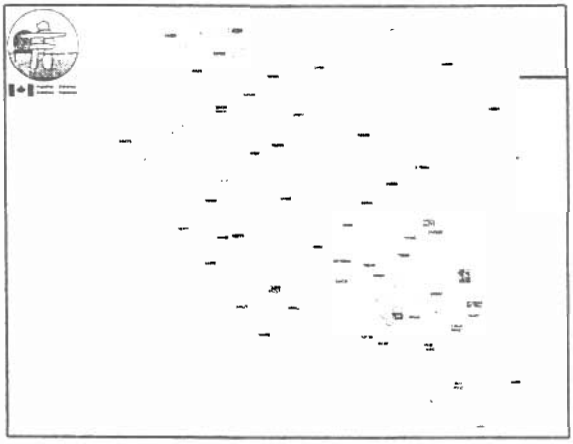
Map II-3: FOX-5, Lower Site Overview

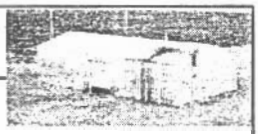
Map II-2: FOX-5 Upper Site Overview



Site Investigation







Site Investigation Results

- Contaminants found:
  → Fuel and lube oil, PCBs, copper, lead and zinc
- Contamination is consistent with patterns at other DEW Line sites

Site Investigation Results

- Predominantly contamination associated with fuel storage facilities (Fuel and lube oil, lead, zinc)
- PCB contamination mainly in areas where power-generating equipment was used and from building materials

Landfill Assessment

Investigate whether contaminants are moving out of landfills:

- Take samples from above and from below of landfil
- Compare results

EWG Evaluation Process

- Environmental Working Group (EWG) independently evaluates landfills in a consistent manner using a matrix approach
  - Where contaminants come from (Source)
  - How do contaminants move (Pathway)
  - Are there any people, animals or plants that can be affected? (Receptors)
- Traditional knowledge about site is also considered in these evaluations

Landfill Remediation Recommendations

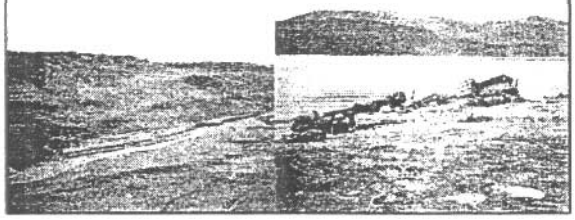
High Risk Landfills in unstable locations
→ Excavate

Moderate Risk Landfills
→ Leachate contain or excavate

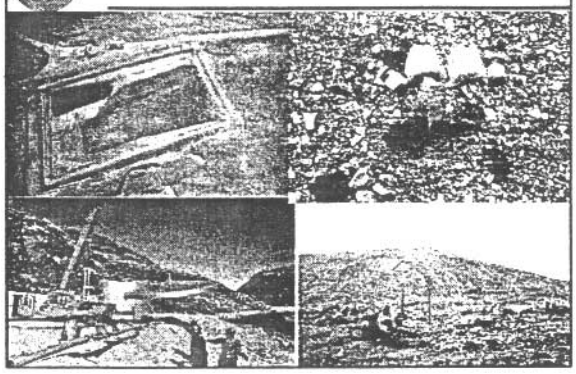
Low Risk Landfills
→ Regrade

Landfills at FOX-5

- *Upper Site Main Landfill:* Moderate Risk
- *Lower Site Airstrip Landfill:* High Risk because of active erosion and direct contact with water



Construction



Where do contaminants + materials go?

Barrels:

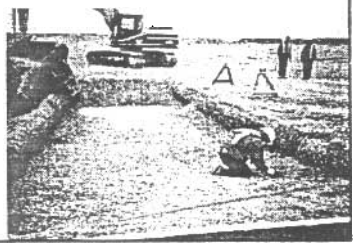
- test contents

→incinerate contents or ship South

- crush or shred *empty* barrels

Post Excavation Work

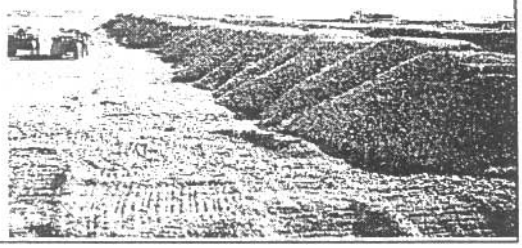
- Collect Soil Samples
- Test for contaminants
- Establish area is clean or continue excavation



Cleanup Work- Landfills

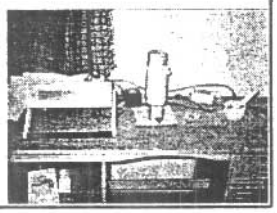
- Partial/complete excavation or regrading of landfills (if required)
- Excavated soil will be stored on storage areas
- Storage areas will be tested for contaminants *before* and *after* soil will be stored on them.

Soil Stockpile Classification

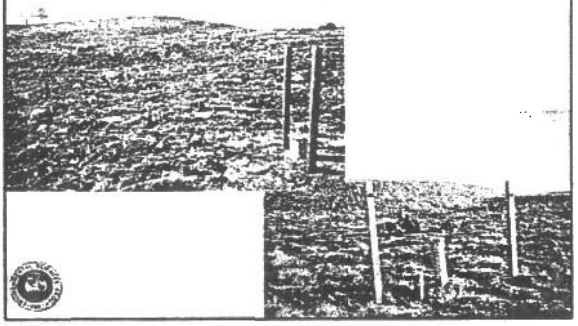


Field Analyses

- PCB test kits
- TPH test kits
- Inorganic Elements by X-Ray Fluorescence



Landfill Monitoring



Landfill Monitoring

- Visual Assessment
- Temperature of ground
- Soil and Water

Landfill Monitoring Requirements

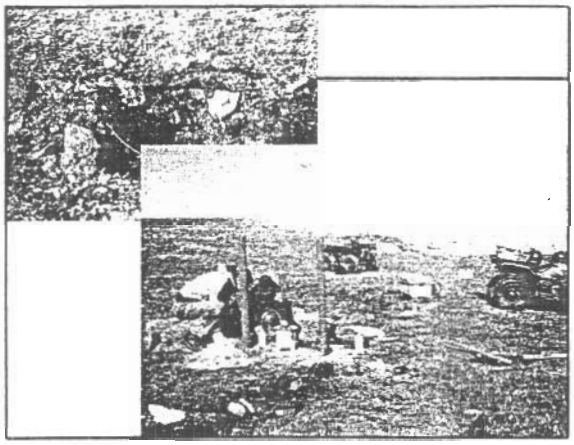
Landfill Classification	Visual	Active Layer Groundwater Sampling	Soil Sampling	Thermal Monitoring
High Risk – Existing Landfills	Not required, as landfill to be excavated.			
Moderate Risk –Existing Landfills	✓	✓	✓	✓
Low Risk –Existing Landfills	✓		✓	
New Landfills – Non-Hazardous Wastes	✓	✓	✓	
New Landfills – Engineered Landfill	✓	✓	✓	✓

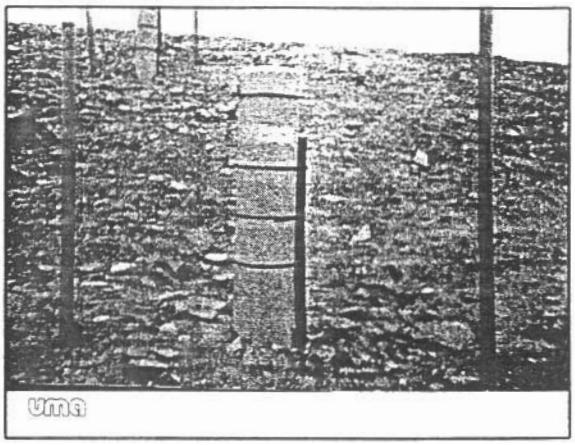
How often will the landfills be monitored?

- *Phase I: First 5 Years*
  Confirmation that landfill is performing as expected.
- *Phase II: Years 6-25*
  Confirmation of stable conditions
- *Phase III:*
  Potential monitoring for long term issues.

Landfill Monitoring Frequency

Landfill Classification	Phase I	Phase II
High Risk – Existing Landfills	Not required, as landfill to be excavated	
Moderate Risk – Existing Landfills	year 1, 2, 3, 4, 5	year 7, 10, 15, 25
Low Risk – Existing Landfills	year 1, 3, 5	year 7, 10, 15, 25
New Landfills Non-Hazardous Wastes	year 1, 3, 5	year 7, 10, 15, 25
New Landfills Engineered Landfill	year 1, 2, 3, 4, 5	year 7, 10, 15, 25





Conclusion

- A detailed environmental investigation of the FOX-5 DEW Line site was conducted by ESG.
- A detailed engineering design for the cleanup of the site was prepared based on the results of this investigation by UMA.

DEW Line Clean-up Project

ENGINEERING AND DESIGN

FOX-5

QIKIQTARJUAQ

Barry Fedorak, P.Eng

DEW Line Clean-up Project

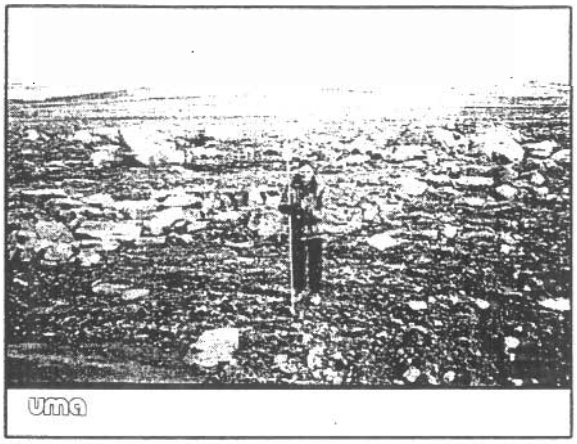
- Role of UMA
- Engineering and Design for the Clean Up of the FOX-5 DEW Line Site

Role of UMA

- Site Investigations – Engineering Design
- Engineering Design and Drawings
- Construction Quality Assurance
- Post Construction Landfill Monitoring

Role of UMA

- Engineering Site Investigations
  - General Site Conditions
  - Inventory of Building Materials
  - Engineering Surveys
  - Geophysical Surveys



Engineering and Design

- Clean Up Activities at FOX-5
  - Excavation or Closure of Existing Landfills
  - New Landfills and Landfarms
  - Demolition and Debris Collection
  - Contaminated Soils Excavation

FOX-5 DEW Line Site