Mid-Canada Line Project: Phase 2, 1999
Interim Report

Kativik Regional Government
Kuujjuaq, Quebec
December, 1999

Project Team: Michael Barrett, Yves Heroux, Sammy Tukkiapik, Geoff Klein.

6 février 2002
MID Reimer

19

Interim Report Mid-Canada Radar Line Project Phase 2, 1999

Project Team
Michael Barrett,
Yves Heroux,
Sammy Tukkiapik,
Geoff Klein

Kativik Regional Government
Kuujjuaq, Quebec
December, 1999.

330 A 55° 17' 74°33' 330
333A 55°20' 75°25' 333
336A 55°16' 75°59' 336
339A 339
406
410

17 August 2000*

Table of Contents

Appendices

1- Executive Summary

During the winter of 1999, a second round of consultation meetings was held in Kawawachicamach, Chisasisbi, Whapmagoostui and Kuujjuaraapik. Environmental authorization was received to proceed with work on 37 of the 42 sites of the abandoned Mid-Canada Radar Line in Quebec. The remaining 5 sites await authorization pending certain clarification. The work plan prepared by the Kativik Regional Government was approved by the representatives of the Quebec Ministry of the Environment, Environment Canada and the Department of National Defense. In June, work was realized on five sites in the Kawawachicamach sector. In September, seven sites in the sector east of Whapmagoostui/Kuujjuaraapik were surveyed and work plans prepared. Additional samples were taken of materials for contaminant and hazardous materials analyses. The soil bioremediation process was initiated. A detailed work plan was prepared for the period January to April, 2000.

1) Introduction

This interim report on the Mid-Canada Radar Line Phase 2 covers the period January to December 1999. It is designed as a working document for the Nascapi, Cree and Inuit communities as well as the representatives of the Department of National Defence, Environment Canada and La Ministère de L'Environnement du Québec. The results and any conclusions should be considered as preliminary.

2) Background

The Mid-Canada Line, an intermediate Early Warning System for aircraft detection, was one of the three radar networks scattered across Canada's 4500 km wide northern frontier. Far to the north is the DEW Line built by the Americans, and hundreds of km south was the Pinetree Line, the first of the three to be built.

The Mid-Canada Line became operational in January 1958. It was built at a cost of 225 million dollars and stretched across Canada's 55th parallel from Hopedale (Labrador) to Dawson Creek (British Columbia).

The construction of the line involved over 200,000 tons of materials – vehicles, steel, lumber, construction material, electronic equipment, camp gear, fuel, food. All the materials and men were conveyed by rail, sea, air and winter tractor trains in one of the world's most difficult areas for construction and transportation: the rocky, rugged bushland, the thousands of lakes, the sub-Arctic tundra, and the treacherous muskeg.

This was a colossal undertaking, as the line had to be built within three years. Yet, the Mid-Canada Line was operational for only 7 years and was shut down permanently in April 1965.

3.1- History

Shortly after World War II, a high-level Canada-U.S.A. committee (the Military Co-operation Committee) drew up an emergency plan for the common defence of North America and directed that air defence organisations of the two countries prepare detailed emergency air defense plans. Early in 1954, the same committee authorized a combined planning group of representatives from the RCAF and USAF air defence commands. This group later moved to Colorado Springs, the present headquarters of NORAD, the North American Air Defence Command. Its studies confirmed that the best air defence of the continent was an integrated defence, with forces of both countries operating under a single command responsible to both governments. The final result was the development of a joint radar warning network consisting of the DEW (Distant Early Warning) line across the northern rim of the continent, the Mid-Canada Line across the 55th parallel, and the Pinetree Line across southern Canada.

Accurate maps were essential for physical siting purposes of all the stations. One of the first tasks of the army was therefore to produce precise contour maps (one-mile-to-the-inch) of a fifteen-mile wide strip along the 55th parallel from aerial photos taken especially for the purpose by Air Transport Command. As for the technology to be used for aircraft detection, the Defence Research Board had demonstrated that a Doppler detection system could detect aircraft with a high degree of reliability.

Professor G.A. Woonton of McGill University had discussed the use of a Doppler system with US officials in early 1951 and because of the association of McGill University in its development, the Mid-Canada Line became also known as the "McGill Fence". A final report by the Systems Engineering Group, submitted on August 27th 1954 to the RCAF, USAF, and the Canadian and American governments, recommended the installation of a single Doppler line. Both governments approved the final report to undertake the construction of what became known as the Mid-Canada Line.

3.2- Phase 1 Project

When it was completed, the Mid-Canada Line consisted of eight Sector Control Stations located at Dawson Creek (BC); Stoney Mountain (Alberta); Cranberry Portage (Manitoba); Bird (Manitoba); Winisk (Ontario); Great Whale River (Quebec); Knob Lake (Quebec); and Hopedale (Labrador). These eight stations were all manned. In a double staggered line between were ninety Doppler Detection Stations, all unmanned. All ninety-eight stations were interconnected by tropospheric scatter communications systems and the Line was naturally linked into the overall Air Defence System (DEW/Pinetree).

These sites were stretched across 4500 kilometres and included 264 permanent buildings; two major and ten minor airstrips; a multitude of helicopter pads; 370 tower and radio masts of various sizes, including many over 350 feet high; 16 large scatter dishes; 322 diesel alternator units; plus literally thousands of items of radar, Doppler detection, radio relay, multiplex, point-to-point radio equipment, etc.

The typical Detection Site consisted of a 28 by 60 foot prefabricated building (most were of steel panel construction with structured steel wind bracing) divided into power, equipment, and living quarters. Three diesel electric generators were housed at one end, one active and two on automatic standby. Heat exchangers on the diesel exhaust provided heat for the building. The detection apparatus, communication equipment, fault alarm devices, etc. were located in the central portion of the building. Although designed to be unmanned, these sites had a living quarter at the remaining end of the building for visiting maintenance teams. Each detection site had at least one tower, which supported the antennae. The towers were four feet square and varied in height from 25 to 350 feet, depending upon the height of the hill upon which they stood. There were storage tanks for the diesels and also a wooden hut, complete with rations and heating, which could be used as a survival shelter.

The detection stations were, as aforementioned, unmanned and included automatic standby equipment in the event of main equipment failure. This kept that section of the Line operating until technicians from the nearest Sector Control Station could respond to the alarm and repair the main equipment. Information on aircraft crossing the Line was sent to the adjacent Sector Control Station where it was recorded. Here, it was determined which direction the aircraft were flying in crossing the Line and identification was established through flight plan correlation. Unidentified crossings were reported to the Air Defence System to the South.

Shutting Down the Line

By January 1st 1958, the whole Mid-Canada Line was operational. By April 1965, it had been completely shut down. What happened?

The overriding factor leading to the termination of the Line was its high cost of operation. One of the reasons the Line was so expensive to operate was the problem of fuel supply to sites. In many cases, fuel was brought in by ship, flown in Canso wing tanks to a lake, transferred into drums, and then brought to the detection sites by helicopter. This, together with other expenses pertaining to the operation and upkeep of the network added to a considerable sum.

In addition, a study was to confirm that by the time fighter planes were scrambled as a result of a Mid-Canada Line warning the targets were already under surveillance by Pinetree radars. One had therefore to conclude that the additional warning time provided by the Mid-Canada Line did not warrant the expense of operating the system. Yet,

American authorities were very concerned about the protection of the eastern US heartland.

Consequently, the western half of the Line was closed in January 1964, while the eastern half remained in operation until April 1965. By that time, the Americans too became convinced that the Line was simply not cost effective. Although some low-level coverage was lost, this was considered acceptable in view of DEW and Pinetree capabilities.

The sites were decommissioned in accordance with the standards of the time and in 1966, the Government of Canada proceeded to the sale of the sites and all associated installations and materials. Most of the sites throughout Canada have been reused with a new vocation, dismantled, or put out of use by its new owners. However, the sites situated in Quebec (and Labrador) met with a different fate: they were solely abandoned.

3.3- Agreement for Phase 2 Project

The Government of Quebec became the owner of the sites for a sum of $2,200 and for nearly 20 years, the sites were neither maintained nor monitored. In 1985 however, a special team made up of representatives from Environment-Quebec and Environment Canada, with logistic support from the Department of National Defence was put together to perform an inventory of all the sites. The findings were summarized in the Mid-Canada Line Inventory report (1986) by Berrouard et al. Following the visit to the sites, a tripartite committee with representatives from National Defense, Environment-Quebec and Environment Canada was formed. After analyzing different alternatives, the committee concluded that the cleanup of the sites should be done in two phases and recommended to proceed as soon as possible with the elimination of the 300,000 liters of hydrocarbons that have been abandoned for more than 20 years in a fragile environment.

The Kativik Regional Government, in concert carried out this first phase of the cleanup successfully in 1987 with the Cree, Inuit and Naskapi communities. The hydrocarbons were destroyed in 29 sites (the inventory indicated that there were no hydrocarbons left in the remaining 13 stations). Where time allowed, barrels were collected and piled. The work performed during Phase I is described at length in the 1988 report by Audette. The report also contains a description of the sites as well as recommendations for work to be done in the second phase of the project.

From 1995 to 1998 a series of discussions, presentations and meetings were initiated by the KRG with representatives of the Department of National Defence, Environment Canada and la Ministère de la Faune et de L'Environnement du Québec concerning the condition of the sites.

In April 1998, a contribution agreement was signed between the Department of National Defense, the Ministère de l'Environnement et de la Faune (Quebec) and Kativik Regional Government (KRG). In accordance with the agreement, National Defense will make a

maximum contribution of $1,500,000 so that "preventive remediation measures on the Mid-Canada Line sites situated in Quebec" can be implemented. The KRG was appointed the promoter of the project. It will also be responsible for ensuring that the guidance and feasibility of the works described in the Final Work Plan are maintained.

4- Location of Mid-Canada Sites

- 22 Detection Sites
- 20 Supply Sites

G.P.S.

3) Detection site 215
Location: 55°22'N, 64°01'W — 55° 21.650'N 64°01.490'W

2- Detection site 218
Location: 55°13'N, 64°49'W — 55° 16.273'N 64°49.183W

3- Supply site 218A
Location: 55°15'N, 64°15'W — 55° 15.865'N 64° 17.607'W

4- Detection site 221
Location: 55°18'N, 65°25'W — 55° 18.020'N 65°24.090'W

5- Supply site 221A
Location: 55°18'N, 65°20'W — 55° 17.900'N 65° 20.315W

6- Detection site 224
Location: 55°14'N, 66°02'W

7- Supply site 224A
Location: 55°16'N, 66°14'W

8- Detection site 227
Location: 55°17'N, 66°43'W

9- Supply site 227A
Location: 55°18'N, 66°41'W

10- Detection site 303
Location: 55°09'N, 67°34'W

11- Supply site 303A
Location: 55°11'N, 67°25'W

12- Detection site 306
Location: 55°15'N, 68°20'W

13- Supply site 306A
Location: 55°13'N, 68°06'W

14- Detection site 309
Location: 55°10'N, 69°00'W

15- Supply site 309A
Location: 55°08'N, 68°47'W

16- Detection site 312
Location: 55°13'N, 69°44'W

17- Supply site 312A
Location: 55°11'N, 69°32'W

18- Detection site 315
Location: 55°09'N, 70°34'W

19- Supply site 315A
Location: 55°09'N, 70°40'W

20- Detection site 318
Location: 55°14'N, 71°20'W

21- Supply site 318A
Location: 55°16'N, 71°19'W

22- Detection site 321
Location: 55°15'N, 72°12'W

23- Supply site 321A
Location: 55°15'N, 72°10'W

24- Detection site 324
Location: 55°19'N, 73°01'W

25- Supply site 324A
Location: 55°17'N, 73°11'W

26- Detection site 327
Location: 55°14'N, 73°44'W

27- Supply site 327A
Location: 55°13'N, 73°43'W

28- Detection site 330
Location: 55°18'N, 74°34'W

29- Supply site 330A
Location: 55°17'N, 74°33'W

30- Detection site 333
Location: 55°17'N, 75°16'W

31- Supply site 333A
Location: 55°20'N, 75°25'W

32- Detection site 336
Location: 55°21'N, 76°05'W 55° 21.67'N 76° 05.83' W

33- Supply site 336A
Location: 55°16'N, 75°59'W

34- Detection site 339
Location: 55°15'N, 76°49'W 55° 16.029' N 76° 47.768' W

35- Supply site 339A
Location: 55°15'N, 76°50'W 55° 06.37' N 76. 50.52' W

36- Detection site 342
Location: 55°15'N, 77°38'W

37- Detection site 403
Location: 54°59'N, 78°18'W

38- Supply site 403A
Location: 55°06'N, 78°13'W

39- Detection site 406
Location: 54°49'N, 79°01'W

40- Supply site 406A
Location: 54°48'N, 79°03'W

41- Supply site 409A
Location: 54°38'N, 79°45'W (Cape Jones)

42- Detection site 410
Location: 54°38'N, 79°45'W (Cape Jones)

transformers : 54° 38.4 N 79° 44.6 W Tanks

1. Summary of Consultation and Site Visits in 1998

A first round of consultations took place in the week of July 6, 1998 between a group of representatives from National Defense, Environment Canada, KRG, and representatives from the following Communities: Cree of Chisasibi and Whapmagoostui, Inuit of Kuujjuaraapik, and Naskapis of Kawawachikamach. The first objective of the consultation meetings was to inform the Communities about the content of the Contribution Agreement and to answer any questions with respect to it. The second purpose, equally important, was to consult the Communities to establish a list of priorities in terms of work to be done, and to identify which sites were the most important and had the largest impact on the communities.

Selected sites situated on the western part of the Line were inspected during the same week with the participation of representatives from the Cree Communities of Chisasibi and Whapmagoostui. Soil, surface water, and construction material samples were collected for analysis. Environment Canada prepared a report which includes the results of laboratory analyses and some recommendations (Environment Canada, September 1998). The report confirms the presence of PCB's in the paint and the floor tiles of the buildings and a limited contamination of the soil by residual hydrocarbons. On a more positive note, analyses showed that all sampled surface waters were free of any chemical or toxicological contamination.

On December, 11 1998, a meeting was held at the Ministère de l'Environnement du Québec offices in Quebec City. The representatives from National Defense, Environment Canada, KRG and the Ministère de l'Environnement du Québec met to discuss the main objectives of the work plan. As a general consensus, it was agreed that the work performed must ensure that the general condition of the sites upon completion of the restoration will be respectful of current regulations and policies.

6- Consultation Meetings in Winter 1998/1999

In the winter a second series of consultations were undertaken in the communities by KRG representatives including Sandy Gordon, Department Head Renewable Resources, Michael Barrett, Special Projects Coordinator, and Yves Heroux, Environmental Specialist.

6.1- Kawawachikamach (December 2nd, 1998)

The meeting was held at the Band Council Office of the Naskapi Community of Kawawachikamach. Representatives from the Community of Kawawachikamach were:

- Philip Einish, Chief
- Joseph Guanish, Deputy-Chief
- Jacob Mameanskum, Councillor
- Willie Mameanskum, Councillor

- Isaac Pien
- John Mameanskum, Band Secretary

Copies of the following documents were provided to the assembly:

1. Summary of First Consultations made in July 1998.
2. Background information on the history of the Mid-Canada Line.
3. Proposed Work Plan for each site including description of work and timetable.
4. French copy of the results of the Sampling Program performed in July 1998 at selected sites. The English summary, to be completed, will be sent by mail.
5. Description of proposed salaries, allowances and equipment rental.
6. Salary breakdown for work at each site.
7. Maps showing the location of the 42 sites that are part of the Mid-Canada Line in Quebec.
8. VHS video document on inspection of selected Mid-Canada sites made in July 1998.

The meeting was held to discuss the proposed work plan resulting from the first period of consultations and the environmental evaluation, which took place in July 1998. The results of the laboratory analyses with respect to the environmental evaluation were discussed. In brief, the results from the soil samples collected at burning sites (where the petroleum products were eliminated by burning during the Phase I cleanup in 1987) indicated that, as expected, hydrocarbons were still present at relatively high levels. No other toxic substances were found in significant concentrations. The collected surface water samples were free of any chemical or toxicological contaminants. However, with respect to the construction material, the presence of PCBs was detected in both the paint and the floor tiles. PCBs were used at the time as a plasticizer to improve the durability of these materials.

Several questions were raised regarding the presence of PCBs and its effect on human health and the environment. It was explained that because the PCBs were in the solid form and in low concentration, they were not likely to have a marked effect on the environment. As for the potential effect on health, the only possible contamination to humans would be through direct ingestion of the paint. Given the remoteness of the sites, the health risk associated with the presence of PCBs in the paint and floor tiles is considered negligible. The point was raised however, that in the event of a building on fire, toxic fumes would be generated.

Details of the work plan and timetable were presented and discussed. It was explained that the bulk of the remediation work would involve manual work with the use of light equipment only (e.g. ATVs and trailers). The work is to be carried out during the months of June and July so as not to interfere with other activities such as hunting and outfitting operations. The assembly expressed its agreement with the work plan presented and reiterated the will of the Community to work closely with the KRG on this project. The area of primary interests for the Community of Kawawachikamach was identified and includes site 215 (near the Labrador border) and all the sites westward up to and including site 312 (near Caniapiscau).

Finally, an administrative question was raised concerning the method of payment to the workers. The deputy-chief proposed that the Band Council pay directly the workers involved and bill the KRG for refund. The proposition was welcome and will be studied. The Band Council will also work at obtaining more funds to be used for further cleanup of the sites, for instance to bring back material (e.g. barrels) for proper disposal. On this note, the meeting was adjourned.

6.2- Chisasibi (February 10, 1999)

The meeting was held at the Band Council Office of the Cree Community of Chisasibi. Representatives from the Cree Community of Chisasibi were:

- Abraham Rupert, Deputy Chief
- L. George Pachanos, Chee Bee Construction
- Steven Bearskin – Cree Construction & DEO Co.
- Eddie Pachano, CNC Director General of Operations
- Edward Tapiatic, CNC Director Trad. Pursuit. CTA
- WM Chiskamish, CNC Maintenance Supervisor
- Elijah Napash, Trapper
- Bobby Snowboy
- George Snowboy
- Noah Snowboy
- Freddie Scipio
- Daniel Snowboy
- Joshua Lameboy
- Harry Scipio

Copies of the following documents were provided to the assembly:

1. Summary of First Consultations made in July 1998.
2. Background information on the history of the Mid-Canada Line.
3. Proposed Work Plan for each site including description of work and timetable.
4. French copy of the results of the Sampling Program performed in July 1998 at selected sites. The document was accompanied with an English summary.
5. Description of proposed salaries, allowances and equipment rental.
6. Salary breakdown for work at each site.
7. Map showing the location of the 42 sites that are part of the Mid-Canada Line in Quebec.
8. VHS video document on inspection of selected Mid-Canada sites made in July 1998.

The meeting started with a presentation of a video made during the inspection of selected Mid-Canada sites performed in July, 1998. The video showed the present condition of the sites as well as some of the work performed for the environmental evaluation such as soil sampling. Following the video presentation, the representatives from the Chisasibi Community were given a summary of the results of the laboratory analyses performed on

collected soil, surface water and construction material samples. In brief, the results showed that as expected, soil at burning sites still contained fairly high levels of hydrocarbons. No other toxic substances, including PCBs, were identified in measurable concentration. Surface water samples showed no measurable levels of any chemical or toxicological contaminants, including hydrocarbons. As for the construction material, PCBs were found in the paint and floor tiles in concentrations requiring that this material be managed in accordance with the provincial and federal regulations on dangerous material.

Some representatives expressed concerns regarding the presence of PCBs in the paint as the latter has started to peel off. Some edible animals (e.g. geese and ducks) may ingest the paint, and PCBs be passed on to humans as these animals may later be harvested. Although the level of PCBs in the paint is high enough to fall under the regulations on dangerous material, it is nevertheless at the lower end of the scale. The potential health risks to human by bio-accumulation does exist but is believed to be minimal given the minute amount of PCB paint that may be ingested by animals and later passed on to humans.

The sites identified as being in the area of primary interests for the Community of Chisasibi were sites 406, 406A and 410 (Cape Jones). Several questions were raised regarding the work planned for Cape Jones. Dismantling the buildings is no longer considered since the presence of PCB paint was discovered. Federal regulations would require the use of steel containers for on-site storing of all painted material and floor tiles. The emphasis will therefore be put on stabilization of unsafe buildings. The use of heavy machinery to help in the work may become necessary but is not considered thus far given the remoteness of the site and the budgetary limitations. It was explained that the remediation work would mainly involve manual work with the use of light equipment such as ATV's & trailers. There will be a general cleanup of the site which will essentially include the following: collection of debris, collection and piling of barrels; stabilization of unsafe structures, dismantling of pipeline network, and collection in barrels of residual hydrocarbons in pipelines to be sent to an authorized centre. Given the budgetary limitations, the only option at this time is to store the material onsite in locations that will insure minimal impact to the surrounding environment. The KRG acknowledged that a complete cleanup of this site would require a budget substantially higher than the $1.5M presently available for this project. However, the KRG emphasized that the work planned at site 410, which is slated to extend over the three years of the project, would help alleviate some of the environmental impacts of the site, and provide an opportunity to gather further information for additional remediation work.

The recycling of material has been discussed and will be encouraged whenever possible. Finally, there was a request that the KRG provides Mr. William Bearskin, Environmental Officer, with photocopies of all the laboratory analyses of samples collected during the July 1998 inspection.

6.3- Whapmagoostui (February 11, 1999)

The meeting was held at the Band Council Office of the Cree Community of Whapmagoostui. Representatives from the Community of Whapmagoostui were:

- Matthew Mukash, Chief
- David Masty, Band Administrator
- Andrew Kawapit
- George Masty
- Josie George

Copies of the following documents were provided to the assembly:

1. Summary of First Consultations made in July 1998.
2. Background information on the history of the Mid-Canada Line.
3. Proposed Work Plan for each site including description of work and timetable.
4. French copy of the results of the Sampling Program performed in July 1998 at selected sites accompanied with an English summary.
5. Description of proposed salaries, allowances and equipment rental.
6. Salary breakdown for work at each site.
7. Maps showing the location of the 42 sites that are part of the Mid-Canada Line in Quebec.
8. VHS video document on inspection of selected Mid-Canada sites made in July 1998.

The main objectives of the project were explained at the beginning of the meeting as the representatives were not available during the first phase of consultations and this was followed with the presentation of a video document shot during the inspection of selected Mid-Canada sites in July 1998. The video showed the present condition of the sites as well as some of the work performed for the environmental evaluation. Following the video presentation, the results of the laboratory analyses performed on collected soil, surface water and construction material samples were presented. As expected, soil at burning sites still contained fairly high levels of hydrocarbons. No other toxic substances were identified in measurable concentration. Surface water samples showed no measurable levels of any chemical or toxicological contaminants, including hydrocarbons. As for the construction material, PCBs were found in the paint and floor tiles at concentrations high enough so that this material must be managed in accordance with the provincial and federal regulations on dangerous material.

The presence of PCBs in the paint and floor tiles is a cause for concern as there are plans to reuse some of the sites for a new vocation (e.g. Traditional Teaching Centre at site 336, Youth Fishing Camp at site 339A). The PCBs present at the sites are in the solid form and at a relatively low concentration. Nevertheless, at locations where the buildings are to be reused, the KRG proposed the use of a sealer on the walls, and sealer mixed with abrasive for the floor. This would virtually eliminate the risks of accidental ingestion of PCB paint. This proposal was well received by the representatives.

The assembly was informed that, following the meeting held the previous day in Chisasibi, sites 406, 406A and 410 had been identified as area of primary interests by the Community of Chisasibi. The representatives of the Community of Whapmagoostui were in agreement with this statement. Questions were raised regarding the fate of some buildings, namely the operation building on site 403, which is in very poor condition and represents a safety hazard. The original plan of dismantling the building had to be abandoned following the discovery that PCBs were used in the paint and floor tiles. Dismantling the building is no longer considered as the *Storage of PCB Material Regulations* would require that steel containers be brought in for on-site storing of all painted material and floor tiles. Stabilization work is planned instead so that the building no longer constitutes a safety hazard.

Remediation work will mainly involve manual work and the use of light equipment such as ATV's and trailers. A question was raised regarding the possible relocation of some of the survival huts. It was stressed that the location of the detection sites (on top of bare hill tops) is not of particular interest to hunters and trappers. It should not be too difficult to relocate some of these prefabricated wooden buildings to sites better suited for hunting and trapping purposes. The suggestion was welcomed by the KRG as reuse and recycling of the material and infrastructure will be favoured whenever possible. On this note, the meeting closed.

7- Description of Work on Kawawachikamach Sites in 1999

In June 1999, work was undertaken on five sites in the area north of Shefferville.

Work Crew

Labourers:	Ms	Elizabeth Chemaganish
	Mr.	Paul Einish
	Mr.	Jesse Guanish
	Mr.	Peter Sandy
	Mr.	Sandy Swappie
Cook:	Ms	Mary-Ann Sandy
Logistic Clerk:		Mr. Alex Mameamskum
For the KRG:	Mr.	Michael Barrett, Special Projects Co-ordinator
	Mr.	Sammy Tukkiapik, Environmental Technician
	Mr.	Yves Héroux, Environmental Projects Specialist

Site 215 (June 20 - 21)

GPS: **55° 21.650' N 64° 01.490' W**

Work Period: **June 20 - 21 1999**

Description:

The 1985 report mentioned that the site is accessible by seaplane at the bottom of the hill. This information is accurate but without ATV's, the walk up the trail to the site would require over 90 minutes. For this reason, a helicopter was used to gain access to the site.

The detection site includes the main building, two large detection towers left untouched, four small aluminium towers, a Herman Nelson, a tractor (brand International) and 2 rolls of Frost fences. Seven reservoirs of 3400 liters have disappeared since the 1985 survey – only 2 are left (4400 liters each). There are also 90 barrels on the site.

The structure of the main building is intact. However, the door leading to the living quarter of the building and two of the large windows have been broken. The shower has also been demolished. The two small windows on the power room doors have also been broken. The living quarter, the electric section and the power room were vandalized. The generators are all gone, and so are the battery sets.

Right outside the building, the overhead cable conduit leading to one of the detection towers was identified as a serious safety hazard because most of the poles used to support the overhead structure were broken. In fact, only the three poles closest to the building were still standing.

This site must have been used much more regularly by work crews than the other detection site. It is difficult to explain otherwise the presence of thousands of rusted food cans, broken glass bottles, and the likes that litter the vicinity of the site. Several small dumps, some containing large items such as an apparatus to heat up concrete during the curing period in winter, surrounds the site. The remains of the dismantled survival hut are still on the site and the old helicopter pad is still easily identifiable.
The temperature was cool with a mixture of showers and sunny breaks.

Work Performed:

Contamination Assessment:

A flat area, likely contaminated by heavy oil, was located right outside the building, some 15 meters from the power room. The area, approximately 8m x 12 m, is located right on the bedrock. Also, three tar patches were found about 125 meters north of the main building. The largest one measures 1.6 m x 0.8 m and includes, as a bonus, the print of a black bear's paw.

Building:

The building was inspected and cleaned up. The larger debris were put alongside the back wall of the electric room and the pathway between the living quarter and the power room was cleared of all debris. In the living quarter, the paint, which was peeling off in the living quarter, was scraped off after the initial cleanup of the building. The windows in the living quarter and in the power room were repaired using LEXAN sealed with silicone caulking. The door leading to the living quarter was also fixed using plywood found on the site.

Overhead Cable Conduit:

The overhead cable was identified as a clear hazard and had to be put down for safety reason. The structure was brought down safely using the basic tools at our disposal (axe, bow saw, and a hacksaw). The work, however, required several hours to complete.

Barrels:

Most of the barrels were already collected near the large reservoirs although several were scattered around. A total of 90 barrels are now located next to the reservoirs. Two barrels of tar and one barrel of fuel were found about 150 meters north of the main building (down from the tar patches). The three barrels are in good condition and no leaks were observed.

Food Cans and other Debris:

The sheer amount of food cans and other debris littering this site is astonishing. In the two days spent at this site, the work crew has picked up well over 3,000 food cans, plenty of glass debris coming from bottles – China tableware (!) - radio tubes – etc., and numerous metallic debris. The cleanup of the debris was concentrated over a 200-meter radius around the main building. Several wires that were partly buried were either pulled out of the soil when possible, or cut at each end to prevent accidents by tripping.

Site 218A

GPS: **55° 15.865' N 64° 17.607' W**

Work Period: **June 11 - 14/15 1999**

Site Description:

Site 218A is located in a wet area on the shore of a lake. The rocky bottom near the shore made the approach by seaplane difficult and consequently the work crew had to load and unload the seaplane waist deep in water.

The main area of the site includes the fuel pumping station (pump and pipe network), the primary drum depot which is located on a flat area 50 meters from the lake, and 10 large reservoirs split in two groups. The group closest to the lake has six reservoirs while the other group, further inland, has four. It should be pointed out that these reservoirs do not have a capacity of 3800 liters, as stated in the 1985 report, but rather a volume of 4400 liters. The inscription 1000 IG (imperial gallon) is still visible on the outside of some of the reservoirs. One of them was nevertheless measured and the value of 4400 liters (4.4 m^3) was confirmed.

Eighteen (18) rolls of Frost fences, still rust free, are located on the site near the main barrel depot. The remains of a log cabin were found some 100 meters away. The roof was entirely gone and the cabin barely had two walls still standing. Further away, past the cabin, were two barrel depots, which were in close proximity to the lake. Some of the barrels were in the lake, partly or completely submerged. The barrels on this second site used to contain the AVGAS for the helicopter. It is likely that two different drum depots, one for the diesel and one for the AVGAS, were operated to prevent potential foul-ups.

The burning site was identified by Marc Tremblay (MENVIQ) on June 15th. The contaminated area is approximately 5 m x 12 m. It is located on a slope leading to the lake some 30 meters away. Values from the PetroFLAG field test kit indicated a concentration of 11,000 PPM. This is consistent with data obtained from laboratory analyses of samples taken in July 1998 at other Mid-Canada burning sites.

The wildlife abounds around the site: ptarmigans, several species of ducks and Canada geese were observed in the first few hours after our arrival. The weather was hot and sunny the first two days, then turned windy, rainy and cold thereafter.

Mr. Tremblay from the MENVIQ and Mr. Leclair from Environment Canada, arrived on June 14th came ashore for a short visit of the site before heading for site 218 the same day. The majority of the work crew, including Mr. Barrett and Mr. Leclair, did leave for site 218 on June 14th (2 flights) but due to high winds, the remainder of the work crew, including Mr. Tremblay had to wait the following day to reach site 218. It should be pointed out that the pilot of the Otter expressed concerns regarding the presence of the large rocks as they represent a serious risk for the floats of the seaplane. For this reason, it would perhaps be better to consider site 218A as being accessible solely by helicopter.

Work Performed:

Barrels:

Over 300 barrels originally piled between the larger reservoirs and the lake were moved away and piled at the primary drum depot which already contained close to one hundred barrels. Over 30 barrels scattered around the main site (some over 200 meters away) were collected and brought to the primary drum depot. Altogether, there are now 450 barrels at the primary drum depot.

Burned = done.

240 barrels were originally gathered in two piles right by the lake about 300 meters away from the main site area. These drums were transferred to a secondary depot 40 meters away from the lake. Fifteen barrels were also taken out of the lake. These contained significant amount of water and rust – they were drained away from the lake and stored together with the other

Fuel Piping network:

The double piping system (over 40 steel pipes diameter 11/2" & 3" ID) going from the shore to the two reservoir sites were dismantled. There was no residual fuel in any of the pipes dismantled. The fuel pump was removed from its wooden base at the lakeshore and brought up to the primary drum depot. Also, 36 partially submerged flexible lines (15 meters long 3" ID) were removed from the lake and put alongside the main barrel depot.

Log Cabin:

The remains of a log cabin, different from the typical GP (general purpose) hut used as survival shelter on the other sites, were found between the two main barrel sites. Parts of two walls were still standing. The structure was brought down for safety reason and a general cleanup of the surrounding area was performed. The debris included mostly construction material, but also bigger items such as a stove and a sink. The wooden walkway leading to the pumping site was left untouched; the wood is partly decomposed with vegetation growing around and over it. Obviously, nature is taking its course here.

Food Cans and other Metallic Debris:

The metallic debris observed on the site were mainly rusted food cans, which were found, gathered at six distinct locations around the site. These were collected and piled next to the nearest barrel depots.

Site 218 (June 14/15 - 18)

GPS: **55° 16.273' N 64° 49.183' W**

Work Period: **June 14/15 - 18 1999**

Description:

Site 218 is located on the top of a hill and was accessed by seaplane via a 2 km trail. The walk up from the lake takes 15-20 minutes. The approach with the seaplane was smooth and made the unloading of the plane easy. The pilot was told to wait a few of hours so that Mr. Leclair and Mr. Tremblay (MENVIQ) could give the KRG personnel the required on-site training on soil biotreament and the use of the PetroFLAG field test kit.

Some 170 barrels were originally piled right by the side of the lake. A small stream runs in the middle of the trail leading to the detection site. The trail was originally used by a track vehicle and a tractor track was found a few hundred meters from the lake as we worked our way up to the detection site. Right next to it was a barrel filled with water.

We found the tractor itself, with its two tracks on, lying in the middle of the trail about two thirds of the way up.

The detection site includes the main building (28ft x 60 ft ARMCO steel frame building), two large detection towers (already down), three smaller aluminium towers, a tractor, 25 rolls of Frost fences, 6 reservoirs (2 of 4400 liters and 4 of 3400 liters), piping system from the reservoirs to the building (power room) and 115 barrels.

The main building was in a general mess but the structure and windows were intact. The living quarter, the electric room and the power room were vandalized. The floor at the entrance of the living quarter will require attention as it is giving way. Surrounding the site and main building were several small dumps, many of which contained large items (tractor parts and the likes).

The burning site is located on an incline down from the 4 large reservoirs and is about 25 meters long by 8 meters wide. The area surrounding the reservoirs was also checked using a shovel and organoleptic observations. As expected, the soil around the reservoirs (area of about 20 m x 15 m) displayed a noticeable diesel odour. Another area about 25 meters behind the main building was likely contaminated by heavy oil. This area is probably where the oil change of heavy machinery was performed while the site was in operation.

The temperature was cold throughout our stay at this site. The weather was a mixture of rain showers, ice pellets and snow. We had a treat on the last day however with numerous sunny breaks and great looking rainbows

Work Performed:

On-site Training - Biotreatment & Contamination Assessment:

The on-site training for soil biotreatment and the use of the PetroFLAG field test kit was given at the detection site. The soil samples for the biotreatment studies to be undertaken by the Biotechnology Research Institute (BRI – CNRC) were collected by Mr. Gervais Leclair. The site where the soil samples were collected is 25 meters behind the main building. This area, roughly 5m x 5m, was likely used for the oil change of the heavy machinery. Therefore, lubricating oil should be the main source of contamination. The soil biotreatment of this area was performed by Mr. Leclair with the assistance of Mr. Barret and the procedures were well explained to the remaining KRG personnel who arrived the following day. As for the contamination assessment, a sample from the same contaminated site was analyzed by the KRG personnel under the supervision of Mr. Tremblay and data obtained using the PetroFLAG field test kit indicated a concentration of 17,790 PPM. A soil sample to be analyzed by a certified laboratory was also taken from the same location for correlation purposes.

The burning site used in 1987 is located down from the 4 large reservoirs. The area, identified by organoleptic methods, is on a slight incline and is about 27 meters long by 8 meters wide. A shovel was used to dig a few holes around the large reservoirs. Not

surprisingly, hydrocarbon odours were perceptible in the area immediately surrounding the large reservoirs. Given the limited amount of fertilizers, lime and organic material available, and the fact that the nearest sensitive milieu (lake) was about 2 km away, a decision was made not to perform biotreatment on this burning site and keep instead the remaining of the available biotreatment material for other potential locations that are closer to a sensitive environment.

Down by the lake, iridescence could be observed in the small stream alongside which the barrels were rolled up to their new location. The typical rainbow-like display of colors could also be observed at the site where the barrels were originally stored, right next to the lake. Biotreatment over this area was performed by addition of fertilizer and lime. It is possible that, given the incline, parts of the nutrients end up in the lake. However, the potential gain obtained by the stimulation of the biological activity over the remediated area greatly overrides this possibility. Furthermore, the risk of eutrophication is virtually non-existent given the amount of fertilizer used and the size of the lake.

Building:

The building was inspected and cleaned up. The larger debris were put alongside the back wall of the electric room and the pathway between the living quarter and the power room was cleared of all debris lying on the floor. In the electric room, some metallic objects hanging from the ceiling were removed to prevent head injury as this part of the building has no window and is therefore quite dark even during daylight hours. The paint, which was peeling off in the living quarter, was scraped off after the initial cleanup of the building and put in a sturdy plastic bag. The floor at the porch entrance, which was giving way, was solidified using plywood found at the site. A sample of the floor tiles was collected for Mr. Tremblay.

The lube oil was left in the generator. The oil basin at the forefront of the generator contained about 5-6 gallons. If we add to this amount what likely remained within the engine itself and the quantity already present in the oil pan underneath the generator, it is likely that close to 10 gallons of lube oil remain at this site.
At this site, 8 sets of 3 batteries (24 units) were found. Acid was still present in nearly all the cells checked. Altogether, these batteries weigh well over 150 kg. A decision was made to leave them inside the building. However, in order to contain any potential leaks, the batteries were all put into two large and sturdy plastic containers specially bought for this purpose.

Barrels:

At the lake site, the 170 barrels that were mostly piled on the lakeshore (a few were scattered around) were relocated higher up at a distance of approximately 55 meters from the lake. The chosen location is on a small incline, therefore a "fence" was built using fallen trees and some large metallic debris (a fridge and a heavy metallic filing cabinet) to prevent the barrels from rolling down during spring thaw. The chosen location is not visible from the lake and this greatly enhances the aesthetics of the site.

9. Eleven barrels were found with significant amount of water in it – many of these were taken out from the lake.

As mentioned, a barrel filled with water was lying about half way up the trail leading to the detection site. It was rolled out away from the trail and emptied.

115 barrels can be found at the detection site. Over 20 drums were scattered around the site; these were brought together with all the others right next to the 4 reservoirs of 3400 liters.

Food Cans and other Debris:

Large amounts of shingles were collected in the vicinity of the main building. These most likely belonged to the survival shelter, which has disappeared. Metallic debris, mostly in the form of food cans and a lot of broken glass (many originating from broken radio tubes) was also scattered over a large area. There were also a large amount of wires, especially around the building that were cut to prevent users from tripping over them. These were collected and put at the nearest of the several small dumpsites surrounding the main building.

Site 221A (June 18 - 23)

GPS: **55° 17.900' N 65° 20.315' W**

Work Period: **June 18 - 23 1999**

Description:

The area around this site is very wet – all marshes. The camp was put at the only "dry" place available - the old helicopter pad which was still on plywood planks. Several barrels were scattered around, but most of the 542 barrels were originally piled at several different locations. Given the wetness of the area, several barrels were found half buried in water although they were at a fair distance from the lake. As a result, several of those barrels were corroded and contained a fair amount of infiltrated water.

The site can be divided in two areas. The primary area included the helicopter pad, the pumping station (piping network), two 4400-liter reservoirs right next to the lake (the other five large reservoirs of the same capacity are 80 meters inland) and over 400 barrels (AVGAS and diesel). Fuel odours were noticeable on the shoreline of the lake in front of the piping network. Iridescence was observed at the lakeshore right in front of the piping network. The remains of at least seven barrels, completely submerged, were also in the immediate vicinity of the dock.

The secondary area, clearly visible from the pumping station, is about 200 meters away along the lake. It included 103 barrels, a small structure right by the lake possibly used

for drying meat, the remains of a backhoes (toilet), four small aluminium antennas, and numerous metallic and construction debris.

The weather cleared out on the first evening and the temperature started to warm up. This was a short break however as the weather soon turned cold and windy again with showers that were heavy at times

Work Performed:

Contamination Assessment & Biotreatment

Limited soil contamination was observed here and there at this site. This contamination was mainly in small patches at locations where barrels were submerged for years in marshes.
However, there is an area between the helicopter pad and the lake where growth has not yet taken place.

The contaminated area, 12 m x 15 m, surrounds a platform where three rather large manual valves were installed. This spot is very wet and iridescence is visible here and there. The current method of bioremediation, relying on fertilizer, lime and organic material cannot be used in situ as it also requires oxygen to properly enhance biological activity. Unfortunately, the contaminated area is by and large an anaerobic milieu and no contingencies were established for this type of situation. Therefore, the only actions taken were to remove the valves and the piping network from the area. On a positive note, the very wet condition of the soil has likely prevented the diesel from seeping too deep into the soil since the difference in specific gravity between water and diesel give the latter buoyancy.

The contamination level at this site could not be assessed in the absence of the PetroFLAG field test kit. However, organoleptic observations (iridescence and odours) clearly indicate that there is contamination of the soil. Since the wet area is a mere two meters from the lake, it is the opinion of the author that special attention should be paid at this site.

Building:

There were no buildings on the primary area of the site. On the secondary area, there was what appeared to be meat storage (for drying?) right by the lakeshore. The small structure was brought down and the remains put together with the debris from the old backhouse which became our main depot (45 meters from the lake) for miscellaneous debris.

Barrels:

Several hundred barrels were piled up behind the helicopter pad at the primary site. Altogether, the main barrel depot contains 542 barrels, which includes the 83 barrels of AVGAS that were moved away from the lake. The main depot is 25 meters from the

lake. Several barrels, and remains of barrels, were taken out from the lake (mostly near the docking area) and put at the main drum depot.

At the secondary area, 103 barrels were moved further inland at a distance of 30 meters from the lake.

- One barrel full of gas (200 liters) and 9 other barrels containing an estimated total of 1100 liters were found around the main area.

- One barrel of lube oil, never opened and still in good condition, was found further away on the lakeshore. The barrel was too heavy to roll over a long distance given the wetness of the soil. The barrel was brought some 12 meters from the lake and put in upright position on a plywood platform (in order to slow down the corrosion process).

Fuel Piping network:

The piping system (11/2" & 3" steel pipes) connecting the two groups of reservoirs 80 meters apart were dismantled and put alongside the helicopter pad. The large valves on the wooden platform were also removed and put together with the steel pipes. There was no residual fuel in either the pipeline or the three large valves.

Food Cans and other Debris

The debris were mainly concentrated on the secondary area. Shingles, other construction material, and rusted food cans were collected and put together with the remains of the backhouse. Aluminium towers were put alongside the secondary drum depot. Wooden walkway, or what remains of them, were left untouched.

Site 221 (June 20 - 21)

GPS: **55° 18.020' N 65° 24.090' W**

Work Period: **June 20 - 21 1999**

Description:

The detection site, only accessible by helicopter, includes the main building, two large detection towers, four small aluminium towers, 17 reservoirs of 4400 liters and 200 barrels. A tractor track has been found on the site but the heavy equipment is gone. Several barrels are scattered around the bottom of the hill.

The structure of the main building is intact but the inside has been vandalized. In the power room, only one generator remains but the 3 battery sets (54 units) are still there. Also found inside the building were six 10-gallon drums of motor oil, four empty one

half-full, and the last one full. Outside near the main building are the remains of the survival huts which were likely scattered around by the strong winds.

The site is littered with miscellaneous debris (food cans, construction material, metallic debris, etc.). Several small sites are also found around the site. The pipeline from the big reservoirs to the main building is relatively high at some location; it was noticed however that the wooded supports for the pipeline had started to rot. Amongst the 200 barrels on the site, 26 still contains significant amount of diesel for a total of approximately 3000 liters. The presence of these barrels was not detected during the 1985 inventory and therefore this site was not included in the Phase II work plan for the elimination of hydrocarbons carried out in 1987.

Work Performed:

Contamination Assessment:

An area 10 meters away from the building was likely contaminated with heavy oil. The contaminated area is on rock and measures about 25 m^2. Diesel leaks were also observed here and there around the large reservoirs and the main barrel depot.

Building:

The building was inspected and cleaned up. The larger debris were put alongside the back wall of the electric room and the pathway between the living quarter and the power room was cleared of all debris. In the living quarter, the paint, which was peeling off in the living quarter, was scraped off after the initial cleanup of the building. The entrance door leading to the living quarter was also repaired. The windows in the power room were repaired using LEXAN and silicone caulking. The battery sets were put inside three sturdy plastic containers to contain potential leaks. The six 10-gallon barrel of motor oil, containing altogether approximately 15 gallons, were put in evidence in the power room.

Barrels:

Approximately 90 barrels were piled in four different locations at the bottom of the hill with the biggest depot containing 52 drums. Near the large reservoirs, 200 barrels are now piled (174 of that are empty). 26 barrels still filled with diesel have been piled in upright position next to the other barrels. The drums were identified with "#1" spray painted on top. The barrels are in good condition and no leaks were observed.

partially

Pipeline:

Due to the frailty and the relative height of the pipeline support at this site, the decision was made to knock the wooden support down for safety reason. The pipeline now lies on the ground or a few centimetres above it.

Food Cans and other Debris:

The site has required a general cleanup and the debris were put in one of the few dumpsites scattered around the site. The construction material (from the survival hut) scattered around were piled up together, drums and miscellaneous debris were collected.

8- Udpdate to 1985 Inventory of Whapmagoostui/Kuujjuaraapik Sites

On September 9, 1999 a meeting was held at the Band Council Office of the Cree Community of Whapmagoostui. Persons present at the meeting included Chief Matthew Mukash who had recently been elected Deputy Grand Chief, Band Administrator (now Chief), David Masty, Alex Tuckatuck, President of the Inuit Landholding Corporation, Sandy Gordon, Muncie Novalinga and Michael Barrett of the KRG and Geoff Klein of Makivik Corporation. A series of documents including a copy of the contribution agreement were presented to Chief Mukash. The status of the project was reviewed and discussed. Subject to confirmation, it was agreed that a planned inventory on the sites east of Whapmagoostui/Kuujjuaraapik should proceed at the end of September. This was later confirmed by telephone.

On September 24 Michael Barrett, Sammy Tukkiapik and Geoff Klein travelled from Kuujjuaq to Kuujjuaraapik.

On September 25 sites 336, 336A and 333A were surveyed by helicopter. Utilizing the camp at Lac Molette as a base the team surveyed sites 330, 330A and 333 on September 26. The following day sites 339 A and 339 were surveyed. At 339 Major Francois Lauzon, of the Department of National Defense, Gervais Leclair and Lucie Olivier of Environment Canada met the survey team.

330A - 99 SEPT 26

- The cabin is being used as a fairly well kept Cree camp.
- One cabin window is broken out.
- Three empty propane cylinders are beside the cabin.
- There is an old collapsed log structure beside the cabin, most of the logs are gone.
- Two photographs were taken of two out of three rectangular depressions of unknown origin behind the diesel reservoirs.
- Thirty lengths of 4" pipe lie stacked behind the main barrel pile.
- An estimated 1840 barrels on site.
- One dozen barrels are lying in the lake that used to serve as dock floats.
- No burn site was detected.

330 - 99 SEPT 26

Operations Building

- Generators all present.
- Diesel in 10-gallon pails attached to generators with small diameter hose.
- 18 batteries behind generators.

- Mercury switches present on reservoirs.
- Oil reservoirs are 3/4 full on generators.
- Oil pans are full too.
- 3 gallons of grease under building.
- George counted 289 barrels.

Survival Shelter
- 2 broken windows
- Buried winch near bunkhouse
- Several dumps are scattered around the knoll on which the radar installation sits. The dumps contain barrels, cement mixers, antennae, fire pumps, oil heaters, bunks, pipes. wheelbarrows, flashing, paint cans with some residue, food cans and old fuel cans.

333A - 99 SEPT 26

- The building is ruined, but there re still some useable wall panels. The lakeward half of the roof is gone. All the windows are broken. Floor is partly incinerated.
- One of the three propane tanks behind the building is still full.
- 2 Bombardier tractors are 5m from the water.
- Caribou carcass resulting from entanglement with loose guy wires on site.
- Approximately 100m of pipe needs sectioning.
- There is a sheen on the nearshore lakewater on the south side of the site. Its origin is unknown, but two soil samples were taken from the nearby shore.
- Barrels are scattered along the shoreline.
- There is lots of garbage grown over by willows on the south shore of the site.

333 - 99 SEPT 26

Operations Building
- Kitchen windows broken.
- Back door off its hinges.
- 2 large batteries in kitchen.
- 2 smaller batteries in kitchen.
- 8 batteries remain in generator room.
- One generator is missing.
- Building is full of snowshoe hare droppings.
- Window is broken out of the back door.
- Mercury switches are gone.
- Oil reservoirs on generators are more than 3/4 full.
- Underneath building are two five gallon pails of ethyl hydrate and a couple of cans of roofing tar. There are also some old nails and a shovel. The substructure looks good.

Survival Shelter
- The building is pulling apart along the center of the roof.

- Walls are cracked.
- A few windowpanes are knocked out.
- There are no mattresses.
- Two heaters have been tossed out along with fire extinguisher.

Surroundings
- There is a 10-gallon can of some unidentified product beside the Jaeger compressor.
- George counted 844 piled barrels and estimated another 50 strewn about.
- Burn zone by reservoirs measures about 6x12m. A tongue of contamination runs downhill for about 43m in length and as wide as 20m.
- Hoses and pipe lying around reservoirs.
- TD9 International (1959) dozer at the lake.

336A - 99 SEP 25

- Cabin is being used as a Cree camp.
- Roof needs patching.
- Corner needs jacking.
- Stands need to be moved under joints.
- Pair of old toboggans underneath.
- Windows intact.
- Building measures 14x17m.
- Rear corners need to be lowered.
- There is a half-barrel of oil by the cabin.
- One demolished shack.
- There is a 1/4 full (residue) drum by the water.
- Move hoses and pipe further from shore to pumping station.
- Move dump from shore 90m east of cabin - 1/2 tonne of miscellaneous steel and hose.
- 200m of pipe to be sectioned.
- One of the three propane tanks is still full.
- 2 full oil drums.
- 1/2 full oil drum.
- 1/2 full gas drum.

336 - 99SEP25

Operations Building
- All 3 generators present.
- 1 set of batteries is missing.
- Oil reservoirs are 3/4 full.
- 2 smaller portable batteries are also in generator room.
- Diesel reservoirs inside are empty.
- 4 mercury switches present.

- Underneath the building: 4 cans roofing tar, 6 empty cans, 4 cans antifreeze, 2 crowbar, 2 picks, 6 shovels.

Survival Shelter
- Windows good.
- 6 good bunks, but mattresses are shot.
- Both furnaces look useable.
- Front step needs repair.
- Some barrels, pipe and wheelbarrows around hut need tidying.

Surroundings
- Cables lying all about.
- Cans lying all about.
- George counted 859 barrels, 2 full.
- 9x1000 gal diesel tanks.
- Burn pit has a 5" burn depth.
- Burn area 9x10x0.12m
- Some bear scat on site.
- Old compressor by far barrels.
- Hose leading to pond below oil drainage.

339 - 99SEP27

Operations Building
- Kitchen windows are broken.
- Mercury switches are still in generator room.
- All three generators are present.
- The oil reservoir on the leftmost generator is empty the center one is 3/4 full and the one on the right is 1/8 full.
- All generators have oil in their pans.
- One of the rear doors is off of its hinges. The glass is broken out of both doors.
- Inside of building is a mess.
- The substructure of the building is in good condition.
- One old five gallon paint can is underneath the building.
- Three empty rectangular gas cans (10gal) are lying behind the building.

Survival Shelter
- Building measures twelve by eight meters.
- The windows are intact, including the storm windows.
- The roof of the structure is ruined.

Surrounds
- Nine hundred and thirty barrels on site.
- No fuel in nine diesel reservoirs.

- Trace of fuel in one of the avgas reservoirs is evidenced by a small spill at the out flow of one reservoir.
- Barrels are piled very close to lake near the survival shelter.
- Twenty-three barrels are stacked across the lake. One is full of gas.
- Two burn pits are obvious on the site.
- Soil contaminated to some degree is approximately 3250 square meters.

339A - 99SEP27

- The old bunkhouse is now a Cree camp in good condition with one broken pane.
- Approximately 200 barrels are on site. Four of the barrels have fuel in them. One of these is open and contaminated with water.
- There is a road surveyed in behind the camp. Should make for easy snowmachine access.
- There is modern garbage strewn about the site and several dumps of modern garbage around the site.
- The barrels on this site are broadly scattered. Several are in the lake or in the shrubbery.

406 - 99SEP28

- Four diesel drums still contain some fuel.
- Several barrels on site rest in ponded water.
- The buildings on the upper part of the site are gone except for the footings.
- A small hut remains at the lower part of the site by Hudson's Bay. 406A
- The four reservoirs at the lower part of the site were inaccessible from the upper part due to a steep cliff and so were not checked for fuel residue. 406A
- There are an estimated 1200 empty barrels on site.
- The batteries from the absent generators are lying around on the land.
- Most of the electric circuitry is also lying about.
- Other debris is also lying everywhere.
- An additional 80 or 90 barrels were spotted from the helicopter about three kilometers west along the beach from Site 406.

410 - 99SEP28

- The three bay garage building measures about twelve by twelve meters and has an oil change pit in one bay. Asbestos insulates the piping in the garage.
- There is a large rectangular reservoir behind the garage but no residual contamination is apparent.
- The building behind the dishes measures approximately twenty-five by nine meters, has one section missing and has been heavily scavenged for materials.

- The boiler house is the largest building on site measuring thirty-one by sixteen meters and in one of the two large reservoirs there is a discarded battery.
- The final remaining building is three by ten meters in area and has an associated building measuring three by four meters. Both buildings housed electrical equipment.
- The spit extending south towards James Bay is about 780 meters long. It is impossible to determine how much of the spit is natural fill and how much is dozed over garbage. There is a dumpsite 500m down the road leading to the spit. There are some tar barrels still leaking product onto the soil along the east side of the road.
- On the spit extending north into Hudson's Bay there are two huge reservoirs that have some unidentifiable gunk inside on the bottoms. There are also about 150 rotting barrels with no residue at the end of a kilometer of pipe
- There are a few square reservoirs on site not associated with any building that have no sign of contamination.
- There are old batteries lying on the land.
- Environment Canada collected paint samples for PCB analysis and continued soil bioremediation below the tank farm.
- An island five kilometers south of the site has three reservoirs on it and the remains of an old building.

9- Work Plan for Sites in the Kawawachikamach Sector

The following work plan will be implemented beginning in March 2000-01-09

Site # 215 GPS- 55 22'N, 64 01'W

Distance from Schefferville to the site is 191 km.

Mercury switch(s)
2- barrels of tar (north of the building) * (to be discussed)
1-barrel of fuel.
No generators left at the site.
Install different language signs and first aid kit on the main building.
Tools needed for this site – Mercury switch container.
10. Shovel.
11. Tools and screws.

4-hours to gather the material and to transport to the lake for the plane to pick-up.
1- day of flying to site and back to Shefferville completing the task above.

Site # 218 GPS- 55 13' N, 64 15' W

#218

Distance from Schefferville to the site is 140 km.

Batteries – 8 sets of 3=24 units.
Mercury switch(s)
Approx. 10 gals of oil in the generator tanks and the pan under the generators.
Install different language signs and first aid kit on the main building.

Tools needed for this site – Mercury switch container.
- 3- 5 gallon cans for the oil in the generator tanks.
- Hand pump to be used with the oil in the tanks.
- Tools and screws.
- containers for batteries (something strong to be to transport by sling from helicopter.)

4-hours to gather the materials and the oil and transport to the lake for the plane to pick-up.
1 – day for the transporting to the lake and to fly back to Shefferville.

Site # 221 GPS- 55 18' N, 65 25' W

Distance from Schefferville to the site is 108 km.

Batteries- 18 sets of 3 = 54 units.
Mercury switch(s)
Approx. 25 gals of oil in the generator, the 2-10 gal can which the other is full and the other is half full.
26 drums marked with # 1 spray paint (fuel in the drums)
Install different language sign and first aid kit.

2- days maximum to transport the batteries and the mercury switches, the oil and the fuel in the drums that were left, have to be transferred to newer drums to be able to transport the drums by plane.

The tools needed for this work plan are-
- small hand pump to use on the tank of the generator.
- mercury switch container
- Tools and screws
- plastic containers for the batteries (something strong to be use in the transport)
- 15 drums for the fuel (empty drum)
- 1 drum for the oil

The number of work days should be 4 days maximum with 3 crews working on the batteries, fuel left behind and the mercury switches and what every is under the building.

The sites that will be worked on this summer will be visited during this work program to transport the mercury switches and the motor oil and the carbolic acid.

The site 303 has mercury switches and 75 l of motor oil.
The site 224 has mercury switches and 50 l of motor oil and 4 l of carbolic acid.
The two sites will take a full day to transfer the chemicals into safe containers and transport to a lake near by.

Time and weather permitting the following sites will be inventoried in preparation for work in the summer of 2000-01-07 Site 224-A distance from Shefferville 65 km GPS - 55 16'N, 66 14' W - float plane
Site 224 distance from Shefferville 69 km GPS - 55 14'N, 66 02' W - helicopter
Site 227-A distance from Shefferville 57 km GPS - 55 18'N, 66 41' W - float plane
Site 227 distance from Shefferville 55 km GPS - 55 17'N , 66 43' W -
Site 303-A distance from Shefferville 54 km GPS - 55 11'N, 67 25' W - float plane
Site 303 distance from Shefferville 60 km GPS - 55 09'N, 67 34' W - helicopter

Working crew from Kawachikamach

SITE	CREW	# DAYS	DATE	WORK DESCRIPTION
224-A	5	6	JUNE 5	Clean-up main building and site, collect and Pile barrels, dismantle survival building. 690 barrels to be piled.
224	5	4	JUNE 11	Clean-up main building and site , Collect and pile barrels. 70 barrels to be piled.
227-A	5	4	JUNE 15	Clean-up site, collect and pile barrels Dismantle survival building. 250 barrels to be piled.
227	5	4	JUNE 19	Clean-up building and site. Collect and pile barrels. 180 barrels to be piled.
303-A	5	4	JUNE 23	Clean-up sites, collect and pile barrels which are on the other side of the lake. 780 barrels to be piled. 160 barrels to piled on other side of the lake.
303	5	4	JUNE 27	Clean-up building and site. Collect and pile barrels. 70 barrels to be piled.

10- Work Plan for Sites East of Whapmagoostui/Kuujjuaraapik

330A.

1) A few hundred feet of two and four inch pipe running from the diesel reservoirs to the lake edge need to be sectioned and stacked with the thirty lengths of pipe already stacked behind the largest pile of barrels.

2) In the brush behind the cabin there are three barrels with some fuel in them which need to be removed.

3) In the lake there are a dozen rotting barrels that used to act as floats for an old dock that has ceased to function as such. Barrels should be removed from the water and stacked with the others.

4) In the cabin, one window is broken and needs fixing.

330.

1) In the generator room of the main building there is diesel fuel in three ten-gallon pails connected to the generator by small diameter flexible hose. These pails need to be removed.

2) Behind the generators there are 18 batteries that need to be removed.

3) On top of the indoor diesel reservoirs there are mercury switches that need to be removed.

4) The oil pans under the generators need to be drained and the oil needs to be removed from the site.

5) The oil reservoirs at the front of each generator are three quarters full. These also need draining and the oil needs to be removed from the site.

6) There are three gallons of grease stored underneath the building that will be removed.

7) In the bunkhouse, there are two broken windows that need fixing.

8) While rubbish has been dumped at the wood edge all around the site, the site of greatest concern is a small dump over a small cliff behind the main building. Paint and fuel cans should be removed from standing water.

9) Soil bioremediation is required on a 300 square meter burn pit, a 140 square meter burn pit, and on a 60 square meter plume draining the smaller burn pit.

10) Both buildings need a cleanup.

333A.

1) The shelter is beyond repair and should be laid down.

2) One propane container behind the building still has propane in it and should be removed.

3) Loose cable like that, which killed a caribou on site need to be rolled or cut into sections so that it can no longer entangle antlered animals such as moose and caribou.

4) One hundred meters of two and four inch pipe need to be sectioned and stacked.

5) The barrels scattered along the shoreline all around the site should be collected and all barrels on the site should be consolidated into one big pile.

333.

1) In the main building the kitchen windows are broken and need repair.

2) The back door is off its hinges and needs to be rehung.

3) Two large and two small batteries are in the kitchen and need to be removed along with eight batteries in the generator room.

4) The window in the back door needs to be fixed.

5) The oil reservoirs and pans on the generators still contain oil that needs to be drained and removed.

6) Underneath the main building there are a couple of cans of roofing tar and two five-gallon pails of ethyl hydrate that need to be removed.

7) The main building is full of snowshoe hare droppings and needs to be swept out.

8) The bunkhouse is pulling apart along the center beam of the roof. The gap should be covered to keep the weather out. This would extend the life of the building for another decade, but it will eventually have to be laid down.

9) The bunkhouse walls are cracked and also need to be sealed.

10) A few windowpanes need repair.

11) Beside the Jaeger compressor on site is a ten-gallon pail containing an unidentified product that needs to be removed from the site.

12) Approximately 300 square meters of soil requires bioremediation.

336A.

1) Some repairs are required on the shelter. The roof of the building needs to be patched to stop leakage. The front left corner of the building needs to be jacked up to stop it from slumping. The rear corners need to be lowered. The support stands need to be moved underneath the joints of the floor joists.

2) There is half drum of oil by the shelter that needs to be removed from the site.

3) Hoses and barrels need to be moved from the lakeshore up to the pumping station.

4) The dump at the lakeshore ninety meters east of the cabin should be moved further from the shoreline.

5) Two hundred meters of pipe needs to be sectioned and stacked.

6) One full propane tank by the building needs to be removed. Additionally, two and a half drums of oil need to be removed and a half drum of gas need to be removed.

336.

1) Cables of a half-inch diameter or less should be rolled up and piled to avoid the entanglement of wildlife.

2) Bunkhouse needs to be swept clean of mattress bits.

3) The bunkhouse step needs to be repaired for safety.

4) About ninety square meters of soil require bioremediation.

5) Twelve batteries behind two of the generators in the main building need to be removed, as do two smaller batteries also in the generator room.

6) The four mercury switches on the indoor diesel reservoirs need to be removed.

7) The three oil reservoirs and the pans on the generators need to be drained and the product removed.

8) There are four gallon cans of antifreeze and another four of roofing tar beneath the building that need to be removed.

PCBs are bound in paint and capacitors on all sites and if laid down all remnants will be accompanied by two signs in four languages recommending against burning of the rubbish.

11. Hazardous Materials

The information available with respect to the type of chemical products used at supply and detection sites, together with results obtained from the chemical analysis of samples (soil, surface water and construction material), indicate that the chemical contamination of the Mid-Canada Line sites situated in Quebec is minimal and mostly confined to localized areas. Water samples were taken in surface water bodies downstream from tank farms and burning sites where hydrocarbons were burnt during Phase I of the Mid-Canada Line Cleanup in 1987. Extensive chemical analysis did not reveal any detectable level of contaminants in the surface water.

However, several soil samples displayed high concentration of heavy hydrocarbons (C10-C50). This result was somewhat expected as several samples were collected at burning sites and in the vicinity of fuel reservoirs. The high heat of combustion at the burning sites, that is over an area of approximately 2 to 4 square meters, has modified the structural nature of the soil and is responsible for the growth inhibition that was observed on the burning sites. In other words, the lack of organic material and bacterial flora in those localized zones has impeded natural biodegradation of the hydrocarbons. Mr. Leclair of Environment Canada is the lead on soil bioremediation for the Mid-Canada Line. Laboratory studies and onsite work have begun and will continue wherever required.

Construction materials were analyzed for the presence of asbestos and PCBs. It was found that asbestos was not used for the insulation of the building but may however be present in wall panels since they are made of "Fibrociment". One exception is on site 410 where the insulation around pipes in the garage building was determined by the Department of National Defence to be asbestos. Although asbestos is not considered a dangerous material in Quebec, its presence warrants that precautionary measures be taken to insure the health of the workers during dismantling operations.

PCBs were found in floor tiles and in the paint used for wall panels. PCBs were often used at the time as plasticizer, improving both the elasticity and the wear resistance of the paint. As for the floor tiles, they were made to meet military specifications and PCBs were added as fire retardant. The tiles were often referred to as *battleship tiles*. A detailed description of the field sampling performed in July 1998 at selected Mid-Canada Line sites and the results of the chemical analysis can be found in the Final Report by Environment Canada (September 23, 1998). Swab tests of the paint show that the PCBs

are bound in the paint and therefore do not pose a health hazard (see Appendices B and D).

12. Conclusions

The sites that are part of the Mid-Canada Line situated in Quebec have been abandoned for over thirty years. With the exception of the phase 1 project in 1987 no clean up of the sites has been undertaken. Consequently, these sites are in general in dismal condition; miscellaneous physical debris is ubiquitous and abundant. In some instances, this debris represents a safety and environmental threat. Finally, vandalism compounded by harsh weather conditions and neglect have made some of the buildings unstable, rendering the sites prone to accidents. Site 410 represents a special case both in terms of the scope of the work required and the importance of the surrounding area for wildlife. In 1999, this site was visited by the survey crew accompanied by William Bearskin from Chisasibi. Additional samples were taken with particular attention to the area of the large fuel reservoir where there is evidence of fuel oil leakage. Further consultation with the community of Chisasibi respecting this site should be a priority for the year 2000.

As expected, in 1999, the logistics for work on the sites proved complex. A complicating factor was the discovery of quantities of hydrocarbons most of which had not been identified in the 1985 survey. The removal of these hydrocarbons and the other identified hazardous materials will be a priority for the winter of 2000.

Much progress was realized on the five sites in the Kawawachicamach sector due in a large part to the work of the Nascapi members of the work crew. This experience will serve as a model for work in the coming summer.

Appendix A

Gouvernement du Québec
Ministère de
l'Environnement

Direction régionale du Nord-du-Québec

Le 16 mars 1999

Monsieur Johnny N. Adams
Président
Administration régionale Kativik
Case postale 9
Kuujjuaq (Québec) JOM 1C0

OBJET : Projet de nettoyage des sites de la ligne de détection radar Mid-Canada
N/Référence : 3214-16-41 et 3215-16-11

Monsieur,

La Commission de la qualité de l'environnement Kativik (CQEK), à la suite de la réunion tenue le 17 novembre 1998, a fait part à la sous-ministre de l'Environnement, M^me^ Diane Gaudet, de sa décision de ne pas assujettir à la procédure d'évaluation et d'examen des impacts sur l'environnement et le milieu social le projet de nettoyage des sites de la ligne de détection radar Mid-Canada.

Pour faire suite à la lettre du 5 septembre 1998 que vous avez adressée à M^me^ Diane Gaudet et à la décision de la Commission, vous trouverez ci-joint une attestation de non-assujettissement à la procédure d'évaluation et d'examen des impacts sur l'environnement et le milieu social pour votre projet pour les sites situés dans le territoire d'application défini à l'article 168 de la *Loi sur la qualité de l'environnement* (LQE).

Nous comprenons que les travaux seront réalisés en fonction du plan de travail qui aura été préalablement approuvé par notre Ministère. De façon générale, nous nous attendons à ce que ces travaux soient réalisés conformément à la *Politique de protection des sols et de réhabilitation des terrains contaminés* et à la réglementation en vigueur au Ministère. Les matières dangereuses qui pourraient potentiellement être découvertes en cours de nettoyage, seront disposées conformément au *Règlement sur les matières dangereuses*. Des rapports documentant les différentes étapes du processus de nettoyage et un rapport final devront nous être transmis.

150, boul. René-Levesque Est
8e étage, boîte 97
Québec (Québec) G1R 4Y1

Téléphone : (418) 643-6662
Télécopieur : (418) 643-2057

Dans l'éventualité où ces travaux devaient avoir une envergure significative, ceux-ci devront préalablement être présentés pour évaluer l'opportunité d'assujettir ces travaux à la procédure d'évaluation des impacts sur l'environnement et le milieu social par la CQEK. Toute modification au projet doit être autorisée par le Ministère.

Nous transmettons votre dossier à la Direction régionale de l'Abitibi-Témiscamingue qui verra, s'il y a lieu, à l'application des dispositions prévues au chapitre I de la LQE pour votre projet et qui en assurera le contrôle.

Finalement, le Ministère prend pour acquis que vous obtiendrez les autorisations et les permis nécessaires des autorités compétentes. Vous devrez également respecter l'ensemble des engagements faisant partie des renseignements fournis au Ministère et vous assurer d'obtenir toute autorisation requise par toute loi et tout règlement, le cas échéant.

En ce qui concerne les sites situés dans le territoire d'application défini à l'article 133 de la LQE, le Ministère a également transmis votre projet au Comité d'évaluation (COMEV). Le Ministère, après consultation du COMEV, souhaite obtenir certains éclaircissements et renseignements techniques préalablement à sa décision sur l'opportunité d'assujettir, pour le territoire désigné à l'article 133 de la LQE, ce projet à la procédure. Après interprétation à partir de données disponibles, il s'avère que ces sites seraient 339, 342, 403, 406, 406A, 409A et 410. Nous vous demandons de valider les coordonnées en longitude et en latitude de ces sites pour s'assurer qu'ils correspondent bien à ceux que nous avons identifiés comme étant situés dans le territoire d'application du régime environnemental de la Baie-James pour le sud du 55^{e} parallèle. Les compléments d'information requis portent donc sur les éléments suivants :

1) Plusieurs des sites où les travaux de nettoyage doivent être réalisés, se retrouvent sur les territoires de chasse utilisés traditionnellement par les Cris de Chisasibi et de Whapmagoostui. En annexe au document que vous avez transmis au Ministère, une série de comptes rendus des premières consultations tenues auprès des communautés cries de Chisasibi et de Whapmagoostui indiquent que l'Administration régionale Kativik (ARK) est le promoteur du projet et qu'il travaillera en étroite collaboration avec les communautés concernées. Cependant, en ce qui concerne le plus important de ces sites, soit Cape Jones, il semble qu'il n'y ait pas de consensus avec les autorités de Chisasibi à l'égard de la maîtrise d'œuvre du projet, cet élément aurait été mis en relief dans deux (2) lettres de M^{me} Violet Pachanos, vice-grand chef du Grand Conseil des Cris, l'une adressée au COMEV et l'autre à l'ARK.

+ 403A

Terres cat I
5 sites sud.
COMEV: 403A

Topo avec
LAP top

Cat. A ni
409A et 410
sont pas listés A
=) argent "neuf"

Le Ministère croit important dans un premier temps que les aspects portant sur la prise en charge du nettoyage du site de Cape Jones ainsi que des autres sites qui sont définis selon l'article 133 de la LQE soient clarifiés et nous demandons que vous nous transmettiez vos commentaires à ce propos.

2) En ce qui a trait au site de Cape Jones, nous demandons que vous clarifiez les objectifs du programme de nettoyage à cet endroit en précisant l'envergure des travaux à réaliser et les composantes du site qui demeureront en place ainsi que les activités de restauration à compléter à la fin du programme de nettoyage que comprend votre projet.

Dès leur réception, ces informations seront expédiées au COMEV afin qu'il puisse compléter sa recommandation sur l'opportunité d'assujettir ou non votre projet à une évaluation des impacts sur l'environnement et le milieu social.

Dans l'intervalle, je vous prie d'agréer, Monsieur, l'expression de mes sentiments distingués.

Le directeur régional,

Jocelin Dufresne

p.j.

c.c. M. Jean-Guy Dugré, ministère de l'Environnement, DRAT
M^me^ Malee Saunders, secrétariat, ARK
M. Michael O'Neill, secrétariat, CQEK et COMEV

Translation will follow

\\s10adm1\10r\docum\evalenvi\vinpi02\let\adararkmidlet.doc

Gouvernement du Québec
Ministère de l'Environnement

ATTESTATION DE NON-ASSUJETTISSEMENT

DÉLIVRÉE LE : 8 mars 1999

TITULAIRE : Administration régionale Kativik
Case postale 9
Kuujjuaq (Québec) JOM 1C0

PROJET : Nettoyage des sites de la ligne de détection radar Mid-Canada

N/RÉFÉRENCE : 3215-16-11

À la suite des renseignements préliminaires datés du 5 septembre 1998 concernant le projet de nettoyage des sites de la ligne de détection radar Mid-Canada, pour le territoire d'application défini à l'article 168 de la *Loi sur la qualité de l'environnement*, et après avoir été informé de la décision de la Commission de la qualité de l'environnement Kativik, je vous avise, conformément à l'article 192 de la Loi sur la qualité de l'environnement (L.R.Q., c. Q-2), que le projet décrit ci-dessous n'est pas assujetti à la procédure d'évaluation et d'examen des impacts sur l'environnement et le milieu social :

- inspecter les bâtiments et autres équipements associés aux sites afin de s'assurer qu'ils ne constituent pas un danger pour les utilisateurs potentiels du site et apporter des mesures correctives le cas échéant;
- redonner aux sites un aspect esthétique acceptable par la collecte des barils et autres débris qui jonchent présentement les sites;
- identifier et éliminer dans la mesure du possible toutes situations pouvant porter préjudice à l'environnement (nettoyage de l'intérieur des bâtiments et du site en général, enlèvement des installations de pompage de carburant et récupération du contenu, caractérisation des médiums et évaluation de la superficie et du volume de sol contaminé, entreposage adéquat des matières dangereuses et matières résiduelles).

Cette attestation de non-assujettissement ne vaut qu'à l'égard du projet, tel que décrit dans le document suivant :

Lettre :

Destinataire	Date	Signataire
M^me^ Diane Gaudet	1998-09-05	M. Sandy Gordon

En outre, cette attestation de non-assujettissement ne dispense pas le titulaire d'obtenir toute autre autorisation requise par toute loi ou tout règlement et, le cas échéant, celles pouvant être requises en vertu du chapitre I de la Loi sur la qualité de l'environnement.

Le sous-ministre par intérim,

Normand Carrier

Gouvernement du Québec
Ministère de
l'Environnement

Direction régionale du Nord-du-Québec

Le 17 mars 1999

Monsieur Michael Barrett
Administration régionale Kativik
Case postale 9
Kuujjuaq (Québec) JOM 1C0

OBJET : Plan de travail - Nettoyage de la ligne radar Mid-Canada - Phase II

Monsieur.

Nous vous faisons parvenir, ci-joint, nos commentaires concernant le plan de travail que vous nous avez acheminé par télécopieur le 16 décembre 1998.

Ce plan de travail a été élaboré dans le cadre de la deuxième phase des mesures de réhabilitation de la ligne radar Mid-Canada. L'entente de contribution signée le 30 avril 1998 précise les obligations des différentes parties. Le ministère de l'Environnement, outre sa participation à la définition des objectifs du projet, est responsable du suivi des travaux sur les sites, de la prise de décision relative aux travaux de terrain, de l'approbation des travaux effectués sur les sites et du paiement.

Des modalités de fonctionnement doivent donc dès lors être précisées. À cet effet, la transmission de rapports d'étape nous permettra de faire valoir les préoccupations du Ministère aux différentes étapes de la restauration et d'entériner de façon progressive les travaux qui auront été réalisés. À l'appui de ces renseignements, le Ministère pourra prendre position et faire des recommandations. Si des sites ne rencontraient pas les objectifs de restauration retenus par le Ministère, particulièrement dans le cas de sites plus problématiques, ces sites devront faire l'objet de travaux additionnels à la satisfaction du Ministère avant de considérer l'émission d'une quittance finale pour ces sites.

Nous notons dans le plan de travail que des sites identifiés « *sites de catégorie A* » et « *sites de catégorie B* » ne seront complétés qu'après trois années. L'entente identifie le mode d'attribution des sommes et spécifie que les contributions de la Défense nationale ne devront pas être utilisées avant qu'une

150, boul. René-Lévesque Est
8e étage, boîte 97
Québec (Québec) G1R 4Y1

Téléphone : (418) 643-6662
Télécopieur : (418) 643-2057

quittance finale pour chaque groupe de sites A ou B n'ait été remise à cette dernière par le ministère de l'Environnement du Québec. Ces spécifications sont précisées aux articles 5.6 et 5.7 de l'entente. Nous apprécierions vos commentaires à ce propos.

Finalement, le ministère de l'Environnement souhaite obtenir une confirmation démontrant que les populations concernées ont été informées des travaux réalisés et qu'elles en sont satisfaites. Dans cet esprit, nous vous rappelons que le rapport d'étape qui nous sera présenté devra prévoir une forme d'appréciation écrite des travaux par les représentants officiels des communautés concernées.

Nous vous saurions gré de nous tenir informés des prochaines démarches que vous souhaitez entreprendre dans le cadre de ces travaux.

Veuillez agréer, Monsieur, l'expression de nos sentiments distingués.

Le directeur régional,

Jocelin Dufresne

p.j.

N.B. En annexe, copie du projet de plan de travail de l'ARK du 16 décembre 1998

c.c. M. Guy Desmarais, Direction de la coordination opérationnelle
M. Hugues Ouellette, Direction des politiques du secteur industriel

Gouvernement du Québec
Ministère de
l'Environnement
Direction régionale du Nord-du-Québec

Le 16 mars 1999

Monsieur Johnny N. Adams
Président
Administration régionale Kativik
Case postale 9
Kuujjuaq (Québec) JOM 1C0

OBJET : Projet de nettoyage des sites de la ligne de détection radar Mid-Canada
N/Référence : 3214-16-41 et 3215-16-11

Monsieur,

La Commission de la qualité de l'environnement Kativik (CQEK), à la suite de la réunion tenue le 17 novembre 1998, a fait part à la sous-ministre de l'Environnement, M^me^ Diane Gaudet, de sa décision de ne pas assujettir à la procédure d'évaluation et d'examen des impacts sur l'environnement et le milieu social le projet de nettoyage des sites de la ligne de détection radar Mid-Canada.

Pour faire suite à la lettre du 5 septembre 1998 que vous avez adressée à M^me^ Diane Gaudet et à la décision de la Commission, vous trouverez ci-joint une attestation de non-assujettissement à la procédure d'évaluation et d'examen des impacts sur l'environnement et le milieu social pour votre projet pour les sites situés dans le territoire d'application défini à l'article 168 de la *Loi sur la qualité de l'environnement* (LQE).

Nous comprenons que les travaux seront réalisés en fonction du plan de travail qui aura été préalablement approuvé par notre Ministère. De façon générale, nous nous attendons à ce que ces travaux soient réalisés conformément à la *Politique de protection des sols et de réhabilitation des terrains contaminés* et à la réglementation en vigueur au Ministère. Les matières dangereuses qui pourraient potentiellement être découvertes en cours de nettoyage, seront disposées conformément au *Règlement sur les matières dangereuses*. Des rapports documentant les différentes étapes du processus de nettoyage et un rapport final devront nous être transmis.

150, boul. René-Lévesque Est
8e étage, boîte 97
Québec (Québec) G1R 4Y1

Téléphone : (418) 643-6652
Télécopieur : (418) 643-2057

Dans l'éventualité où ces travaux devaient avoir une envergure significative, ceux-ci devront préalablement être présentés pour évaluer l'opportunité d'assujettir ces travaux à la procédure d'évaluation des impacts sur l'environnement et le milieu social par la CQEK. Toute modification au projet doit être autorisée par le Ministère.

Nous transmettons votre dossier à la Direction régionale de l'Abitibi-Témiscamingue qui verra, s'il y a lieu, à l'application des dispositions prévues au chapitre I de la LQE pour votre projet et qui en assurera le contrôle.

Finalement, le Ministère prend pour acquis que vous obtiendrez les autorisations et les permis nécessaires des autorités compétentes. Vous devrez également respecter l'ensemble des engagements faisant partie des renseignements fournis au Ministère et vous assurer d'obtenir toute autorisation requise par toute loi et tout règlement, le cas échéant.

En ce qui concerne les sites situés dans le territoire d'application défini à l'article 133 de la LQE, le Ministère a également transmis votre projet au Comité d'évaluation (COMEV). Le Ministère, après consultation du COMEV, souhaite obtenir certains éclaircissements et renseignements techniques préalablement à sa décision sur l'opportunité d'assujettir, pour le territoire désigné à l'article 133 de la LQE, ce projet à la procédure. Après interprétation à partir de données disponibles, il s'avère que ces sites seraient 339, 342, 403, 406, 406A, 409A et 410. Nous vous demandons de valider les coordonnées en longitude et en latitude de ces sites pour s'assurer qu'ils correspondent bien à ceux que nous avons identifiés comme étant situés dans le territoire d'application du régime environnemental de la Baie-James pour le sud du 55e parallèle. Les compléments d'information requis portent donc sur les éléments suivants :

1) Plusieurs des sites où les travaux de nettoyage doivent être réalisés, se retrouvent sur les territoires de chasse utilisés traditionnellement par les Cris de Chisasibi et de Whapmagoostui. En annexe au document que vous avez transmis au Ministère, une série de comptes rendus des premières consultations tenues auprès des communautés cries de Chisasibi et de Whapmagoostui indiquent que l'Administration régionale Kativik (ARK) est le promoteur du projet et qu'il travaillera en étroite collaboration avec les communautés concernées. Cependant, en ce qui concerne le plus important de ces sites, soit Cape Jones, il semble qu'il n'y ait pas de consensus avec les autorités de Chisasibi à l'égard de la maîtrise d'œuvre du projet, cet élément aurait été mis en relief dans deux (2) lettres de Mme Violet Pachanos, vice-grand chef du Grand Conseil des Cris, l'une adressée au COMEV et l'autre à l'ARK.

Le Ministère croit important dans un premier temps que les aspects portant sur la prise en charge du nettoyage du site de Cape Jones ainsi que des autres sites qui sont définis selon l'article 133 de la LQE soient clarifiés et nous demandons que vous nous transmettiez vos commentaires à ce propos.

2) En ce qui a trait au site de Cape Jones, nous demandons que vous clarifiez les objectifs du programme de nettoyage à cet endroit en précisant l'envergure des travaux à réaliser et les composantes du site qui demeureront en place ainsi que les activités de restauration à compléter à la fin du programme de nettoyage que comprend votre projet.

Dès leur réception, ces informations seront expédiées au COMEV afin qu'il puisse compléter sa recommandation sur l'opportunité d'assujettir ou non votre projet à une évaluation des impacts sur l'environnement et le milieu social.

Dans l'intervalle, je vous prie d'agréer, Monsieur, l'expression de mes sentiments distingués.

Le directeur régional,

Jocelin Dufresne

p.j.

c.c. M. Jean-Guy Dugré, ministère de l'Environnement, DRAT
M^me^ Malee Saunders, secrétariat, ARK
M. Michael O'Neill, secrétariat, CQEK et COMEV

Translation will follow

\\s10adm1\s10r\docum\evaleavi\vinpr02\etudarark\mdlet.doc

la Convention
de la Baie-James
et du Nord québécois

Comité d'évaluation
Evaluating Committee
ᑳ·ᐁᔅ·ᐊᐃᐅᑯ ᒣᐣ ᒪᔕᐣ ᓇᓐᑐ
ᒋᐦᒪᐃᑖᑲᓇᐠ ᐊᐦᒋ ᒪᐃᐦᐱ

Le 12 février 1999

Madame Diane Gaudet
Sous-ministre
Ministère de l'Environnement
675, boul. René-Lévesque Est
30e étage, boîte 02
Édifice Marie-Guyart
Québec (Québec) G1R 5V7

OBJET : Phase II du projet de nettoyage des sites de détection radar
Mid-Canada, Administration régionale Kativik
N/Référence : 3214-16-31

Madame la Sous-ministre,

Le Comité d'évaluation a procédé à l'analyse des renseignements préliminaires relatifs au projet cité en titre. Ceux-ci nous ont été transmis le 30 septembre dernier par M. Denis Vandal de la Direction régionale du Nord-du-Québec de votre Ministère. Le but de ce projet est de minimiser les impacts négatifs engendrés par l'abandon des bâtiments et autres équipements laissés sur les 42 sites de la ligne Mid-Canada, répartis sur 900 km le long du 55e parallèle. Plusieurs se retrouvent sur les territoires de chasse utilisés traditionnellement par les Cris de Chisasibi et de Whapmagoostui et cinq(5) d'entre eux sont situés au sud du 55e parallèle Dans un premier temps, le promoteur souhaiterait sécuriser les bâtiments et autres équipements associés aux sites afin qu'ils ne constituent pas un danger pour les utilisateurs potentiels et apporter des mesures correctives le cas échéant. Deuxièmement, le promoteur procédera à l'identification et à l'élimination, dans la mesure du possible, des situations pouvant constituer un préjudice à l'environnement. Finalement, il est prévu que les travaux rendront aux sites un aspect esthétique acceptable par la collecte et l'entreposage adéquat des barils et autres débris qui jonchent les sites.

En annexe au document qui fut transmis au COMEV par le promoteur, il y a une série de comptes rendus des premières consultations tenues auprès des communautés cries de Chisasibi et de Whapmagoostui et, où il est indiqué que l'Administration régionale Kativik est le promoteur du projet et qu'il travaillera en étroite collaboration avec les communautés concernées. Cependant, en ce qui a concerne plus important de ces sites, soit Cape Jones, il semble qu'il n'y ait pas de consensus avec les autorités de Chisasibi à l'égard de la maîtrise d'œuvre du projet; cet élément est notamment mis en relief dans deux lettres de M[me] Violet Pachanos, Vice-Grand Chef du Grand Conseil des Cris, que vous retrouverez en pièces jointes.

Or, après l'étude de l'ensemble des documents reliés à ce dossier, le COMEV croit important dans un premier temps que les aspects portant sur la prise en charge du nettoyage du site de Cape Jones ainsi que des autres sites qui se trouvent au sud du 55e parallèle, soient clarifiés auprès de l'Administration régionale Kativik. D'autre part et en ce qui a trait particulièrement au site de Cape Jones, le Comité désire obtenir des précisions sur les objectifs du programme de nettoyage à cet endroit et il souhaite être informé sur les composantes du site qui demeureront en place ainsi que sur les activités qui resteront à faire suite à la finalisation de cette phase du programme de nettoyage

Finalement, le COMEV pourra formuler sa recommandation lorsqu'il aura reçu cette information additionnelle sur le projet à l'étude.

Je vous prie d'agréer, Madame la Sous-ministre, l'expression de mes sentiments les meilleurs.

Le président,

Benoit Taillon

Benoît Taillon

MO/dd

p.j. (1)

\\vralenvi\dusdi02\comev\let\dgaudet-detectionradar.doc

Appendix B

Kuujjuaq, le 24 mai 1999

Monsieur Gervais Leclair
Environnement Canada
105 rue McGill, 4e étage
Montréal (Québec)
H2Y 2E7

Objet: **Analyse de matériaux de construction pour BPC**

Monsieur Leclair, 20 mai

Cette note fait suite à notre entretien téléphonique ainsi qu'à la réception de la correspondance de Monsieur Jean Lapointe portant sur les teneurs en BPC des matériaux des bâtiments de la Ligne Mid-Canada.

Je concours à votre opinion et à celle de Monsieur Lapointe sur le fait que des analyses supplémentaires doivent être effectuées afin de déterminer la concentration de BPC (en ppm) des matériaux de construction énumérés dans la note de Monsieur Lapointe. Cette information est nécessaire afin d'assurer que la gestion de ces matériaux se fera en conformité avec la réglementation en vigueur.

Je vous saurais gré de bien vouloir faire les démarches nécessaires et me confirmer si les échantillons collectés lors de la campagne d'échantillonnage de juillet 1998 sont toujours disponibles et pourront être utilisés aux fins d'analyse. Pour ce qui est du financement des frais de laboratoire, il serait sans doute souhaitable, si vous n'y voyez pas d'inconvénient, de procéder de la même façon que lors des analyses prédédentes; vous serez remboursé à même le budget Mid-Canada par l'ARK sur réception des factures de frais de laboratoire.

Pour ce qui est de la position officielle du MSSS sur le danger pour la santé de la réutilisation de bâtiments potentiellement contaminés par des BPC, une copie de la lettre de Monsieur Lapointe a été transmise au Dr. Serge Déry, directeur du RRSSS au Nunavik. Une note devrait me parvenir sous peu et une copie sera expédiée aux partenaires de l'Entente.

Je vous pris d'agréer, Monsieur Leclair, mes salutations distinguées.

Yves Héroux, ing. stag.
Spécialiste des projets environnementaux
ARK, Kuujjuaq

Ligne Mid-Canada

ANNEXE C-2 TENEURS EN BPC DES MATÉRIAUX DE CERTAINS BÂTIMENTS

(frottis de surface)

	Échantillon	Longueur	Largeur	Surface (cm^2)	Teneur mesurée (en ug)	Teneur (en ug/100 cm^2)	Teneur (en mg/m^2)	Dépasse la norme du règlement sur les matières dangereuses
410 Mur	#634	28	20	560	0.5	0.089	0.009	NON
336 Mur matériel poreux	#635	20	20	400	2.8	0.700	0.070	-
410 Plancher matériel poreux	#636	22.5	22.5	506.25	0.8	0.158	0.016	-
410 Plafond	#637	40	18	720	N.D.	N.D.	N.D.	NON
							Norme=1mg/m^2	

envoyé par Jean Lapointe (lettre) 20 mai

Peintures	Échantillon	Longueur cm	Largeur cm	Surface cm^2	Masse g	Poids g/cm^2
410 Plafond						
	Faible abrasion	7	7	49	0.2941	0.01
	Aucune abrasion	8.5	2.5	21.25	0.3527	0.02
410 Mur						
	Aucune abrasion	5	5	25	0.3005	0.01

Tuile de plancher	Échantillon	Longueur cm	Largeur cm	Surface cm^2	Masse g	Poids g/cm^2
410 Plancher						
		4	4	16	8.0878	0.51

A noter que la superficie de chaque tuile est de 22,5 cm X 22,5 cm soit 506,25 cm^2.

Modification 20 mai 1999

ENVIRONNEMENT CANADA (RÉGION DU QUÉBEC)
SECTION INTERVENTION ET RESTAURATION
DIRECTION DE LA PROTECTION

CAMPAGNE D'ÉCHANTILLONNAGE

SUR LA « MID-CANADA LINE » EN JUILLET 1998

RAPPORT FINAL

RAPPORT PRÉSENTÉ AUX PARTENAIRES DE
L'ENTENTE DE CONTRIBUTION
« MID-CANADA LINE »:

ADMINISTRATION RÉGIONALE KATIVIK

MINISTÈRE DE LA DÉFENSE NATIONALE

MINISTÈRE DE L'ENVIRONNEMENT
ET DE LA FAUNE DU QUÉBEC

23 SEPTEMBRE 1998

Photo de la page couverture - Équipe d'échantillonnage à Kuujjuaraapik

(de gauche à droite) :

Michael Barrett (Kativik), Jimmy George (Communauté Cris de Whapmagoostui), Gervais Leclair (Environnement Canada) et Gilles Bellegarde, ing. (Défense nationale).

N'apparaissent pas sur la photo, William Bearskin, George Snowboy et Harry Snowboy (Communauté Cris de Chisasibi).

Photo prise le 10 juillet 1998 par Yves Héroux, ing. (Kativik)

Ce document est publié avec l'autorisation du ministère de l'Environnement du Canada

PERSPECTIVE DE GESTION

Ce rapport d'analyses sur l'eau et les sols est publié dans le cadre de l'entente de contribution du 30 avril 1998 entre l'administration régionale Kativik, le Ministère de la Défense nationale, Environnement Canada et le Ministère de l'environnement et de la faune du Québec concernant les mesures préventives de rémédiation à consentir sur certains sites de la Mid-Canada Line (MCL) situés au Québec. Les analyses comportent une approche écotoxicologique basée sur des bioessais.

AVIS DE RÉVISION

Le présent rapport a été examiné par la Direction de la Protection, Environnement Canada, qui en a autorisé la publication. Cette autorisation ne signifie pas nécessairement que le contenu du rapport reflète les opinions et les politiques du Ministère. Les mentions de marque de commerce et de produits commerciaux qui apparaissent dans ce rapport ne signifient aucunement que leur utilisation est recommandée.

COMMENTAIRES DES LECTEURS

Veuillez adresser vos commentaires sur le contenu du présent rapport à Gervais Leclair, (514) 496-6847, de la Direction de la protection, Section Intervention et restauration, Environnement Canada, 105 rue McGill, 4^{e} étage, Montréal (Québec), H2Y 2E7.

SOMMAIRE ÉXÉCUTIF

But

L'administration régionale Kativik, le Ministère de la défense nationale et Environnement Canada (région du Québec), aidés de représentants autochtones de Chisasibi et Kuujjuaraapik ont procédé à une campagne d'échantillonnage les 8, 9 et 10 juillet 1998 sur les sites des stations 336, 339, 339A, 403 et 410 de la ligne Mid-Canada (MCL) dans le but d'obtenir des données sur la contamination potentielle des sites échantillonnés afin de mieux planifier ultérieurement le plan d'opération, les mesures de santé et sécurité au travail, et finalement les coûts forfaitaires de décontamination et de démantèlement de certains sites de la MCL.

Objectif

Identifier le type et l'ampleur de la contamination potentielle du sol et de l'eau de surface suite à la visite des sites mentionnés précédemment afin d'obtenir des données environnementales fiables pertinentes au milieu.

Conclusions

- aucune contamination toxicologique et chimique des eaux de surface (lacs et étangs),
- aucune contamination par l'amiante pour les matériaux isolants en laine minérale (intérieur des murs et revêtement de tuyauterie du site 403),
- contamination écotoxicologique observée à des degrés divers au niveau des sols sur deux régions du site 410 (#1 et #3) ainsi que sur les sites de brûlage 339-1 et 410 Tk farm Marais, la cause la plus probable étant respectivement les hydrocarbures résiduels et les hydrocarbures imbrûlés,
- contamination variable en BPC des débris de démolition (tôle de plafond, panneau mural en Fibrociment et tuile de plancher). La tôle de plafond peinte et le panneau mural peint du site 410 sont en-deçà de la norme du MEFQ pour les frottis de surface et ne seraient pas considérés comme matières dangereuses alors que le panneau mural peint (site 336) et la tuile de plancher (site 410) dépassent la norme et demandent une étude plus approfondie.

à corriger

Recommandations

1) caractériser les panneaux muraux des sites 336 et 410 pour l'amiante puisque l'échantillonnage a révélé par la suite qu'ils étaient composés de Fibrociment,
2) caractériser les BPC (méthode par congénères puis lixiviation selon le test du MEFQ) afin de préciser les modes d'élimination et les usages futurs permis:
   2.1 panneau mural peint, tuile de plancher, tôle de plafond peinte (portion intacte et portion exposée aux intempéries) du site 410,
   2.2 panneau mural peint du site 336,
3) échantillonner à l'automne 1998 les sols des sites de brûlage Tk farm Marais 410 et 339-1, ainsi qu'un échantillon composite des sites 410-1 et 410-3, afin de compléter durant l'hiver 1999 des essais de biotraitabilité qui pourraient être réalisés par l'Institut de recherche en biotechnologie du CNRC ou encore l'École polytechnique de Montréal (groupe Biopro).

Ressources impliquées à ce jour

Les coûts engagés jusqu'à présent sont de 17 263,38$ pour les analyses chimiques et biologiques. Des essais supplémentaires pour le site 410 ont engagé des déboursés supplémentaires de 5 356,93$.

Au niveau du personnel, le laboratoire du Centre Saint-Laurent d'Environnement Canada fournit 1,5 personne-année en suivi analytique alors que la Direction de la protection d'Environnement Canada engage pour l'année financière 1998-1999 un minimum de 0,4 personne-année dans le cadre des engagements et des mesures d'appui du gouvernement fédéral consentis dans l'entente de contribution « Mid-Canada Line ».

SOMMAIRE ÉXÉCUTIF

But

L'administration régionale Kativik, le Ministère de la défense nationale et Environnement Canada (région du Québec), aidés de représentants autochtones de Chisasibi et Kuujjuaraapik ont procédé à une campagne d'échantillonnage les 8, 9 et 10 juillet 1998 sur les sites des stations 336, 339, 339A, 403 et 410 de la ligne Mid-Canada (MCL) dans le but d'obtenir des données sur la contamination potentielle des sites échantillonnés afin de mieux planifier ultérieurement le plan d'opération, les mesures de santé et sécurité au travail, et finalement les coûts forfaitaires de décontamination et de démantèlement de certains sites de la MCL.

Objectif

Identifier le type et l'ampleur de la contamination potentielle du sol et de l'eau de surface suite à la visite des sites mentionnés précédemment afin d'obtenir des données environnementales fiables pertinentes au milieu.

Conclusions

- aucune contamination toxicologique et chimique des eaux de surface (lacs et étangs),
- aucune contamination par l'amiante pour les matériaux isolants en laine minérale (intérieur des murs et revêtement de tuyauterie du site 403),
- contamination écotoxicologique observée à des degrés divers au niveau des sols sur deux régions du site 410 (#1 et #3) ainsi que sur les sites de brûlage 339-1 et 410 Tk farm Marais, la cause la plus probable étant respectivement les hydrocarbures résiduels et les hydrocarbures imbrûlés,
- contamination variable en BPC des débris de démolition (tôle de plafond, panneau mural en Fibrociment et tuile de plancher). La tôle de plafond peinte et le panneau mural peint du site 410 sont en-deçà de la norme du MEFQ pour les frottis de surface et ne seraient pas considérés comme matières dangereuses alors que le panneau mural peint (site 336) et la tuile de plancher (site 410) dépassent la norme et demandent une étude plus approfondie.

Recommandations

1) caractériser les panneaux muraux des sites 336 et 410 pour l'amiante puisque l'échantillonnage a révélé par la suite qu'ils étaient composés de Fibrociment,
2) caractériser les BPC (méthode par congénères puis lixiviation selon le test du MEFQ) afin de préciser les modes d'élimination et les usages futurs permis:
   2.1 panneau mural peint, tuile de plancher, tôle de plafond peinte (portion intacte et portion exposée aux intempéries) du site 410,
   2.2 panneau mural peint du site 336,
3) échantillonner à l'automne 1998 les sols des sites de brûlage Tk farm Marais 410 et 339-1, ainsi qu'un échantillon composite des sites 410-1 et 410-3, afin de compléter durant l'hiver 1999 des essais de biotraitabilité qui pourraient être réalisés par l'Institut de recherche en biotechnologie du CNRC ou encore l'École polytechnique de Montréal (groupe Biopro).

Ressources impliquées à ce jour

Les coûts engagés jusqu'à présent sont de 17 263,38$ pour les analyses chimiques et biologiques. Des essais supplémentaires pour le site 410 ont engagé des déboursés supplémentaires de 5 356,93$.

Au niveau du personnel, le laboratoire du Centre Saint-Laurent d'Environnement Canada fournit 1,5 personne-année en suivi analytique alors que la Direction de la protection d'Environnement Canada engage pour l'année financière 1998-1999 un minimum de 0,4 personne-année dans le cadre des engagements et des mesures d'appui du gouvernement fédéral consentis dans l'entente de contribution « Mid-Canada Line ».

RAPPORT FINAL

But

L'administration régionale Kativik, le Ministère de la défense nationale et Environnement Canada (région du Québec), aidés de représentants autochtones de Chisasibi et Kuujjuaraapik ont procédé à une campagne d'échantillonnage les 8, 9 et 10 juillet 1998 sur les sites des stations 336, 339, 339A, 403 et 410 de la ligne Mid-Canada (MCL) dans le but d'obtenir des données sur la contamination potentielle des sites échantillonnés afin de mieux planifier ultérieurement le plan d'opération, les mesures de santé et sécurité au travail, et finalement les coûts forfaitaires de décontamination et de démantèlement de certains sites de la MCL.

Contexte de la campagne d'échantillonnage

Au Québec, la MCL est composée de 42 sites. 37 sites sont situés sur des terres au nord du 55^{e} parallèle et les autres sont situés sur des terres au sud du 55^{e} parallèle. Certaines infrastructures sont dans une condition qui pourrait être préjudiciable à la sécurité des gens ayant accès à ces sites (ex. antennes, bâtiments, conduites hors-terre). Du sol trouvé sur ces sites et des matériaux placés sur les terres humides sur la plupart de ces sites sont dans une condition qui pourrait être préjudiciable à l'environnement (ex. réservoirs rouillés et tuyauteries abandonnés sans impasse et contenant toujours des hydrocarbures). Comme mesure de prévention, les parties de l'entente de contribution « Mid-Canada Line » désirent corriger ces conditions des sites aussitôt que possible.

Compte tenu qu'il n'existe pas de données environnementales fiables concernant l'impact environnemental que peut représenter ces sites, une campagne d'échantillonnage a été mise sur pied dans le but d'obtenir des données sur la contamination de ces sites. Ces informations devraient permettre de mieux planifier le plan d'opération et les coûts forfaitaires de décontamination et de démantèlement ultérieurs pour les sites qui seront retenus lors de l'étude de faisabilité.

Choix des sites

Le choix des sites retenus pour cette campagne d'échantillonnage a été fixé en fonction de la représentativité des sites en terme d'usages passés et futurs de chaque station. Une carte de la région visitée est d'ailleurs fournie à l'**Annexe A**.

Hormis le site 410 qui est le plus important de la MCL, tous les autres sites consistent en des anciennes stations radar qui sont composées d'une ou plusieurs antennes de métal et d'un bâtiment de 28 pieds par 60 pieds divisé en trois sections. Ces sections sont respectivement la salle des machines, qui comprend trois moteurs diesel, une section servant d'atelier et d'entrepôt, et finalement une section de séjour pour les ouvriers destinés à faire l'entretien périodique des stations. A l'extérieur on trouve de nombreux réservoirs et barils contenant ou ayant contenu principalement des produits pétroliers. Compte tenu de leur fonction de surveillance radar, ces sites sont situés au sommet d'une

colline ou d'une montagne surplombant la région environnante ce qui peut entraîner des risques de contamination du bassin versant. Une station de ravitaillement est toujours présente au niveau d'un lac accessible par hydravion. Le travail d'échantillonnage devait donc se faire par avion et / ou hélicoptère pour tenir compte des distances entre chaque station et de leur accessibilité. La localisation des stations retenues pour la présente campagne d'échantillonnage est indiquée au **Tableau 1**.

TABLEAU 1 - EMPLACEMENT DES SITES VISITÉS ET TYPES D'ÉCHANTILLONS RECUEILLIS

NUMÉRO DU SITE	LOCALISATION	CARACTÉRISTIQUE	SOLS	EAUX	DÉBRIS DE DÉMOLITION
336	55°21'N, 76°05'W 105 Km de Kuujjuaraapik	• Réutilisation du bâtiment prévue			X
339	55°15'N, 75°59'W 61 Km de Kuujjuaraapik	• Réutilisation du bâtiment prévue • Site de brûlage d'hydrocarbures en 1987	X	X	
339A	55°15'N, 76°50'W 63 Km de Kuujjuaraapik	• Aucun bâtiment		X	
403	54°59'N, 78°18'W 46 Km de Kuujjuaraapik	• Bâtiment à démolir	X	X	X
410	54°38'N, 79°45'W 140 Km de Kuujjuaraapik	• Plusieurs bâtiments à démolir • Site de brûlage d'hydrocarbures en 1987 • Aussi connu sous le nom de "Pointe Louis XIV", ce site représentait le site le plus important de la MCL au Québec	X	X	X

Méthodologie employée

Compte tenu de la superficie couverte par la MCL, il est important de s'assurer de la représentativité des échantillons qui seront recueillis afin de tenir compte notamment de l'historique de chaque site et des usages antérieurs: en plus des déversements lors des opérations normales entre 1955-1966, certains réservoirs furent vidés de leur contenu et brûlés à ciel ouvert entre le 17 juin et le 17 juillet 1987 (fin septembre 1987 pour le site 410) afin de diminuer les risques de déversement. La méthode employée consistait à brûler les hydrocarbures de façon plus ou moins contrôlée dans des tranchées ou des cavités naturelles en aval des réservoirs (donc en fonction du bassin versant).

Le plan d'échantillonnage utilisé pour les sols des sites 339, 403 et 410 fut inspiré du plan d'échantillonnage utilisé dans le cadre du projet de restauration mené de 1993 à 1995 à Kuujjuaq avec les modifications suivantes : chaque site a été divisé selon des surfaces d'une maille de 15 mètres de côté, orienté selon le bassin versant, et centré sur le point apparent qui semblait le plus contaminé. Les points d'échantillonnage ont été disposés en quinconce à partir du point qui semblait le plus contaminé (#1), un point à 15 mètres en aval (#2) et finalement un point #3 déterminé au hasard sur cette grille. A noter que la ligne reliant les points #1 et #2 correspondaient à la jonction des deux plans inclinés définissant l'axe d'écoulement. Les plans d'échantillonnage pour chaque site (hormis pour le site 339A pour lequel seule de l'eau a été prélevée à la demande Jimmy George) se retrouvent à l'**Annexe B**.

Les sous-échantillons, au nombre de 5, d'un volume de 100 mL chacun, ont été prélevés à l'aide d'une spatule en acier inoxydable, par décapage de la paroi verticale préalablement mise à nue avec une pelle. Une première série d'échantillons proviennent d'une profondeur de 0-15 cm et homogénéisés suite à leur prélèvement. L'échantillon composite a été formé de 100 mL de chacun des sous-échantillons, identifié, et placé dans un bocal étanche en verre de type « Mason » de 500 mL. Une deuxième série a été prélevée à une profondeur de 15-30 cm manipulée et conservée de la même façon.

Dans le cas du site 336, seul un échantillon de panneau mural peint a été recueilli (le bâtiment a été identifié pour une réutilisation par la communauté). Pour le site 339A, seul un échantillon de l'eau du lac a été prélevé (site potentiel pour une pourvoirie).

Paramètres retenus

Afin de cerner les contaminants qui pourraient causer des problèmes, nous avons utilisé les paramètres biologiques et chimiques pertinents pour le type de contamination attendue pour les sols, les eaux de surface et certains débris de démolition. Le **Tableau 2** indique les paramètres analysés.

TABLEAU 2 - LISTE DES PARAMÈTRES ANALYSÉS

PARAMÈTRES ANALYSÉS	SOLS	EAUX	DÉBRIS DE DÉMOLITION
Bioessai Microtox (phase liquide - élutriat pour les sols) *	X	X	
Bioessai Algues (*S. Capricornutum*) -croissance	X	X	
Bioessai Germination (Latuca Sativa) @ 100% uniquement	X	X	
Bioessai SOS chromotest	X	X	
Substances organiques semi-volatiles	X	X	
Hydrocarbures aromatiques polycycliques (HAP)	X	X	
Huiles et graisses totales	X	X	
Huiles et graisses minérales (C_{10}-C_{50})	X	X	
Métaux	X	X	
BPC par Arochlor (frottis de surface)			X
Fibres d'amiante			X

* : Compte tenu de la composition des sols en milieu nordique, des élutriats d'échantillons composites surface-profondeur furent utilisés afin d'obtenir une quantité de sols suffisante pour effectuer les tests.

Résultats obtenus et discussion

Dans le but d'identifier les causes potentielles de contamination, nous avons essayé de corréler les données biologiques avec les résultats des analyses chimiques. Ces résultats sont indiqués à l'**Annexe C** et les données brutes se retrouvent à l'**Annexe D** (analyses chimiques) et à l'**Annexe E** (bioessais). Le lecteur trouvera une indication des méthodes utilisées dans ces mêmes annexes.

1. Observations générales

Selon les résultats indiqués à l'**Annexe C**, nous pouvons observer au **Tableau 3** qu'il n'y a pas de problèmes du côté des eaux : la mesure de la toxicité pour les eaux n'indique aucune toxicité et aucun produit chimique d'origine anthropique pour tous les échantillons recueillis.

Aucune contamination par l'amiante pour les matériaux isolants en laine minérale (intérieur des murs et revêtement de tuyauterie du site 403).

Le problème se situe évidemment au niveau des sols puisque la plupart contiennent des hydrocarbures en quantité ainsi qu'au niveau des débris de démolition où l'on a mesuré des BPC sur certains échantillons. Seuls des sols se sont révélés toxiques principalement pour les sites 339-1 et 410.

TABLEAU 2 - LISTE DES PARAMÈTRES ANALYSÉS

PARAMÈTRES ANALYSÉS	SOLS	EAUX	DÉBRIS DE DÉMOLITION
Bioessai Microtox (phase liquide - élutriat pour les sols) *	X	X	
Bioessai Algues (*S. Capricornutum*) -croissance	X	X	
Bioessai Germination (Latuca Sativa) @ 100% uniquement	X	X	
Bioessai SOS chromotest	X	X	
Substances organiques semi-volatiles	X	X	
Hydrocarbures aromatiques polycycliques (HAP)	X	X	
Huiles et graisses totales	X	X	
Huiles et graisses minérales (C_{10}-C_{50})	X	X	
Métaux	X	X	
BPC par Arochlor (frottis de surface)			X
Fibres d'amiante			X

* : Compte tenu de la composition des sols en milieu nordique, des élutriats d'échantillons composites surface-profondeur furent utilisés afin d'obtenir une quantité de sols suffisante pour effectuer les tests.

Résultats obtenus et discussion

Dans le but d'identifier les causes potentielles de contamination, nous avons essayé de corréler les données biologiques avec les résultats des analyses chimiques. Ces résultats sont indiqués à l'**Annexe C** et les données brutes se retrouvent à l'**Annexe D** (analyses chimiques) et à l'**Annexe E** (bioessais). Le lecteur trouvera une indication des méthodes utilisées dans ces mêmes annexes.

1. Observations générales

Selon les résultats indiqués à l'**Annexe C**, nous pouvons observer au **Tableau 3** qu'il n'y a pas de problèmes du côté des eaux : la mesure de la toxicité pour les eaux n'indique aucune toxicité et aucun produit chimique d'origine anthropique pour tous les échantillons recueillis.

Aucune contamination par l'amiante pour les matériaux isolants en laine minérale (intérieur des murs et revêtement de tuyauterie du site 403).

Le problème se situe évidemment au niveau des sols puisque la plupart contiennent des hydrocarbures en quantité ainsi qu'au niveau des débris de démolition où l'on a mesuré des BPC sur certains échantillons. Seuls des sols se sont révélés toxiques principalement pour les sites 339-1 et 410.

TABLEAU 3 - CONCLUSIONS SUITE AUX RÉSULTATS INDIQUÉS À L'ANNEXE C

	SOLS ET EAUX	
1	Substances organiques semi-volatiles dans le sol	Non détecté dans l'ensemble sauf quelques traces de 4 produits non réglementés par le MEFQ dans les sols du site 339 (échantillon #1 - en profondeur) qui est un ancien site de brûlage en 1987.
2	HAP dans sol	Non détectés dans l'ensemble: quelques traces de naphtalène mesurées mais après vérification il s'agit de contamination des échantillons au laboratoire.
3	Huiles et graisses totales dans sol	Apport organique substantiel sur le site 403 tant en surface qu'en profondeur.
4	Huiles et graisses minérales (C_{10}-C_{50}) dans sol	Contamination au-delà du critère C du MEFQ pour les échantillons #1 du site 339 (contamination en surface et en profondeur pour ce site de brûlage), échantillon #3 du site 410 (contamination en profondeur) et #Tk farm Marais 410 (contamination en surface). La majorité des autres échantillons (tant en surface qu'en profondeur) se classent dans la plage B-C du MEFQ.
5	Métaux	Non détecté pour l'eau mais contamination des sols dans la plage A-B du MEFQ pour les sites 410#1 et 410#3 en cuivre et zinc. On remarque aussi beaucoup d'aluminium à ces endroits mais ce paramètre n'est pas réglementé.
6	Substances organiques volatiles dans l'eau	Non détecté pour les lacs et / ou étangs attenant aux sites 339, 339A, 403 et 410.
7	HAP dans l'eau	Non détecté sauf pour le lac attenant au site 403 qui semble présenter une trace de naphtalène: après vérification il s'agit d'une contamination des échantillons au laboratoire.
8	Huiles et graisses totales dans l'eau	Traces détectées aux lacs des sites 339 et 339A mais non significatif dans les deux cas.
9	Huiles et graisses minérales (C_{10}-C_{50}) dans l'eau	Non détecté y compris pour les lacs des sites 339 et 339A.
	MATÉRIAUX DE DÉMOLITION	
10	BPC par Arochlor (frottis de surface)	Contamination supérieure à la norme de matière dangereuse permise en Arochlor 1254 a été détectée sur le panneau mural peint du site 336, du site 410 et la tuile de plancher du site 410.
11	Fibres d'amiante	Non détecté dans les 2 matériaux isolants analysés (site 403).
	BIOESSAIS *	
12	Microtox (phase liquide -élutriat)	Aucune toxicité tant pour les sols que pour l'eau sauf pour le sol du site de brûlage 339-1 et Tk farm marais 410.
13	Algues (*S. Capricornutum*) -croissance	Aucune toxicité tant pour les sols que pour l'eau sauf pour le sol du 403-2. On obtient en général de légères inhibitions pour les sols mais cela est non significatif.
14	Germination (Latuca Sativa) - 100% uniquement	Aucune toxicité tant pour les sols que l'eau.
15	SOS chromotest	3 échantillons de sol du site 410 sont génotoxiques : #3, #Tkfarm marais et #1 en ordre de génotoxicité décroissante. Aucune eau sur l'ensemble des échantillons analysés n'est génotoxique.
* :	1- Essais sur des élutriats d'échantillons composites surface-profondeur pour les sols afin d'obtenir une quantité de sols suffisante pour effectuer les tests.	2- À noter que le délai maximum pour réaliser les tests sur l'eau a été dépassé et que les résultats des bioessais sur l'eau doivent être utilisés à titre indicatif.

2. Observations particulières à chaque site

Afin de faciliter l'interprétation des données, nous allons maintenant analyser les résultats de l'**Annexe C** en fonction de chaque site.

Site 336

Pour ce site, seul un échantillon de panneau mural peint a été prélevé et mesuré pour les BPC. Il s'est avéré que cet échantillon était contaminé par ~~7,0~~ 2,01 mg/m^2 alors que la norme du MEFQ est de 1 mg/m^2. Compte tenu que ce type de panneau mural se retrouve à plusieurs endroits sur la MCL, nous allons traiter plus en détail de la gestion de ce type de matériau un peu plus loin dans ce rapport.

Site 339

Au niveau des eaux de surface, aucun contaminant n'est détecté et aucune toxicité n'est mesurée.

Au niveau des sols (339-1), on retrouve principalement un problème d'hydrocarbures ainsi qu'une toxicité aiguë telle que mesurée par le test Microtox. Compte tenu qu'il s'agit d'un site de brûlage antérieur, il est possible que la toxicité mesurée soit associée à la forte présence des hydrocarbures (au-delà du critère C du MEFQ) puisque les autres bioessais sont négatifs.

Site 339A

Seule l'eau du lac attenant au site a été échantillonnée (à la demande de Jimmy George). Aucune toxicité et aucune contamination chimique d'origine anthropique n'est mesurée.

Site 403

Au niveau des eaux de surface, aucun contaminant n'est détecté et aucune toxicité n'est mesurée.

Au niveau des sols, on observe une réponse toxique mais non significative pour les algues au site 403-2 alors que la contamination en hydrocarbures (C_{10}-C_{50}) est entre 1400 (surface) et 4700 mg/kg (profondeur), soit la plage B-C (basée sur la concentration moyenne) selon les critères du MEFQ. Le type de contaminant peut ici expliquer la toxicité mesurée.

Au niveau des débris de démolition, aucune contamination par l'amiante pour les matériaux isolants en laine minérale (intérieur des murs et revêtement de tuyauterie),

Site 410

Le site 410 (Pointe Louis XIV) est certes le site le plus problématique au niveau des sols. Toutefois, au niveau des eaux de surface, aucun contaminant n'est détecté et aucune toxicité n'est mesurée.

Suite aux résultats préliminaires, 3 échantillons de sols provenant du site 410 se sont avérés génotoxiques (test SOS chromotest). Nous avons donc procédé à 22 analyses supplémentaires en vue d'améliorer la fiabilité des données et essayer de déterminer le(s) type(s) de contaminant(s) causant la génotoxicité mesurée pour certains échantillons de sols (« hot spots ») sur le site 410.

Il en ressort que le site est particulièrement contaminé et génotoxique selon l'ordre de génotoxicité décroissant suivant : 410-3, Tk farm Marais 410 et 410-1. Les essais supplémentaires réalisés ne permettent pas d'identifier un contaminant particulier mais il apparaît probable que la génotoxicité observée peut provenir du type de produit pétrolier présent. La génotoxicité du site Tk farm Marais 410 peut s'expliquer par son utilisation à des fins de brûlage en septembre 1987.

3. Problématique particulière: les biphényles polychlorés (BPC) dans les débris de démolition

Compte tenu des résultats positifs obtenus par suite de frottis de surface sur les débris de démolition (voir **Annexe C-2**), nous nous sommes penchés sur les implications pour gérer les nombreuses tôles, tuiles de plancher et revêtements muraux qui composent chaque bâtiment le long de la MCL. De plus, comme tous les bâtiments sont analogues et qu'ils ont été construits à la même période, nous avons essayé de recueillir des échantillons les plus représentatifs possibles en tenant des usages passés et futurs.

Suite aux travaux de la Défense nationale, on sait que les peintures employées contenaient possiblement des BPC puisqu'à l'époque de la construction de la MCL, il était fréquent d'ajouter des BPC (1254 et 1260 particulièrement) à la peinture afin de lui donner une meilleure élasticité et une meilleure résistance aux éléments atmosphériques.

La campagne d'échantillonnage a permis de constater l'abrasion très avancée des matériaux de recouvrement soumis aux intempéries. Le vent, très violent dans le Grand Nord, semble avoir joué un rôle important à ce niveau. On a remarqué que la peinture sur les tôles était très altérée. Il en est de même pour les panneaux muraux intérieurs peints.

Ainsi, selon le **Tableau 4**, la tôle métallique du plafond au 410 est en-deça de la norme du MEFQ (1 mgBPC/m^2) sur les BPC dans les frottis de surface, tout comme le panneau mural du 410. Toutefois, le panneau mural du 336 contient une teneur relativement élevée alors qu'il s'agit du même matériel que pour le 410. Après vérification, il est apparu que les panneaux muraux semblent faits de Fibrociment. Le panneau du 336, exposé aux intempéries, a absorbé plus d'eau que celui du 410 et il est possible que cela soit la raison pour laquelle on mesure un taux plus élevé de BPC. Les tuiles de plancher du 410 sont contaminées aux BPC, ce qui était prévu puisqu'il s'agit de tuiles de spécification militaire.

Tableau 4 - Résultats des analyses de BPC par frottis de surface selon la norme du MEFQ

Localisation	Description	Échantillon	Teneur en BPC (en mg/m^2)	Matière dangereuse
410 Mur	Panneau	#634	~~0,89~~ 0.ce3	NON
336 Mur	Panneau	#635	~~7,00~~ 0.07	~~OUI~~ NON
410 Plancher	Tuile	#636	~~1,58~~ 0.015	~~OUI~~ NON
410 Plafond	Tôle	#637	~~0,14~~ LD	NON
Norme=1mgBPC/m^2 MEFQ				

erreur corrigée d. lettre Jean Lapointe 20 mai 1998

Ainsi, la tôle de plafond du site 410 n'est pas une matière dangereuse en vertu du Règlement sur les matières dangereuses ni le panneau mural du site 410. Le panneau en Fibrociment pour du site 336 ainsi que la tuile du plancher du site 410 seraient considérés comme des matières dangereuses toujours selon ce même règlement. NON

Il est à noter que la méthode par frottis de surface n'est valable que pour les matériaux non poreux. Une autre norme, celle-là de 50 mgBPC/kgMatériel s'applique pour l'enfouissement des matériaux poreux comme les panneaux muraux en Fibrociment et la tuile de plancher.

Afin de pouvoir trouver un mode d'élimination acceptable, nous avons échantillonné de nouveau les matériaux du **Tableau 4** afin d'en estimer les quantités de peinture par rapport aux surfaces de chaque matériau. Les résultats, indiqués au **Tableau 5** permettent de calculer le poids de peinture par unité de surface. Il sera donc possible de déterminer la quantité de BPC par kg de matériel (tôle, panneau mural, tuile de plancher) une fois que la concentration totale en BPC sera déterminée (voir recommandations). Il sera alors possible d'envisager une gestion des débris de démolition en fonction des règlements en vigueur et des usages. Pour l'instant, le **Tableau 5** ne permet pas de conclure autre chose.

Tableau 5 - Résultats des quantités de peinture pesées en laboratoire sur la tôle de plafond, le panneau mural et la tuile de plancher pour le site 410

Localisation	Échantillon	Longueur	Largeur	Surface	Masse	Poids/Surface
		cm	cm	cm^2	g	g/cm^2
410 Plafond						
	Sans peinture	7,4	5	37	24,854	
	Forte abrasion	7	7	49	0,2941	0,01
	Aucune abrasion	8,5	2,5	21,25	0,3527	0,02
410 Mur						
	Sans peinture	5	5	25	23,3682	
	Aucune abrasion	5	5	25	0,3005	0,01
410 Plancher *						
	Sans peinture	4	4	16	8,0878	

* : A noter que la superficie de chaque tuile est de 22,5 cm X 22,5 cm soit 506,25 cm^2. Évidemment, il n'y a pas de peinture sur la tuile de plancher mais il y a des BPC selon le test de frottis.

Il faudrait procéder aussi à l'analyse du panneau mural du site 336 pour les BPC totaux compte tenu de l'état de dégradation observé.

Finalement, un test de lixiviation sur les panneaux muraux des sites 336 et 410 devraient être réalisés afin de préciser les risques que représentent ces débris de démolition pour l'environnement et les usages futurs. Au niveau de la santé et de la sécurité au travail, des analyses d'amiante devront être réalisées sur ces mêmes panneaux puisqu'ils se sont avérés composés de Fibrociment.

CONCLUSIONS ET RECOMMANDATIONS

En résumé :

- aucune contamination toxicologique et chimique des eaux de surface (lacs et étangs),
- aucune contamination par l'amiante pour les matériaux isolants en laine minérale (intérieur des murs et revêtement de tuyauterie du site 403),
- contamination écotoxicologique observée au niveau des sols sur deux régions du site 410 (#1 et #3) ainsi que sur les sites de brûlage 339-1 et 410 Tk farm Marais, la cause la plus probable étant respectivement les hydrocarbures résiduels et les hydrocarbures imbrûlés,

- contamination variable en BPC des débris de démolition (tôle de plafond, panneau mural en Fibrociment et tuile de plancher). La tôle de plafond peinte et le panneau mural peint du site 410 sont en-deçà de la norme du MEFQ pour les frottis de surface et ne seraient pas considérés comme matières dangereuses alors que le panneau mural peint (site 336) et la tuile de plancher (site 410) dépassent la norme et demandent une étude plus approfondie.

Afin de préciser certains points, nous recommandons les actions suivantes :

1) caractériser les panneaux muraux des sites 336 et 410 pour l'amiante puisque l'échantillonnage a révélé par la suite qu'ils étaient composés de Fibrociment,
2) caractériser les BPC (méthode par congénères puis lixiviation selon le test du MEFQ) afin de préciser les modes d'élimination et les usages futurs permis:
   2.1 panneau mural peint, tuile de plancher, tôle de plafond peinte (portion intacte et portion exposée aux intempéries) du site 410,
   2.2 panneau mural peint du site 336,
3) échantillonner à l'automne 1998 les sols des sites de brûlage Tk farm Marais 410 et 339-1, ainsi qu'un échantillon composite des sites 410-1 et 410-3, afin de compléter durant l'hiver 1999 des essais de biotraitabilité qui pourraient être réalisés par l'Institut de recherche en biotechnologie du CNRC ou encore l'École polytechnique de Montréal (groupe Biopro).

RÉDIGÉ PAR :

Gervais Leclair, M.Sc.
Conseiller principal de projets
Section Intervention et restauration
Environnement Canada (région du Québec)
Tél. : (514) 496-6847
FAX : (514) 496-2901

Jean Lapointe, chim.p., M.Sc.A.
Conseiller scientifique
Section Intervention et restauration
Environnement Canada (région du Québec)
Tél. : (514) 283-9202

23 SEPTEMBRE 1998

FIN DU RAPPORT FINAL

CETTE PAGE EST LAISSÉE LIBRE INTENTIONNELLEMENT

Environnement Canada
Région du Québec

Environment Canada
Quebec Region

Protection
105 rue McGill, 4e étage
Montréal (Québec) H2Y 2E7
Tél : (514) 283-9202
Fax : (514) 496-2901

Définition de notre matériau (BPC) Définir — comment on le gère?
Ex. Bulk ....
Matériau de démolition.

Montréal, le 20 mai 1999

M. Yves Héroux ing.
Administration régionale Kativik
C.P. 9
Kuujjuaq Québec
Canada J0M 1C0

OBJET: Corrections aux teneurs en BPC des matériaux des bâtiments - Mid-Canada Line

Dans le cadre de la mise au point du plan de travail pour la désaffectation de la Mid-Canada Line (projet intitulé *Mesures préventives de rémédiation sur les sites de la Mid-Canada Line situés au Québec*), il était requis de statuer, conjointement avec le CRSSS sur le plan de la santé, pour identifier entre autres les précautions à prendre pour réutiliser sécuritairement certains bâtiments.

À cet effet nous avons refait les calculs permettant d'estimer les teneurs en BPC mesurées par frottis à la surface des matériaux prélevés de certains bâtiments, et corrigé les erreurs qui s'étaient glissées à l'annexe C-2 du rapport intitulé *Campagne d'échantillonnage sur la Mid-Canada Line* (23 septembre 1998). Je vous transmets une copie révisée de cette annexe. Pourriez-vous en faire suivre une copie aux autres récipiendaires du rapport. À notre avis ces changements ne devraient pas faire en sorte que le CRSSS soit écarté de la consultation.

Il est à noter que la méthode par frottis de surface sert à juger s'il s'agit de matières dangereuses dans le cas des matériaux non poreux, et devrait surtout servir de base de discussion avec le CRSSS. Une autre norme, celle-là de 50 mg/kg matériel, s'applique pour l'enfouissement des déchets de démolition en l'occurrence peinture, panneaux muraux en Fibrociment et tuiles de plancher. Il s'agit du *Règlement sur le stockage des matériels contenant des BPC*. Tel que recommandé dans le rapport, il faudrait donc mesurer les concentrations de BPC conformément à ce règlement afin de préciser les modes d'élimination avec un minimum d'analyses:

- tuile de plancher du site 410 (matériel poreux) ND
- le panneau mural du site 336 (matériel poreux) ND
- peinture du panneau mural du site 336.

Je vous transmets mes excuses pour les inconvénients que peuvent occasionner ces changements ainsi que l'expression de mes sentiments les meilleurs.

Jean Lapointe

Jean Lapointe, chimiste
Conseiller scientifique

Canada

Ligne Mid-Canada

ANNEXE C-2 TENEURS EN BPC DES MATÉRIAUX DE CERTAINS BÂTIMENTS

(frottis de surface)

	Échantillon	Longueur	Largeur	Surface (cm^2)	Teneur mesurée (en ug)	Teneur (en ug/100 cm^2)	Teneur (en mg/m^2)	Dépasse la norme du règlement sur les matières dangereuses
410 Mur	#634	28	20	560	0.5	0.089	0.009	NON
336 Mur matériel poreux	#635	20	20	400	2.8	0.700	0.070	-
410 Plancher matériel poreux	#636	22.5	22.5	506.25	0.8	0.158	0.016	-
410 Plafond	#637	40	18	720	N.D.	N.D.	N.D.	NON
							Norme = 1mg/m^2	

Peintures	Échantillon	Longueur cm	Largeur cm	Surface cm^2	Masse g	Poids g/cm^2
410 Plafond						
	Faible abrasion	7	7	49	0.2941	0.01
	Aucune abrasion	8.5	2.5	21.25	0.3527	0.02
410 Mur						
	Aucune abrasion	5	5	25	0.3005	0.01

Tuile de plancher	Échantillon	Longueur cm	Largeur cm	Surface cm^2	Masse g	Poids g/cm^2
410 Plancher						
		4	4	16	8.0878	0.51

A noter que la superficie de chaque tuile est de 22,5 cm X 22,5 cm soit 506,25 cm^2.

Modification 20 mai 1999

Kuujjuaq, le 24 mai 1999

Monsieur Gervais Leclair
Environnement Canada
105 rue McGill, 4e étage
Montréal (Québec)
H2Y 2E7

Objet: **Analyse de matériaux de construction pour BPC**

Monsieur Leclair,

Cette note fait suite à notre entretien téléphonique ainsi qu'à la réception de la correspondance de Monsieur Jean Lapointe portant sur les teneurs en BPC des matériaux des bâtiments de la Ligne Mid-Canada.

Je concours à votre opinion et à celle de Monsieur Lapointe sur le fait que des analyses supplémentaires doivent être effectuées afin de déterminer la concentration de BPC (en ppm) des matériaux de construction énumérés dans la note de Monsieur Lapointe. Cette information est nécessaire afin d'assurer que la gestion de ces matériaux se fera en conformité avec la réglementation en vigueur.

Je vous saurais gré de bien vouloir faire les démarches nécessaires et me confirmer si les échantillons collectés lors de la campagne d'échantillonnage de juillet 1998 sont toujours disponibles et pourront être utilisés aux fins d'analyse. Pour ce qui est du financement des frais de laboratoire, il serait sans doute souhaitable, si vous n'y voyez pas d'inconvénient, de procéder de la même façon que lors des analyses prédédentes; vous serez remboursé à même le budget Mid-Canada par l'ARK sur réception des factures de frais de laboratoire.

Pour ce qui est de la position officielle du MSSS sur le danger pour la santé de la réutilisation de bâtiments potentiellement contaminés par des BPC, une copie de la lettre de Monsieur Lapointe a été transmise au Dr. Serge Déry, directeur du RRSSS au Nunavik. Une note devrait me parvenir sous peu et une copie sera expédiée aux partenaires de l'Entente.

Je vous pris d'agréer, Monsieur Leclair, mes salutations distinguées.

Yves Héroux, ing. stag.
Spécialiste des projets environnementaux
ARK, Kuujjuaq

Appendix C

Conseil national de recherches Canada
Institut de recherche en biotechnologie

National Research Council Canada
Biotechnology Research Institute

CNRC·NRC

Soil Biotreatability Study of the Mid-Canada Line Project Sites 218, 339 and 410

PRELIMINARY REPORT

Submitted to:

Gervais Leclair
Environment Canada
Intervention and Remediation Section
Michael Barrett
Kativik Regional Government

Authors:

Sylvie Rocheleau, Manon Sarrazin and Geoffrey Sunahara
Applied Ecotoxicology Group

Chantale Beaulieu and Jalal Hawari
Environmental Chemistry Group

Biotechnology Research Institute, NRC
6100 Royalmount Avenue, Montreal, QC, H4P 2R2

November 24, 1999 **CNRC# 43292**

6100, avenue Royalmount
Montréal (Québec) Canada
H4P 2R2

6100 Royalmount Avenue
Montreal, Quebec, Canada
H4P 2R2

Canada

Acknowledgments

The authors thank *Danielle Beaumier*, *Anca Mihoc*, *Suzanne Labelle* and *Danielle Ouellette* from the Environmental Microbiology group and *Dr. Pierre Yves Robidoux* from the Applied Ecotoxicology group for their precious technical advice. The report was revised by *Dr. Charles Greer* from the Environmental Microbiology group and by *Dr. Agnès Renoux* from the Applied Ecotoxicology group.

Table of contents

List of tables

List of figures

1 Introduction

The three sites sampled during the present biotreatability study are located in the Mid-Canada Line radio detection region, sited along the 55th parallel. These sites are contaminated with petroleum hydrocarbons. Site 218 is located at 180 km north of Schefferville and was sampled during the month of June 1999. Sites 339 and 410 are located at 61 km and 140 km of Kuujjuaraapik, respectively, and were burn sites in 1987 (Environnement Canada, 1998). Site 410 is also known as "Louis XIV Pointe" and represents an important bird migration location. Sites 339 and 410 were sampled at the end of September 1999. The goals of the present soil biotreatability study are to determine the petroleum hydrocarbon degradation and the toxicity changes of the contaminated soil samples, with or without amendment of organic matter and minerals, after twelve weeks of incubation at 10°C, as compared to a control soil not contaminated by petroleum hydrocarbons. This preliminary report presents the results of the 12 week study for site 218 and the results collected up to now for sites 339 and 410, *i.e.* during a 6 week period. The detailed methodology of the tests will be described in the final report.

2 Objectives

For each site, the control, contaminated and amended soil samples were:

- Chemically analyzed for their petroleum hydrocarbons content,
- assessed for their biological degradation potential by measuring the hexadecane mineralization,
- microbiologically characterized by enumerating the initial microbial population,
- ecotoxicologically characterized with the Microtox test and the SOS Chromotest. The ecotoxicity of site 410 was also characterized with the lettuce germination, the barley germination and growth inhibition and the earthworm mortality tests.

3 Preparation and characterization of samples

For each site sampled, one contaminated soil, one amended soil and one non contaminated soil adjacent to the contaminated soil were taken. The soil was

amended on site by adding 1 kg of peat moss per m^2 of soil, 0.75 kg of dolomitic limestone per m^2 of soil and 0.1 kg of fertilizer per m^2 of soil. The McInnes natural fertilizer used is a slow release fertilizer with a N/P/K ratio of 8/3/3. The composition of the dolomitic limestone is the following:

- Calcium carbonate ($CaCO_3$) 53.5%
- Calcium content (Ca) 21.0%
- Magnesium carbonate (Mg) 42.0%
- Magnesium content (Mg) 12.0%

The samples from site 218 were received on June 17, 1999. The samples from sites 339 and 410 were received on October 1st 1999. The samples were incubated in mesocosms at 10°C during 12 weeks. Aliquots were taken out after 6 weeks to measure the concentration of petroleum hydrocarbons and the toxicity of the samples using the Microtox test. Microcosms of the samples were incubated at 10°C with ^{14}C-labelled hexadecane. Hexadecane mineralization was measured every week during the first month of incubation and every second week for the rest of the biotreatability study.

The site history, visual aspect, water content and pH of the samples are presented in Table 1. Soil samples from site 218 were slightly acidic (pH values between 5.4 and 6.3) and moderately damp, with water contents ranging from 20% to 25%. The soil samples from site 339 were more acidic (pH values between 4.6 and 6.2) and very wet, with water contents ranging from 31% to 59%. It is interesting to note that the water content of the control soil from site 339 was much lower than the contaminated and amended sites, and that the pH of contaminated site 339 was relatively low (4.6). The contaminated and amended samples from site 410 were mainly composed of sphagnum and small rocks, as opposed to the control site which was mainly composed of small rocks and a small quantity of sphagnum. The water content of the control soil of site 410 was much lower (7%) than the contaminated and amended soils, with water contents of 40% and 52%, respectively. The pH of site 410 samples were alkaline, ranging between 7.4 and 8.1.

Table 1. Preliminary characterization of the samples

Name of samples	Site history	Visual aspect of the soil sample	Water content (%H_2O)	pH
218 -Control site		Homogeneous soil	24.9	5.87
218 –Contaminated site	maintenance of vehicles	Homogeneous soil	20.0	5.40
218-Amended site	maintenance of vehicles	Homogeneous soil	19.8	6.30
339 -Control site		Wet soil with big rocks and roots	30.7	5.17
339 –Contaminated site	Burning site	Very wet soil with roots	59.3	4.57
339 -Amended site	Burning site	Very wet soil with roots	51.8	6.25
410 -Control site		Some sphagnum with small rocks	6.9	8.05
410 –Contaminated site TK farm marsh	Burning site	Wet sphagnum with bigger rocks	39.9	7.43
410-Amended site TK farm marsh	Burning site	Wet sphagnum with bigger rocks	52.2	8.10

4 Results

4.1 Chemical analysis

Chemical analysis of petroleum hydrocarbons (C_{10}-C_{50}) was performed according to the Quebec Environment Ministry standard protocol (Centre d'Expertise en analyse environnementale du Québec, 1997). Results are presented in Table 2. Sites 218 and 410 were initially highly contaminated by petroleum hydrocarbons with concentrations ranging between 28000-30500 mg/kg and 44000-58000 mg/kg, respectively, as opposed to site 339, which had a lower contamination ranging between 1600-2400 mg/kg. Site 218 was contaminated by heavy hydrocarbons, such as motor oil and sites 339 and 410 were contaminated with diesel, as observed on the GC chromatograms (Figures 1-4). After 12 weeks of incubation at 10°C, no petroleum reduction was measured in contaminated site 218 soil.

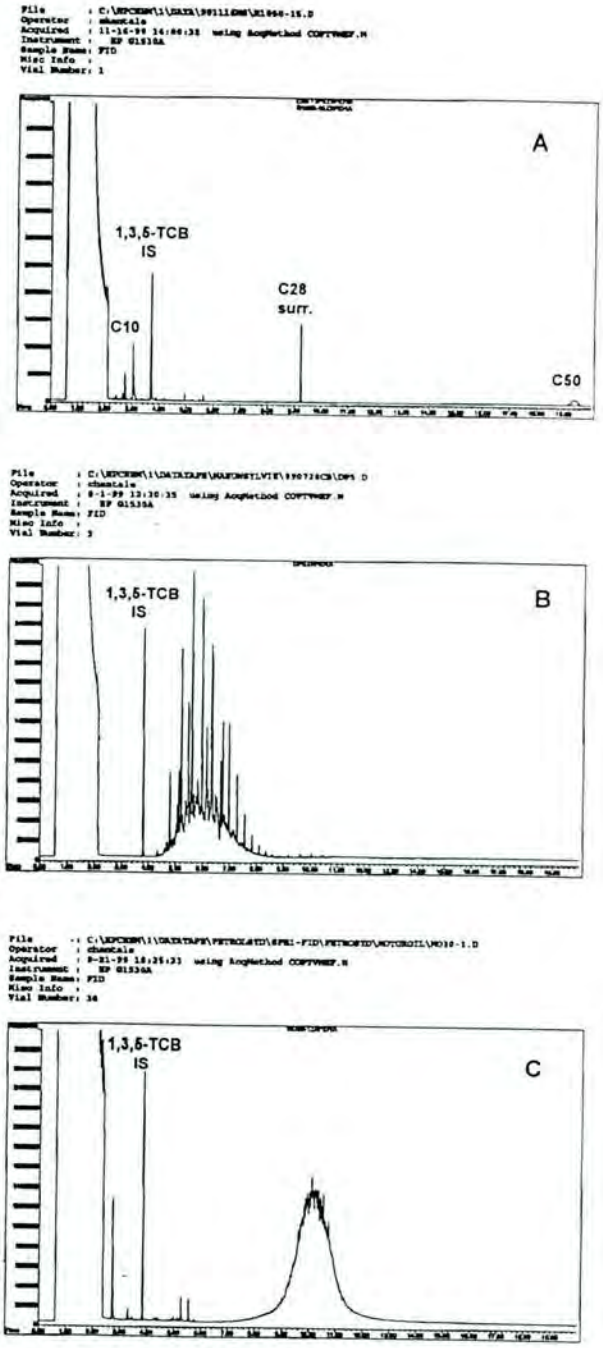


Figure 1. GC chromatograms of A) C_{10}, C_{28} and C_{50} n-paraffins, B) weathered diesel at 50%, and C) grade 30 motor oil standard

However, the addition of amendments resulted in a significant 54% petroleum reduction (Table 2). GC chromatograms of the amended site 218 indicate a concentration reduction of all peaks, especially of the smaller molecular weight hydrocarbons, such as the diesel fraction (Figure 2). After 6 weeks of incubation, a slight reduction of the petroleum hydrocarbon concentration was observed in the contaminated and amended soils of site 339. No significant change was observed at site 410, with a slight petroleum hydrocarbon reduction of 6% in both contaminated and amended sites (Table 2).

Table 2. Analysis of petroleum hydrocarbons (C_{10}-C_{50})

Name of sample	Petroleum hydrocarbons (mg/kg)			
	T= 0	T= 6 weeks	T= 12 weeks	% reduction
218 - Control site	<100	<100	<100	0
218 - Contaminated site	30,500	31,000	33,500	0
218 - Amended site	28,400	20,300	13,600	54
339 - Control site	<100	<100	ND	0
339 - Contaminated site	2,400	2,000	ND	17
339 - Amended site	1,600	1,200	ND	25
410 - Control site	<100	<100	ND	0
410 - Contaminated site	44,400	41,700	ND	6
410 - Amended site	57,800	54,300	ND	6

ND: Not determined yet

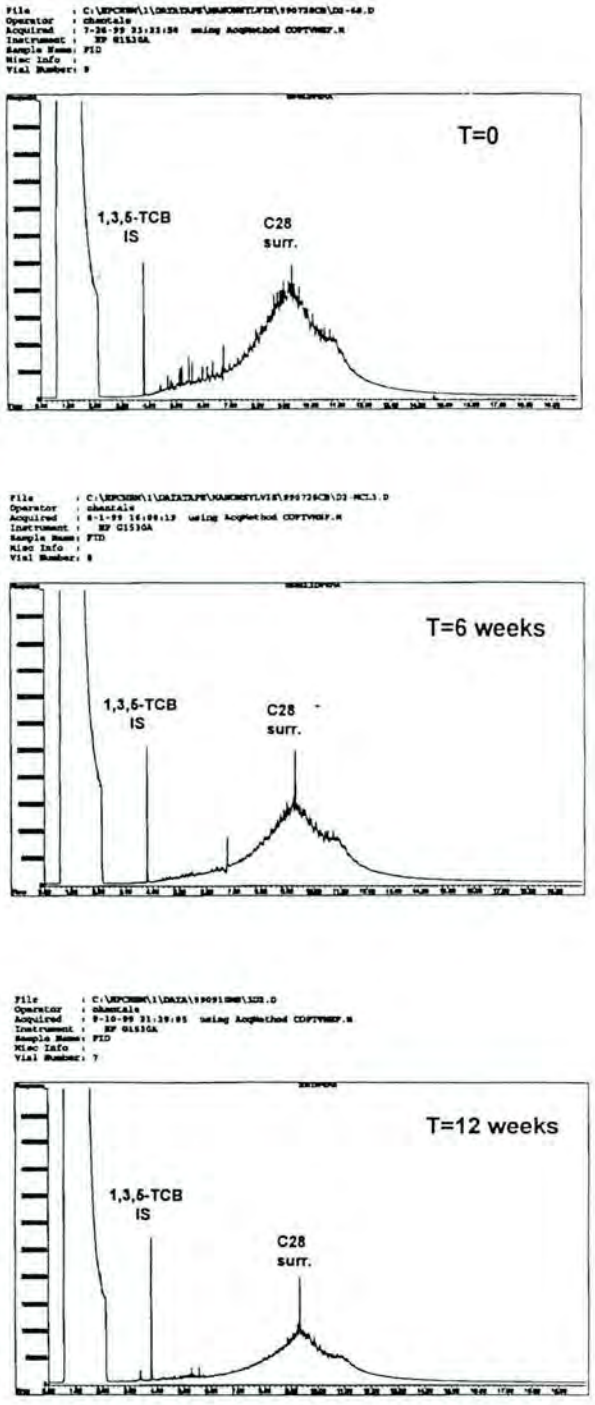


Figure 2. GC chromatograms of the amended soil from site 218 at initial time, and after 6 and 12 weeks of incubation

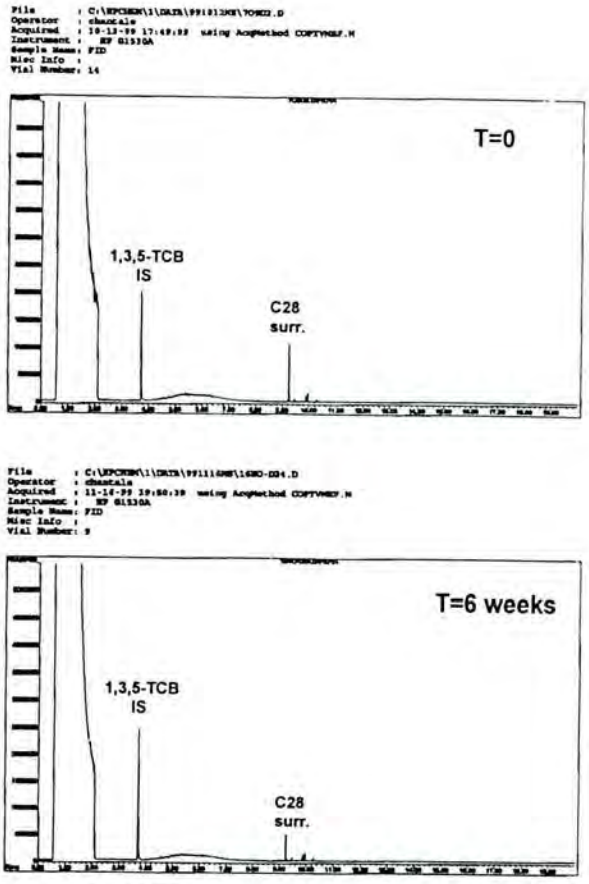


Figure 3. GC chromatograms of the amended soil from site 339 at initial time and after 6 weeks of incubation

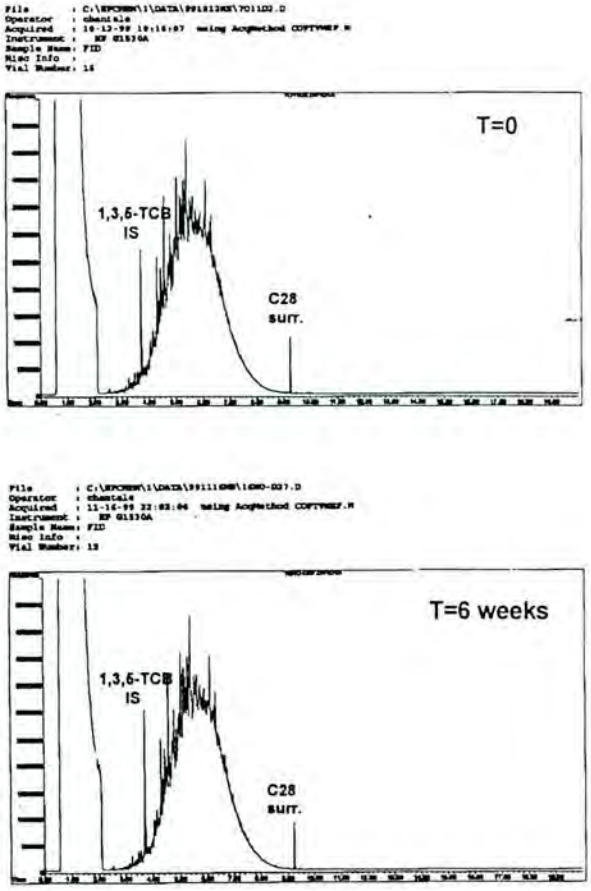


Figure 4. GC chromatograms of the amended soil from site 410 at initial time and after 6 weeks incubation

4.2 Hexadecane mineralization

Hexadecane mineralization studies of site 218 samples were carried out for 84 days at 10°C. As shown in Figure 5, site 218 has a relatively low mineralization potential, with a mineralization percentage of 15% and 17% in both amended and contaminated soils, respectively, as opposed to the control 218 soil, which had 60% mineralization. Up to now, hexadecane mineralization of sites 339 and 410 have been carried out for 42 days. Soils from sites 339 and 410 present higher mineralization potential than site 218, with 34-36% mineralization in the amended soils, as compared to the control soils of sites 339 and 410, which had 60% mineralization (Figures 6 and 7). The contaminated soil from site 339 had a lower mineralization potential of 22%.

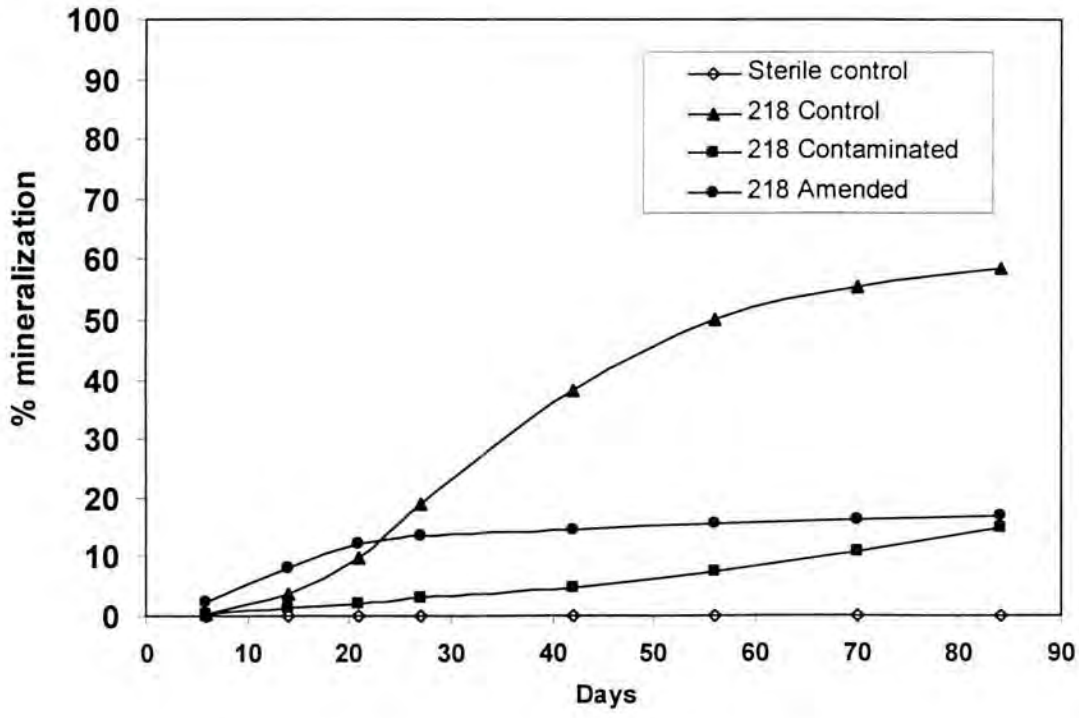


Figure 5. Hexadecane mineralization of site 218

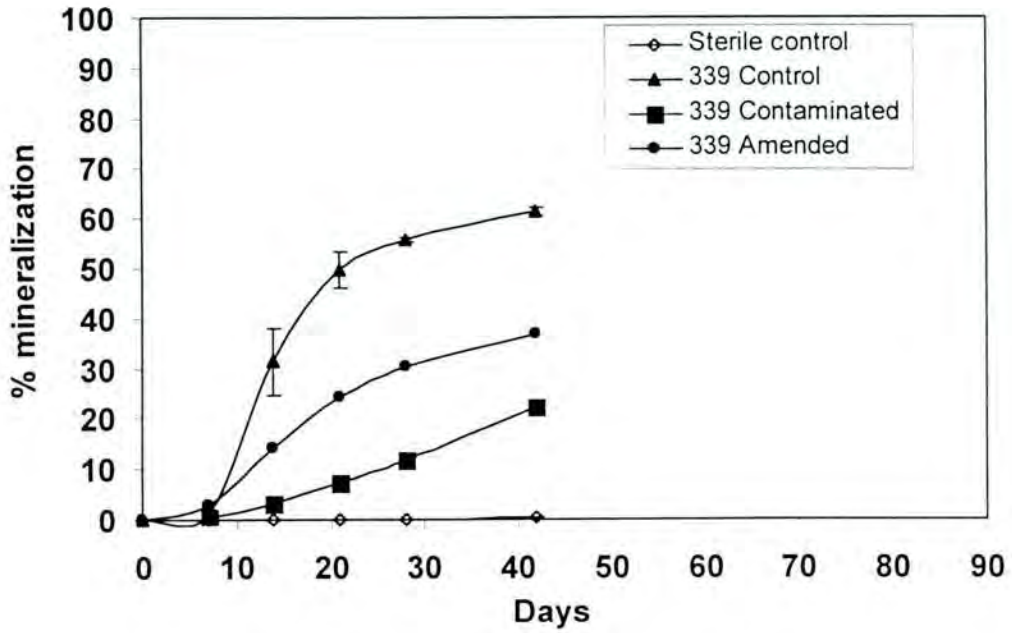


Figure 6. Hexadecane mineralization of site 339

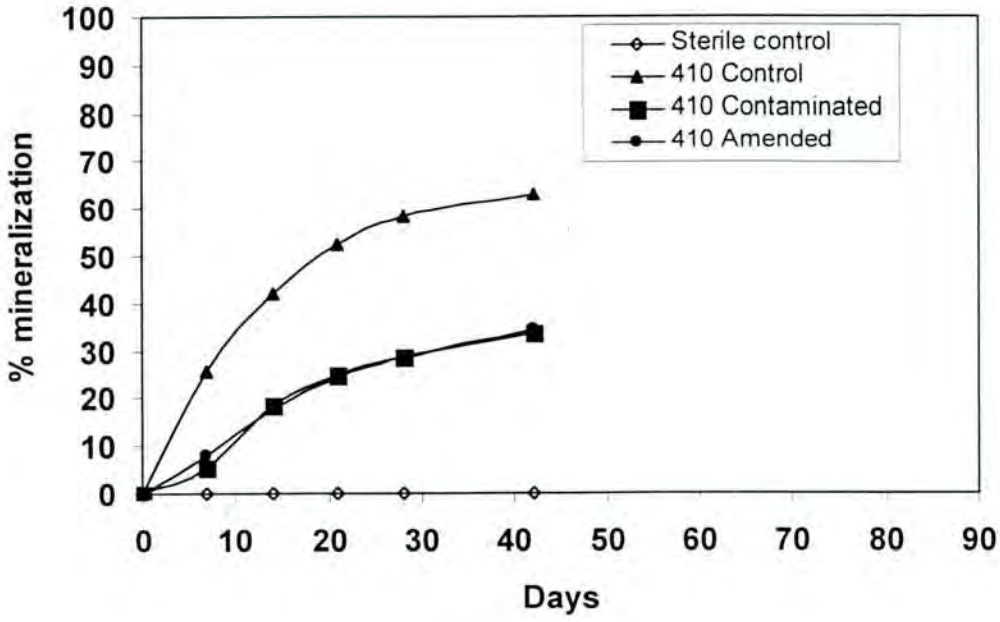


Figure 7. Hexadecane mineralization of site 410

4.3 Microbial analysis

At every site sampled, total heterotrophic bacterial counts were similar in both control and contaminated soil samples, as opposed to the amended soil samples, where bacterial counts were ten times higher. These higher counts were probably due to the addition of peat moss and fertilizer in the amended soils (Table 3). Site 218 had the lowest bacterial counts, in the range of 10^5 CFU/g soil. Site 339 and 410 bacterial counts were respectively ten times and one hundred times higher than at site 218.

Table 3. Microbial analysis

Name of sample	Total heterotrophic bacterial counts (CFU/ g soil)
218 - Control site	4.12E+5 ± 1.66E+5
218 - Contaminated site	5.00E+5 ± 2.12E+5
218- Amended site	1.36E+6 ± 0.33E+6
339 - Control site	1.37E+6 ± 1.97E+5
339 - Contaminated site	1.21E+6 ± 1.62E+5
339 - Amended site	3.91E+6 ± 1.38E+6
410 - Control site	1.22E+7 ± 2.41E+6
410 - Contaminated site	1.54E+7 ± 3.74E+6
410- Amended site	8.40E+7 ± 1.58E+7

4.4 Ecotoxicological analysis

The Microtox toxicity and SOS Chromotest genotoxicity assays were performed to determine the general toxicity and the genotoxicity of every sample. Lettuce germination inhibition, barley germination and growth inhibition, and earthworm mortality assays were performed on site 410 samples only, at the beginning of the study and will be performed at the end of the study to assess the toxicity changes in these samples.

4.4.1 Microtox toxicity assay

The Microtox test is an acute toxicity assay which is often used as a screening tool to assess the toxicity of a sample. The Microtox test measures the inhibition of the

bioluminescence emitted naturally by the marine bacterium, *Vibrio fischeri*, induced by an aqueous sample under study. Table 4 presents the IC50 values, *i.e.* the leachate dilution producing 50% inhibition of bioluminescence and the maximum toxicity values, *i.e.* the maximum inhibition percentage measured at the maximum dilution tested. The lower the IC50 value, the more toxic the leachate is and the higher the maximum inhibition value, the more toxic the leachate is. All soil leachates were slightly toxic, since all IC50 values were above the maximum dilution tested (49.5%). Based on the maximum toxicity values, no significant change of the toxicity was measured for most contaminated soils.

Table 4. Microtox toxicity assay

Sampling period	T= 0		T= 6 weeks		T= 12 weeks	
Name of sample	MT	IC50	MT	IC50	MT	IC50
218 - Control site	13.75	>49.5	22.58	>49.5	11.71	>49.5
218 - Contaminated site	23.47	>49.5	24.65	>49.5	20.20	>49.5
218- Amended site	13.09	>49.5	23.60	>49.5	21.11	>49.5
339 - Control site	29.14	>49.5	21.96	>49.5	ND	ND
339 - Contaminated site	25.48	>49.5	24.26	>49.5	ND	ND
339 - Amended site	9.79	>49.5	11.50	>49.5	ND	ND
410 - Control site	8.97	>49.5	0.26	>49.5	ND	ND
410 - Contaminated site	33.09	>49.5	39.88	>49.5	ND	ND
410- Amended site	39.31	>49.5	35.63	>49.5	ND	ND

MT: Maximum toxicity *i.e.* maximum inhibition percentage measured at the maximum dilution tested, expressed in % inhibition. The higher the number, the more toxic the leachate is.
IC50: Leachate dilution producing 50% inhibition of bioluminescence, expressed in % leachate v/v. The lower is the IC50 value, the more toxic the leachate is.
ND: Not determined yet

4.4.2 SOS Chromotest genotoxicity assay

The SOS Chromotest measures the genotoxicity induced by a sample, using *Escherichia coli PQ37*. Genotoxicity was measured without (-S9) and with (+S9) metabolic activation. The maximum genotoxic induction factors are presented in Table 5. Data indicates a high variability and an inherent genotoxicity in the non contaminated control soils, which makes interpretation of the results difficult at this stage. Further analysis of the genotoxicity results will be presented in the final report.

Table 5. SOS Chromotest genotoxicity

Sampling period	T= 0		T= 6 weeks		T= 12 weeks	
Name of sample	IFmax (-S9)	IFmax +S9)	IFmax (-S9)	IFmax +S9)	IFmax (-S9)	IFmax +S9)
218 - Control site	1.57	1.99	2.19[C]	2.51[C]	1.87	1.74
218 - Contaminated site	1.37[C]	2.41[C]	1.86	1.72	1.32[C]	1.91[C]
218- Amended site	1.09	1.26	2.02	1.39	1.75	2.87
339 - Control site	1.47	1.05	ND	ND	ND	ND
339 - Contaminated site	1.62[C]	1.53[C]	ND	ND	ND	ND
339 - Amended site	1.35[C]	1.36	ND	ND	ND	ND
410 - Control site	0.86	1.25[C]	ND	ND	ND	ND
410 - Contaminated site	1.37	1.31	ND	ND	ND	ND
410- Amended site	1.18[C]	1.73[C]	ND	ND	ND	ND

IFmax: Maximum genotoxic induction factor. The annotation [C] beside the induction factor value indicates that the induction factor was corrected for the negative effect on the viability.
ND: Not determined

4.4.3 Plant and earthworm assays

Lettuce germination inhibition, barley germination and growth inhibition and earthworm mortality assays were performed on site 410 samples at the beginning of the study and will be performed after 11 weeks of incubation, in order to assess the change in toxicity detected by these bioassays. The results obtained at the beginning of the study are presented in Figures 8, 9, and 10.

The control and contaminated soils of site 410 did not significantly inhibit germination of the lettuce seeds, as opposed to the amended soil, which caused a 75% inhibition of lettuce germination after 5 days of exposure (Figure 8). Concerning the barley germination and growth inhibition test (Figure 9), an expected stimulation of the seed germination and growth was observed in the control and amended soils, in which nutrients were present or added, respectively. A germination inhibition of the barley seeds was detected in the amended soil, with inhibition rates of 47% after 5 days and 53% after 14 days of exposure, respectively. The heterogeneous composition of the amended soil could explain that some seeds would be exposed

mostly to petroleum hydrocarbons, which inhibited their germination and that other seeds would be exposed mainly to fertilizers, which stimulated their growth.

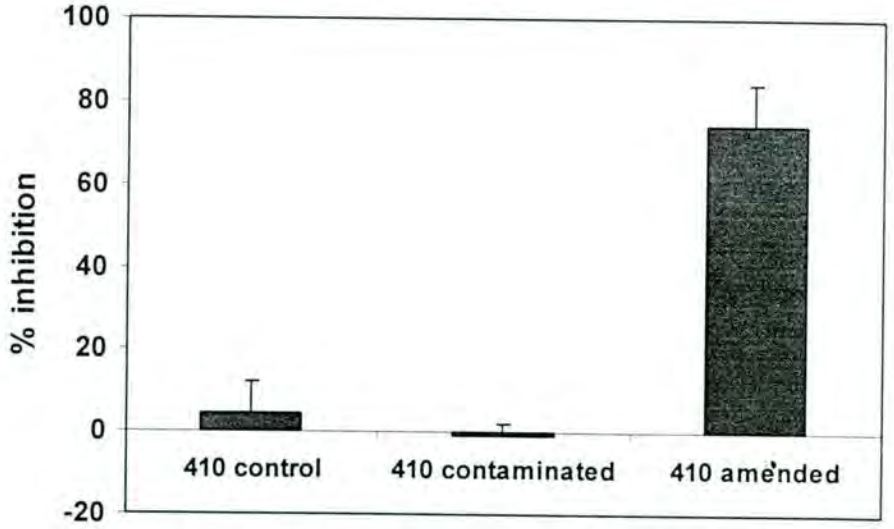


Figure 8. Lettuce germination inhibition assay

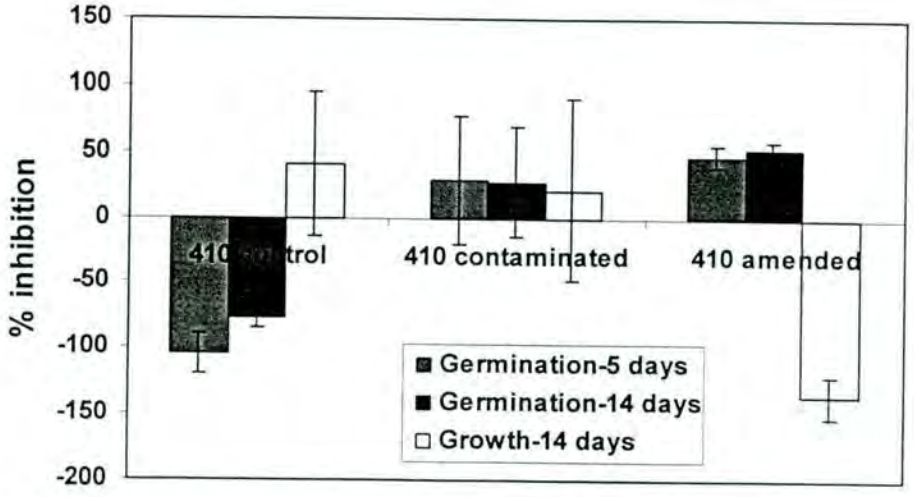


Figure 9. Barley germination and growth inhibition assay

The contaminated and amended soils of site 410 were toxic to the earthworms, as demonstrated by a 100% mortality in both samples (Figure 10). Minimal toxicity was detected in the control soil of site 410, with a 13% earthworm mortality rate, which is equal to the earthworm mortality rate measured in the Organization for Economic Cooperation and Development (OECD) standard soil.

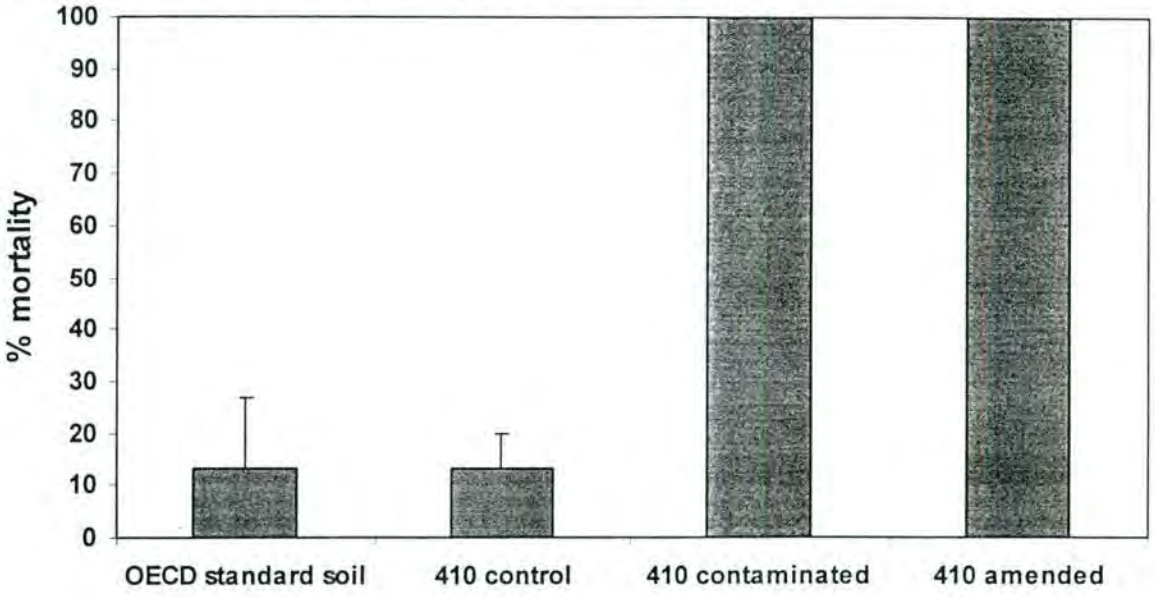


Figure 10. Earthworm mortality

5 Preliminary conclusions

A summary of the results is presented in Table 6. At site 218, the petroleum hydrocarbon concentration of the amended soil was reduced by 54% but the genotoxicity of the soil leachate increased after 12 weeks of incubation at 10°C. No significant change was measured in the contaminated soil of site 218. These data indicate that no chemical and toxicological changes were observed in the contaminated soil of site 218 and that the concentration of petroleum hydrocarbons was reduced but that the toxicity was increased in the amended soil of site 218, at the end of the 12 week study.

At sites 339 and 410, no significant changes in the petroleum hydrocarbon concentration and profile, and in the Microtox toxicity were measured, after 6 weeks of incubation at 10°C. A potential for mineralization was observed for both sites 339 and 410.

Table 6. Petroleum hydrocarbons and toxicity reduction

	Site 218 (12 weeks)		Site 339 (6 weeks)		Site 410 (6 weeks)	
	C	A	C	A	C	A
Chemical tests						
Petroleum hydrocarbons reduction (%)	0	54	same	same	same	same
Hexadecane mineralization (%)	15	17	22	37	34	34
General chemical change	no	yes	+/-	+/-	no	no
Toxicity tests						
Microtox toxicity compared to T0	same	same	same	same	same	same
Lettuce germination inhibition at T0	ND	ND	ND	ND	no	yes
Barley germination and growth inhibition at T0	ND	ND	ND	ND	no	yes
Earthworm mortality at T0	ND	ND	ND	ND	yes	yes
General toxicity change	no	no	no	no	no	no

C: contaminated soil
A: amended soil
ND: not determined

6 References

Beaumier, D., M.-J. Lorrain, C. Beaulieu, S. Dodard, D. Rho, J. Hawari, G. Sunahara, and C. W. Greer. 1997. *Étude de biotraitabilité des sols - Site du Lac Éon*. Conseil National de recherches Canada, Institut de recherche en biotechnologie. Projet # 506-EGG03.

Centre d'Expertise en analyse environnementale du Québec. 1997. *Sols - Dosage des hydrocarbures pétroliers (C_{10} à C_{50})*. Ministère de l'Environnement et de la Faune. Méthode 410-HYD. 1.0.

Environnement Canada. 1998. *Campagne d'échantillonnage sur la "Mid-Canada Line" en juillet 1998*. Environnement Canada (Région du Québec) Section Intervention et Restauration.

Appendix D

Bodycote TECHNITROL • ECO

BODYCOTE TECHNITROL INC.
121, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
TÉL.: (514) 697-3273 • FAX: (514) 697-2090

Certificat d'analyse • Certificate of Analysis

À l'attention de Gervais Leclair
Client Environnement Canada
105, Rue Mcgill
Montreal, Qc, Can
H2X 2E7

No de certificat 11996-99
Date d'émission 99-07-05
Date de réception 99-06-23
No. demande 99-62537
Bon de commande NA

Identification	Tuile De Plancher	Panneau Mural Peint
Référence	Mid-Canada-Line	Mid-Canada-Line
Matrice	Lixiviat (*)	Lixiviat (*)
Date de prélèvement	98-07-09	98-07-09
Lieu du prélèvement	Site 410	Site 336
Prélevé par	Gervais Leclair	Gervais Leclair
No de laboratoire	279793	279794
Date de préparation	99-06-25	99-06-25
Date d'analyse	99-06-30	99-06-30
BPC-C-L-13	µg/L	µg/L
Monochlorobiphényles	< 0.1	< 0.1
Dichlorobiphényles	< 0.1	< 0.1
Trichlorobiphényles	< 0.1	< 0.1
Tétrachlorobiphényles	< 0.1	< 0.1
Pentachlorobiphényles	< 0.1	< 0.1
Hexachlorobiphényles	< 0.1	< 0.1
Heptachlorobiphényles	< 0.1	< 0.1
Octachlorobiphényles	< 0.1	< 0.1
Nonachlorobiphényles	< 0.1	< 0.1
Décachlorobiphényle	< 0.1	< 0.1
Total	ND	ND
%Récupération		
Tétrachloro(13C)biphényle	76	97
Pentachloro(13C)biphényle	82	100
Hexachloro(13C)biphényle	77	100
Octachloro(13C)biphényle	72	94

Non-conformité(s):
Commentaire(s): (*) Lixiviation effectuée selon la norme canadienne et l'analyse selon la norme québécoise.
Note: Ces résultats ne se rapportent qu'aux échantillons soumis pour analyse.

CHIMISTE Yves Moras 94-006 QUÉBEC

Chimiste _____
Yves Moras

Bodycote TECHNITROL • ECO

BODYCOTE TECHNITROL INC.
171, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
TÉL.: (514) 697-3273 • FAX: (514) 697-2090

Certificat d'analyse • Certificate of Analysis

À l'attention de Gervais Leclair
Client Environnement Canada
105, Rue Mcgill
Montreal, Qc, Can
H2X 2E7

No de certificat 11996-99
Date de révision 99-07-05
Date de réception 99-06-23
No. demande 99-62537
Bon de commande NA

Identification	Tuile De Plancher	Panneau Mural Peint	Peinture De Panneau Mural
Référence	Mid-Canada-Line	Mid-Canada-Line	Mid-Canada-Line
Matrice	Lixiviat (**)	Lixiviat (**)	Lixiviat (**)
Date de prélèvement	98-07-09	98-07-09	99-06-15
Lieu du prélèvement	Site 410	Site 336	Site 218
Prélevé par	Gervais Leclair	Gervais Leclair	Gervais Leclair
No de laboratoire	279793	279794	281045
Date de préparation	99-06-25	99-06-25	99-06-30
Date d'analyse	99-06-30	99-06-30	99-07-02
BPC-C-L-13	µg/L	µg/L	µg/L
Monochlorobiphényles	< 0.1	< 0.1	< 0.1
Dichlorobiphényles	< 0.1	< 0.1	< 0.1
Trichlorobiphényles	< 0.1	< 0.1	< 0.1
Tétrachlorobiphényles	< 0.1	< 0.1	< 0.1
Pentachlorobiphényles	< 0.1	< 0.1	< 0.1
Hexachlorobiphényles	< 0.1	< 0.1	< 0.1
Heptachlorobiphényles	< 0.1	< 0.1	< 0.1
Octachlorobiphényles	< 0.1	< 0.1	< 0.1
Nonachlorobiphényles	< 0.1	< 0.1	< 0.1
Décachlorobiphényle	< 0.1	< 0.1	< 0.1
Total	ND	ND	ND
%Récupération			
Tétrachloro(13C)biphényle	76	97	110
Pentachloro(13C)biphényle	82	100	110
Hexachloro(13C)biphényle	77	100	120
Octachloro(13C)biphényle	72	94	110

Non-conformité(s):
Commentaire(s): (**) Lixiviation effectuée selon la norme TCLP qui est l'équivalent de la norme américaine EPA-347.
L'extraction et l'analyse se sont déroulées selon la norme québecoise établie.

Note: Ces résultats ne se rapportent qu'aux échantillons soumis pour analyse.

CHIMISTE Yves Moras 94-006 QUÉBEC

Chimiste _____
Yves Moras

Bodycote TECHNITROL • ECO

BODYCOTE TECHNITROL INC.
121, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
TÉL.: (514) 697-3273 • FAX: (514) 697-2090

Certificat d'analyse • Certificate of Analysis

À l'attention de Gervais Leclair
Client Environnement Canada
105, Rue Mcgill
Montreal, Qc, Can
H2X 2E7

No de certificat 11996-99
Date d'émission 99-07-02
Date de réception 99-06-23
No. demande 99-62537
Bon de commande NA

No. de laboratoire	280176			280178	
Type de contrôle	Blanc	Echantillon	Duplicata	Contrôle Certifié	
Matrice					
Date de prélèvement					
Lieu du prélèvement					
Prélevé par					
Référence					
Date de préparation	99-06-25			Obtenu	Écart acceptable
Date d'analyse	99-06-28			99-06-25	
BPC-C-L-13				99-06-28	
	µg/L			µg/L	µg/L
Monochlorobiphényles	< 0.1			2.1	(1 - 4)
Dichlorobiphényles	< 0.1			2.2	(1 - 4)
Trichlorobiphényles	< 0.0			2.2	(1 - 4)
Tétrachlorobiphényles	< 0.1			2.1	(1 - 4)
Pentachlorobiphényles	< 0.1			2.1	(1 - 4)
Hexachlorobiphényles	< 0.1			2.1	(1 - 4)
Heptachlorobiphényles	< 0.1			2.0	(1 - 4)
Octachlorobiphényles	< 0.1			2.0	(1 - 4)
Nonachlorobiphényles	< 0.1			2.0	(1 - 4)
Décachlorobiphényle	< 0.1			2.0	(1 - 4)
Total	ND				
%Récupération					
Tétrachloro(13C)biphényle	79			86	
Pentachloro(13C)biphényle	81			87	
Hexachloro(13C)biphényle	79			85	
Octachloro(13C)biphényle	77			84	

Non-conformité(s):
Commentaire(s):
Note: Ces résultats ne se rapportent qu'aux échantillons soumis pour analyse.

CHIMISTE
Yves Moras
94-006
QUÉBEC

Yves Moras

Bodycote TECHNITROL • ECO

BODYCOTE TECHNITROL INC.
121, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
TÉL.: (514) 697-3273 • FAX: (514) 697 2090

Certificat d'analyse • Certificate of Analysis

À l'attention de Gervais Leclair
Client Environnement Canada
105, Rue Mcgill
Montreal, Qc, Can
H2X 2E7

No de certificat 11996-99
Date de révision 99-07-05
Date de réception 99-06-23
No. demande 99-62537
Bon de commande NA

No. de laboratoire	281307	281308	
Type de contrôle	Blanc	Contrôle Certifié	
Matrice			
Date de prélèvement			
Lieu du prélèvement			
Prélevé par			
Référence			
Date de préparation	99-06-30	Obtenu	Écart acceptable
Date d'analyse	99-07-02	99-06-30	
BPC-C-L-13		99-07-02	
	µg/L	µg/L	µg/L
Monochlorobiphényles	< 0.1	2.0	(1.0 - 4.0)
Dichlorobiphényles	< 0.1	1.9	(1.0 - 4.0)
Trichlorobiphényles	< 0.1	2.0	(1.0 - 4.0)
Tétrachlorobiphényles	< 0.1	2.0	(1.0 - 4.0)
Pentachlorobiphényles	< 0.1	3.1	(1.0 - 4.0)
Hexachlorobiphényles	< 0.1	3.1	(1.0 - 4.0)
Heptachlorobiphényles	< 0.1	3.1	(1.0 - 4.0)
Octachlorobiphényles	< 0.1	3.2	(1.0 - 4.0)
Nonachlorobiphényles	< 0.1	3.1	(1.0 - 4.0)
Décachlorobiphényle	< 0.1	3.0	(1.0 - 4.0)
Total	ND		
%Récupération			
Tétrachloro(13C)biphényle	98	110	
Pentachloro(13C)biphényle	100	100	
Hexachloro(13C)biphényle	110	120	
Octachloro(13C)biphényle	110	130	

Non-conformité(s):
Commentaire(s):
Note: Ces résultats ne se rapportent qu'aux échantillons soumis pour analyse.

CHIMISTE
Yves Moras
94-006
QUÉBEC

Yves Moras

Bodycote TECHNITROL • ECO

BODYCOTE TECHNITROL INC.
121, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
TÉL.: (514) 697-3273 • FAX: (514) 697-2090

Certificat d'analyse • Certificate of Analysis

ANNEXE DES MÉTHODES

Paramètres.	Numéro de méthode	Instrumentation et techniques.
BPC congénères (sol et eau).	13-001-97	Extraction au dichlorométhane et quantification par CG-SM.
BPC Aroclor (sol, liquide, huile).	13-002-96	Extraction à l'hexane et quantification par CG-DCE.
Hydrocarbures Pétroliers C10-C50 (sol).	13-003-97	Extraction à l'hexane et quantification par CG-DIF.
Hydrocarbures Pétroliers C10-C50 (liquide).	13-004-97	Extraction à l'hexane et quantification par CG-DIF.
Huiles et graisses totales (eau).	13-006-97	Extraction à l'hexane et quantification par gravimétrie.
HAP, Composés phénoliques (sol et liquide).	13-011-96	Extraction au dichlorométhane et quantification par CG-SM.
BTEX, HMA, HHT, THM. (sol, liquide, charbon).	13-012-97	Injection "Headspace" (sol) et "Purge and Trap" (eau) et quantification par CG-SM.
AGR (eau).	13-013-97	Extraction au dichlorométhane et quantification par CG-SM.
Composés phénoliques (pâtes et papiers, eau).	13-015-96	Extraction au dichlorométhane et quantification par CG-SM.

TOUS LES RÉSULTATS APPLICABLES AUX SOLS ET SOLIDES SONT EXPRIMÉS SUR BASE SÈCHE À MOINS D'AVIS CONTRAIRE ÉCRIT SUR LE RAPPORT.

Appendix E

ᓄᓇᕕᒃ ᓄᓇᓕᓕᒫᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓗᓯᓕᕆᓂᕐᒥ ᐱᒍᑦᔨᓂᕐᓄᑦ
NUNAVIK REGIONAL BOARD OF HEALTH AND SOCIAL SERVICES
RÉGIE RÉGIONALE DE LA SANTÉ ET DES SERVICES SOCIAUX NUNAVIK

November 4, 1999

Mr. Michael Barrett
Kativik Regional Government
P.O. Box 9
Kuujjuaq, Québec
J0M 1C0

Subject: Request for an opinion on the use of buildings possibly contaminated by PCBs (Mid-Canada Line)

Dear Sir:

Enclosed is the opinion of the Department of Public Health of the Nunavik Regional Board of Health and Social Services concerning the subject above.

According to the documents we received and as discussed several times with Mr. Yves Héroux, we know that the source of polychlorinated biphenyls (PCBs) found on sites along the Mid-Canada Line is the paint used when the line was established. The addition of PCBs to the paint improved its elasticity and resistance to the elements.

You sent us the results of the tests for PCB levels in samples gathered through surface wipe and which are supposed to be representative of future use of these sites. With these results and with consideration for the projects for reuse of these buildings, which we have discussed, the following recommendations apply:

1. Concerning health protection for the workers who will carry out the demolition and renovation of certain buildings, the measured PCB levels, although low, prompt us to recommend use of individual protection measures, such as respirators, to avoid all possible exposure to PCBs during the work.

P.O. BOX 900, KUUJJUAQ (QUÉBEC) J0M 1C0
TEL: 1-800-563-2227 / (819) 964-2222 FAX: (819) 964-2888

2. We also recommend use of a sealing paint on surfaces contaminated with PCBs. Note that workers who will apply this paint must be protected to avoid intoxication with the solvents.

3. Concerning the future users of these sites (youth fishing camps, training centres for traditional life, etc.), we do not believe other measures for protection will be necessary after application of sealing paint.

Yours truly,

Serge Déry, M.D., M.Sc., MPH, FRCPC, CSPQ
Director of Public Health

c.c. Sylvain Allaire, Centre de santé publique de Québec

Appendix F

Mid Canada Radar Line

Work & Site Description

Site # : 215

GPS Position: 55° 2165' N 64° 0149' W

Dates of work at site: JUNE 20 - 21

RESIDUAL MATERIALS

1. Hydrocarbons

1.1 Amount of residual gas present in reservoirs, barrels, pumping station, etc.:
0 litres

1.2 Amount of residual diesel present in reservoirs, barrels, pumping station, etc.:
200 litres

1.3 Residual amount of TAR (identify each of the other types of hydrocarbons) present in the reservoirs, barrels, pumping station, etc.: 400 litres (specify the amount for each type of hydrocarbons)

1.3 Management of residual hydrocarbons: specify for each type the amount and the management method used:
- 2 TAR BARRELS + 1 DIESEL DRUM 150 metres north of MAIN BUILDING - LEFT ON THE SITE - BARRELS LOOKED IN GOOD CONDITION

2. Barrels

2.1 Approximate quantity of barrels: 90

2.2 Approximate quantity of piled barrels having contained toxic material (kerosene, gas or diesel) : 90

2.3 Approximate quantity of piled barrels having contained oil, grease or another non-toxic dangerous material: 2 (TAR)

2.4 Approximate quantity of empty barrels contaminated by a dangerous material other than those described in question 2.2 and 2.3 and identify these dangerous materials if required :

Ø

2.5 Description of the storage area for the empty barrels contaminated by a toxic material and considered as dangerous material:
Area: 30 m^2 Volume: 34 m^3

2.6 Description of storage area for empty barrels contaminated by a non-toxic dangerous material and considered as solid waste:
Area: Ø m^2 Volume: Ø m^3

2.7 Distance from the storage area of barrels considered as dangerous materials to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : > 1000 m.

Resource or zone or habitat involved: Lake

2.8 Distance from the storage area of barrels considered as solid waste to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : N/A m.

Resource or zone or habitat involved: N/A

3. Metallic Debris (Barrels not included)

3.1 Approximate volume of metallic debris or other inert material contaminated on its surface by a toxic substance (gas, diesel, kerosene, etc.) or by oil, grease or other dangerous material: Ø m^3

3.2 Description of the storage area of the metallic debris and other inert material with surface contamination by a dangerous material as covered in question 3.1:

N/A

4. Dismantling of building(s)

4.1 Has one or more buildings been dismantled? NO
(If not, go directly to Section 6)

4.2 If a building was put down, what is the approximate volume of dismantled material considered as solid waste or dry material ? _____ m^3

4.3 For the dismantled material considered as dangerous material, provide the approximate volume of each of the material (floor tiles, wall panels, paint scales, etc.):

_____

_____

4.4 Management of dismantled material contaminated or containing PCBs in amount that are beyond the allowable quantities as described in the Regulation on hazardous Materials:

_____

_____

4.5 Describe the storage area of dismantled material contaminated or containing PCB's in amount that are beyond the allowable quantities as described in the Regulation on hazardous materials:

_____

_____

4.6 Distance from the storage area of dismantled material considered as dangerous material to the nearest waterway or water body: _____ m

4.7 Distance from the storage area of dismantled material considered as dangerous material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____ m.

Resource or zone or habitat involved: _____

5. Hazardous Residual Materials

5.1 Quantity of each of the hazardous residual material found on the site (e.g. paint scale contaminated with PCBs, lead/acid batteries, etc.) to be sent to an authorized centre in confirmity with Regulation on hazardous materials:

_____

_____

_____

5.2 Provide the name of the authorized centre where the hazardous residual material collected at the site will be shipped. Provide the name of the different carriers and plces where the hazardous material will transit until it reaches the authorized centre:

6. Solid Waste and Dry Materials (Barrels not included)

6.1 Approximate volume of solid waste and dry material collected on the site: 100 m^3

6.2 Description of the storage area for the solid waste and dry material collected on the site and/or originating from the dismantling of the building(s):

- several small dumps in areas of less than 1 bin
- one larger dump with heavy metallic debris
- remains of several huts on the site (piled up)

6.3 Distance from the storage area of the solid waste and the dry material collected on the site or originating from the dismantling of building(s) to the nearest waterway or water body: >1000 m

6.4 Distance from the storage area of the solid waste and dry material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique):* >1000 m.

Resource or zone or habitat involved: lake

OTHERS

7. Contaminated Soils

7.1 Provide information on approximate volumes and areas of contaminated soils* see remarks

Criteria	Volumes (m^3)	Areas (m^2)
> C	—	96
B-C		
A-B		

Criterias indicative of soil contamination:

Parameters	Criteria A ppm	Criteria B ppm	Criteria C ppm
Petroleum Hydrocarbons C_{10} - C_{50}	300	700	3500
Benzene	0.1	0.5	5
Toluene	0.2	3	30
Ethylbenzene	0.2	5	50
Xylenes	0.2	5	50
PCBs	0.05	1	10

7.2 Distance from contaminated soils > C to nearest waterway or water body: > 1000 m
Distance from contaminated soils B-C to nearest waterway or water body: _____ m
Distance from contaminated soils A-B to nearest waterway or water body: _____ m

7.3 Distance from contaminated soils > C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : > 1000 m.

Resource or zone or habitat involved: Sols

7.4 Distance from contaminated soils B-C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en oeuvre au Québec de la Convention sur la diversité biologique)* : N/A m.

Resource or zone or habitat involved: N/A

7.5 Distance from contaminated soils A-B C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en* œuvre au Québec de la Convention sur la diversité biologique) : N/A m.

Resource or zone or habitat involved: N/A

7.6 Has soil samples been collected for biotreatment studies? NO
If so, how many samples were collected ? _____

7.7 Was bioremediation work performed on contaminated soils? NO

8. Miscelleneous

8.1 Is there a project to reuse the site or the buildings? If so, for what purpose?
NO

8.2 Has a sign board been installed ? NO

8.3 Were broken windows repaired with LEXAN ? YES

8.4 Has a First Aid kit been left on site ? NO

9. SATISFACTION OF MUNICIPALITIES

9.1 Are the Communities satisfied with the work performed?

---

10. Remarks / Comments:

- Contaminated area 8m X 12m (heavy oil) 15 m from building (main power room), site is right on bedrock.
- 3 tar patches (largest 1.6 m X 0.8 m) about 150 m north from main building.
- Overhead cable conduit leading to distribution towers put down for safety reason.
- Well over 3000 cans and debris of all sorts collected.
- Several wires at ground level were pulled out when possible or cut at both ends.
- Several cleanup of building, one can retained.

Signature (KRG Work supervisor) : Yves Hervieux

Date: June 21 1999

NOTES

- Distances greater than 1 km are expressed as « > 1000 m ».
- Resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique* include the following:

- Critical or sensitive habitat for the biodiversity (muskeg, marshland, swamp...) ;
- Protected areas (park, ecological reserve, habitat and refuge for wildlife...) ;
- Species that are, or that are susceptible to become, endangered or vulnerable and their habitats (This one will not be assessed, unless stated otherwise, due to the absence of qualified biologist on the site during the work phase).

All information allowing a better understanding of field state or a better understanding of work performed can be added to this form. For example, this form could be more descriptive by adding plans, drawings, pictures ...

Observations, drawings, calculations, estimations and analytical results used to estimate volume and areas of contaminated soils will be added to this form.

- This Form draws in part from the *National Classification System for Contaminated Sites* published by the CCME in March 1992.

31/05/99

Mid Canada Radar Line

Work & Site Description

Site # : 218

GPS Position: 55° 16.273' N 64° 49.183 W LAKE 55° 15.912'N 64° 48.841' W

Dates of work at site: JUNE 15 - 18

RESIDUAL MATERIALS

1. Hydrocarbons

1.1 Amount of residual gas present in reservoirs, barrels, pumping station, etc.:
25 litres

1.2 Amount of residual diesel present in reservoirs, barrels, pumping station, etc.:
375 litres

1.3 Residual amount of _____ (identify each of the other types of hydrocarbons) present in the reservoirs, barrels, pumping station, etc.: _____ litres (specify the amount for each type of hydrocarbons)

1.3 Management of residual hydrocarbons: specify for each type the amount and the management method used:
- 400 LITERS OF RESIDUAL FUEL BURNT INSIDE CUT BARREL

2. Barrels

2.1 Approximate quantity of barrels: 170 (AT THE LAKE) 115 (DETECTION SITE)

2.2 Approximate quantity of piled barrels having contained toxic material (kerosene, gas or diesel) : 285
272

2.3 Approximate quantity of piled barrels having contained oil, grease or another non-toxic dangerous material: 15 (5+10 gallon drums)

2.4 Approximate quantity of empty barrels contaminated by a dangerous material other than those described in question 2.2 and 2.3 and identify these dangerous materials if required :

NONE

2.5 Description of the storage area for the empty barrels contaminated by a toxic material and considered as dangerous material:

Area: 64 m^2 lake, 45 m^3 top of hill Volume: 70 m^3 lake, 48 m^3 top of hill

2.6 Description of storage area for empty barrels contaminated by a non-toxic dangerous material and considered as solid waste:

Area: 4 m^2 Volume: 4 m^3

2.7 Distance from the storage area of barrels considered as dangerous materials to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : 55 m. lake site

Resource or zone or habitat involved: lake

2.8 Distance from the storage area of barrels considered as solid waste to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : 55 m.

Resource or zone or habitat involved: lake

3. Metallic Debris (Barrels not included)

3.1 Approximate volume of metallic debris or other inert material contaminated on its surface by a toxic substance (gas, diesel, kerosene, etc.) or by oil, grease or other dangerous material: 0 m^3

3.2 Description of the storage area of the metallic debris and other inert material with surface contamination by a dangerous material as covered in question 3.1:

N/A

4. Dismantling of building(s)

4.1 Has one or more buildings been dismantled? NO
(If not, go directly to Section 6)

4.2 If a building was put down, what is the approximate volume of dismantled material considered as solid waste or dry material ? _____ m^3

4.3 For the dismantled material considered as dangerous material, provide the approximate volume of each of the material (floor tiles, wall panels, paint scales, etc.):

_____

_____

4.4 Management of dismantled material contaminated or containing PCBs in amount that are beyond the allowable quantities as described in the Regulation on hazardous Materials:

_____

_____

4.5 Describe the storage area of dismantled material contaminated or containing PCB's in amount that are beyond the allowable quantities as described in the Regulation on hazardous materials:

_____

_____

4.6 Distance from the storage area of dismantled material considered as dangerous material to the nearest waterway or water body: _____ m

4.7 Distance from the storage area of dismantled material considered as dangerous material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____ m.

Resource or zone or habitat involved: _____

5. Hazardous Residual Materials

5.1 Quantity of each of the hazardous residual material found on the site (e.g. paint scale contaminated with PCBs, lead/acid batteries, etc.) to be sent to an authorized centre in confirmity with Regulation on hazardous materials:

_____

_____

_____

5.2 Provide the name of the authorized centre where the hazardous residual material collected at the site will be shipped. Provide the name of the different carriers and plces where the hazardous material will transit until it reaches the authorized centre:

6. Solid Waste and Dry Materials (Barrels not included)

6.1 Approximate volume of solid waste and dry material collected on the site: 30 m^3

6.2 Description of the storage area for the solid waste and dry material collected on the site and/or originating from the dismantling of the building(s):

several small dumps surrounding the main building
some large items will not be moved and will stay
the site where and there.

6.3 Distance from the storage area of the solid waste and the dry material collected on the site or originating from the dismantling of building(s) to the nearest waterway or water body: >1000 m

6.4 Distance from the storage area of the solid waste and dry material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique):* >1000 m.

Resource or zone or habitat involved: lake

OTHERS

7. Contaminated Soils

7.1 Provide information on approximate volumes and areas of contaminated soils see remarks

Criteria	Volumes (m^3)	Areas (m^2)
> C		
B-C		
A-B		

Criterias indicative of soil contamination:

Parameters	Criteria A ppm	Criteria B ppm	Criteria C ppm
Petroleum Hydrocarbons C_{10} - C_{50}	300	700	3500
Benzene	0.1	0.5	5
Toluene	0.2	3	30
Ethylbenzene	0.2	5	50
Xylenes	0.2	5	50
PCBs	0.05	1	10

7.2 Distance from contaminated soils > C to nearest waterway or water body: _____ m
Distance from contaminated soils B-C to nearest waterway or water body: _____ m
Distance from contaminated soils A-B to nearest waterway or water body: _____ m

7.3 Distance from contaminated soils > C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____m.

Resource or zone or habitat involved: _____

7.4 Distance from contaminated soils B-C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en oeuvre au Québec de la Convention sur la diversité biologique)* : _____m.

Resource or zone or habitat involved: _____

7.5 Distance from contaminated soils A-B C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en* œuvre au Québec de la Convention sur la diversité biologique) : _____m.

Resource or zone or habitat involved: _____

7.6 Has soil samples been collected for biotreatment studies? YES
If so, how many samples were collected ? 3 series of samples

7.7 Was bioremediation work performed on contaminated soils? YES : on soil contaminated by heavy oil (≈ 25 m²) ; also was taken where basin used to be filled up

8. Miscelleneous

8.1 Is there a project to reuse the site or the buildings? If so, for what purpose?
no

8.2 Has a sign board been installed ? no

8.3 Were broken windows repaired with LEXAN ? N/A

8.4 Has a First Aid kit been left on site ? NO

9. SATISFACTION OF MUNICIPALITIES

9.1 Are the Communities satisfied with the work performed?

---

10. Remarks / Comments:

- Soil samples Taken by Francois Leclair (Env. Canada) at the Hill site on oil contaminated with heavy oil
- Biotreatment performed on the aforementioned site
- Petrolka Hill Test Lot initialed 17790 ppm on this oil contaminated soil
- Removal clean up of building
- 8 sets of batteries put in sturdy plastic containers to contain possible leaks and left in power room
- large selection antennas left intact, small aluminum towers cut and moved away
- numerous small dumps were used around the building (already there)
- barrels near the lake were moved away to a site higher up that is not visible from the lake (± 55 meters from lake)

Signature (KRG Work supervisor) : Yves Hesson

Date: June 18th 1999

NOTES

- Distances greater than 1 km are expressed as « > 1000 m ».
- Resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique* include the following:

- Critical or sensitive habitat for the biodiversity (muskeg, marshland, swamp...) ;
- Protected areas (park, ecological reserve, habitat and refuge for wildlife...) ;
- Species that are, or that are susceptible to become, endangered or vulnerable and their habitats (This one will not be assessed, unless stated otherwise, due to the absence of qualified biologist on the site during the work phase).

All information allowing a better understanding of field state or a better understanding of work performed can be added to this form. For example, this form could be more descriptive by adding plans, drawings, pictures ...

Observations, drawings, calculations, estimations and analytical results used to estimate volume and areas of contaminated soils will be added to this form.

- This Form draws in part from the *National Classification System for Contaminated Sites* published by the CCME in March 1992.

31/05/99

Mid Canada Radar Line

Work & Site Description

Site # : 218 A

GPS Position: 55° 15.865' N 64° 17.607' W

Dates of work at site: JUNE 11-15 1999

RESIDUAL MATERIALS

1. Hydrocarbons

1.1 Amount of residual gas present in reservoirs, barrels, pumping station, etc.:
200 litres

1.2 Amount of residual diesel present in reservoirs, barrels, pumping station, etc.:
100 litres

1.3 Residual amount of N/A (identify each of the other types of hydrocarbons) present in the reservoirs, barrels, pumping station, etc.: _____ litres (specify the amount for each type of hydrocarbons)

1.3 Management of residual hydrocarbons: specify for each type the amount and the management method used:
° AVGAS AND DIESEL BURNT IN BATCHES INSIDE A DRUM CUT IN HALF

2. Barrels

2.1 Approximate quantity of barrels: 690 — MAIN: 450 / SECOND: 240

2.2 Approximate quantity of piled barrels having contained toxic material (kerosene, gas or diesel) : 690

2.3 Approximate quantity of piled barrels having contained oil, grease or another non-toxic dangerous material: 0

2.4 Approximate quantity of empty barrels contaminated by a dangerous material other than those described in question 2.2 and 2.3 and identify these dangerous materials if required :

0

2.5 Description of the storage area for the empty barrels contaminated by a toxic material and considered as dangerous material:

Area: 100 m^2 MAIN 55 m^2 SECOND Volume: 150 m^3 MAIN 84 m^3 SECOND

2.6 Description of storage area for empty barrels contaminated by a non-toxic dangerous material and considered as solid waste:

Area: 0 m^2 Volume: 0 m^3

2.7 Distance from the storage area of barrels considered as dangerous materials to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : 50 m. MAIN ; 35 m SECOND

Resource or zone or habitat involved: LAKE

2.8 Distance from the storage area of barrels considered as solid waste to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____ m.

Resource or zone or habitat involved: _____

3. Metallic Debris (Barrels not included)

3.1 Approximate volume of metallic debris or other inert material contaminated on its surface by a toxic substance (gas, diesel, kerosene, etc.) or by oil, grease or other dangerous material: 0 m^3

3.2 Description of the storage area of the metallic debris and other inert material with surface contamination by a dangerous material as covered in question 3.1:

N/A

4. Dismantling of building(s)

4.1 Has one or more buildings been dismantled? NO * see remarks
(If not, go directly to Section 6)

4.2 If a building was put down, what is the approximate volume of dismantled material considered as solid waste or dry material ? _____ m^3

4.3 For the dismantled material considered as dangerous material, provide the approximate volume of each of the material (floor tiles, wall panels, paint scales, etc.):

_____

_____

4.4 Management of dismantled material contaminated or containing PCBs in amount that are beyond the allowable quantities as described in the Regulation on hazardous Materials:

_____

_____

4.5 Describe the storage area of dismantled material contaminated or containing PCB's in amount that are beyond the allowable quantities as described in the Regulation on hazardous materials:

_____

_____

4.6 Distance from the storage area of dismantled material considered as dangerous material to the nearest waterway or water body: _____ m

4.7 Distance from the storage area of dismantled material considered as dangerous material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____ m.

Resource or zone or habitat involved: _____

5. Hazardous Residual Materials

5.1 Quantity of each of the hazardous residual material found on the site (e.g. paint scale contaminated with PCBs, lead/acid batteries, etc.) to be sent to an authorized centre in confirmity with Regulation on hazardous materials:

_____

_____

_____

NOTES

- Distances greater than 1 km are expressed as « > 1000 m ».
- Resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique* include the following:

- Critical or sensitive habitat for the biodiversity (muskeg, marshland, swamp...) ;
- Protected areas (park, ecological reserve, habitat and refuge for wildlife...) ;
- Species that are, or that are susceptible to become, endangered or vulnerable and their habitats (This one will not be assessed, unless stated otherwise, due to the absence of qualified biologist on the site during the work phase).

All information allowing a better understanding of field state or a better understanding of work performed can be added to this form. For example, this form could be more descriptive by adding plans, drawings, pictures ...

Observations, drawings, calculations, estimations and analytical results used to estimate volume and areas of contaminated soils will be added to this form.

- This Form draws in part from the *National Classification System for Contaminated Sites* published by the CCME in March 1992.

31/05/99

8.3 Were broken windows repaired with LEXAN ? n/A

8.4 Has a First Aid kit been left on site ? n/A

9. SATISFACTION OF MUNICIPALITIES

9.1 Are the Communities satisfied with the work performed?

---

10. Remarks / Comments:

- Burning site (4 m x 10 m) about 35 metres from lake
- Soil tested using Petroflag Test kit. 11,000 ppm.
- very wet area
- barrels scattered around and several were in the lake: they have all been collected and piled at 2 different locations
- 36 flexible pipes (3" DIA, 15 metres long) were taken out of the water and stored along side main barrel dump
- piping network (in soil) was disassembled and the pipes moved behind the large reservoirs
- the large reservoirs are not 3700 l. as stated in 1995 report but 4400 l (1000 imperial gallons)
- Burnt fuel cans & other rubbish at 6 different locations were collected and piled next to the second burn dump
- approach difficult with seaplane (rocks are dangerous for the floats) - this site should be reached by helicopter only in the future

Signature (KRG Work supervisor) : Yves Hérard

Date: June 15 1999

Criterias indicative of soil contamination:

Parameters	Criteria A ppm	Criteria B ppm	Criteria C ppm
Petroleum Hydrocarbons C_{10} - C_{50}	300	700	3500
Benzene	0.1	0.5	5
Toluene	0.2	3	30
Ethylbenzene	0.2	5	50
Xylenes	0.2	5	50
PCBs	0.05	1	10

7.2 Distance from contaminated soils > C to nearest waterway or water body: _____ m
Distance from contaminated soils B-C to nearest waterway or water body: _____ m
Distance from contaminated soils A-B to nearest waterway or water body: _____ m

7.3 Distance from contaminated soils > C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____m.

Resource or zone or habitat involved: _____

7.4 Distance from contaminated soils B-C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en oeuvre au Québec de la Convention sur la diversité biologique)* : _____m.

Resource or zone or habitat involved: _____

7.5 Distance from contaminated soils A-B C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en* œuvre au Québec de la Convention sur la diversité biologique) : _____m.

Resource or zone or habitat involved: _____

7.6 Has soil samples been collected for biotreatment studies? _____
If so, how many samples were collected ? _____

7.7 Was bioremediation work performed on contaminated soils? _____
_____
_____

8. Miscelleneous

8.1 Is there a project to reuse the site or the buildings? If so, for what purpose?
NO

8.2 Has a sign board been installed ? NO

5.2 Provide the name of the authorized centre where the hazardous residual material collected at the site will be shipped. Provide the name of the different carriers and plces where the hazardous material will transit until it reaches the authorized centre:

6. Solid Waste and Dry Materials (Barrels not included)

6.1 Approximate volume of solid waste and dry material collected on the site: 34 m^3

6.2 Description of the storage area for the solid waste and dry material collected on the site and/or originating from the dismantling of the building(s):

• LOG CABIN : was dismantled, mostly wood, shingles and electric wires

6.3 Distance from the storage area of the solid waste and the dry material collected on the site or originating from the dismantling of building(s) to the nearest waterway or water body: 15 m

6.4 Distance from the storage area of the solid waste and dry material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique):* 15 m.

Resource or zone or habitat involved: lake

OTHERS

7. Contaminated Soils see remarks

7.1 Provide information on approximate volumes and areas of contaminated soils

Criteria	Volumes (m^3)	Areas (m^2)
> C		
B-C		
A-B		

Mid Canada Radar Line

Work & Site Description

Site # : 221

GPS Position: 55° 18.02' N 65° 24.09' W

Dates of work at site: JUNE 20-21 1999

RESIDUAL MATERIALS

1. Hydrocarbons

1.1 Amount of residual gas present in reservoirs, barrels, pumping station, etc.:
0 litres

1.2 Amount of residual diesel present in reservoirs, barrels, pumping station, etc.:
3000 litres

1.3 Residual amount of waste oil (identify each of the other types of hydrocarbons) present in the reservoirs, barrels, pumping station, etc.: 30 litres (specify the amount for each type of hydrocarbons)

1.3 Management of residual hydrocarbons: specify for each type the amount and the management method used:
- 26 barrels left standing and identified with spray paint contain ± 3000 litres - some may be mixed with water
- waste oil (in 10 gallon jar) left in power room of main building

2. Barrels

2.1 Approximate quantity of barrels: 200

2.2 Approximate quantity of piled barrels having contained toxic material (kerosene, gas or diesel) : 174

2.3 Approximate quantity of piled barrels having contained oil, grease or another non-toxic dangerous material: 0

2.4 Approximate quantity of empty barrels contaminated by a dangerous material other than those described in question 2.2 and 2.3 and identify these dangerous materials if required :
N/A

2.5 Description of the storage area for the empty barrels contaminated by a toxic material and considered as dangerous material:
Area: 65 m^2 Volume: 60 m^3

2.6 Description of storage area for empty barrels contaminated by a non-toxic dangerous material and considered as solid waste:
Area: 0 m^2 Volume: 0 m^3

2.7 Distance from the storage area of barrels considered as dangerous materials to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : 7 1000 m.

Resource or zone or habitat involved: Vallée

2.8 Distance from the storage area of barrels considered as solid waste to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : N/A m.

Resource or zone or habitat involved: N/A

3. Metallic Debris (Barrels not included)

3.1 Approximate volume of metallic debris or other inert material contaminated on its surface by a toxic substance (gas, diesel, kerosene, etc.) or by oil, grease or other dangerous material: N/A m^3

3.2 Description of the storage area of the metallic debris and other inert material with surface contamination by a dangerous material as covered in question 3.1:
N/A

4. Dismantling of building(s)

4.1 Has one or more buildings been dismantled? NO
(If not, go directly to Section 6)

4.2 If a building was put down, what is the approximate volume of dismantled material considered as solid waste or dry material ? _____ m^3

4.3 For the dismantled material considered as dangerous material, provide the approximate volume of each of the material (floor tiles, wall panels, paint scales, etc.):

_____

_____

4.4 Management of dismantled material contaminated or containing PCBs in amount that are beyond the allowable quantities as described in the Regulation on hazardous Materials:

_____

_____

4.5 Describe the storage area of dismantled material contaminated or containing PCB's in amount that are beyond the allowable quantities as described in the Regulation on hazardous materials:

_____

_____

4.6 Distance from the storage area of dismantled material considered as dangerous material to the nearest waterway or water body: _____ m

4.7 Distance from the storage area of dismantled material considered as dangerous material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____ m.

Resource or zone or habitat involved: _____

5. Hazardous Residual Materials

5.1 Quantity of each of the hazardous residual material found on the site (e.g. paint scale contaminated with PCBs, lead/acid batteries, etc.) to be sent to an authorized centre in confirmity with Regulation on hazardous materials:

_____

_____

_____

5.2 Provide the name of the authorized centre where the hazardous residual material collected at the site will be shipped. Provide the name of the different carriers and plces where the hazardous material will transit until it reaches the authorized centre:

6. Solid Waste and Dry Materials (Barrels not included)

6.1 Approximate volume of solid waste and dry material collected on the site: 36 m^3

6.2 Description of the storage area for the solid waste and dry material collected on the site and/or originating from the dismantling of the building(s):

dry material stored at 7 locations around the site
debris are mostly wood, wires, pipes, insulation
material

6.3 Distance from the storage area of the solid waste and the dry material collected on the site or originating from the dismantling of building(s) to the nearest waterway or water body: >1000 m

6.4 Distance from the storage area of the solid waste and dry material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique):* >1000 m.

Resource or zone or habitat involved: lake

OTHERS

7. Contaminated Soils see remarks

7.1 Provide information on approximate volumes and areas of contaminated soils

Criteria	Volumes (m^3)	Areas (m^2)
> C		
B-C		
A-B		

Criterias indicative of soil contamination:

Parameters	Criteria A ppm	Criteria B ppm	Criteria C ppm
Petroleum Hydrocarbons C_{10} - C_{50}	300	700	3500
Benzene	0.1	0.5	5
Toluene	0.2	3	30
Ethylbenzene	0.2	5	50
Xylenes	0.2	5	50
PCBs	0.05	1	10

7.2 Distance from contaminated soils > C to nearest waterway or water body: _____ m
Distance from contaminated soils B-C to nearest waterway or water body: _____ m
Distance from contaminated soils A-B to nearest waterway or water body: _____ m

7.3 Distance from contaminated soils > C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____m.

Resource or zone or habitat involved: _____

7.4 Distance from contaminated soils B-C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en oeuvre au Québec de la Convention sur la diversité biologique)* : _____m.

Resource or zone or habitat involved: _____

7.5 Distance from contaminated soils A-B C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en* œuvre au Québec de la Convention sur la diversité biologique) : _____m.

Resource or zone or habitat involved: _____

7.6 Has soil samples been collected for biotreatment studies? _____
If so, how many samples were collected ? _____

7.7 Was bioremediation work performed on contaminated soils? _____
_____
_____

8. Miscelleneous

8.1 Is there a project to reuse the site or the buildings? If so, for what purpose?
non
_____

8.2 Has a sign board been installed ? non

8.3 Were broken windows repaired with LEXAN ? YES

8.4 Has a First Aid kit been left on site ? NO

9. SATISFACTION OF MUNICIPALITIES

9.1 Are the Communities satisfied with the work performed?

---

10. Remarks / Comments:

- water under the power room door (5m * 5m) contaminated with heavy oil.
- fuel tank found on the site but heavy equipment gone
- several barrels were scattered at the bottom of the hill - these were collected and put together.
- the wooden support for the pipeline going from the reservoir to the main building were knocked down for safety reason
- general cleanup of building ; windows on the power room repaired with LEXAN

Signature (KRG Work supervisor) : SAMMY TUKKIAPIK

Date: June 21st 1999

NOTES

- Distances greater than 1 km are expressed as « > 1000 m ».
- Resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique* include the following:

- Critical or sensitive habitat for the biodiversity (muskeg, marshland, swamp...) ;
- Protected areas (park, ecological reserve, habitat and refuge for wildlife...) ;
- Species that are, or that are susceptible to become, endangered or vulnerable and their habitats (This one will not be assessed, unless stated otherwise, due to the absence of qualified biologist on the site during the work phase).

All information allowing a better understanding of field state or a better understanding of work performed can be added to this form. For example, this form could be more descriptive by adding plans, drawings, pictures ...

Observations, drawings, calculations, estimations and analytical results used to estimate volume and areas of contaminated soils will be added to this form.

- This Form draws in part from the *National Classification System for Contaminated Sites* published by the CCME in March 1992.

31/05/99

Mid Canada Radar Line

Work & Site Description

Site # : 221 A

GPS Position: 55° 17.900'N 65° 20.315'W

Dates of work at site: JUNE 18-22 1999

RESIDUAL MATERIALS

1. Hydrocarbons

1.1 Amount of residual gas present in reservoirs, barrels, pumping station, etc.:
200 litres

1.2 Amount of residual diesel present in reservoirs, barrels, pumping station, etc.:
1100 litres

1.3 Residual amount of waste oil (identify each of the other types of hydrocarbons) present in the reservoirs, barrels, pumping station, etc.: 200 litres (specify the amount for each type of hydrocarbons)

1.3 Management of residual hydrocarbons: specify for each type the amount and the management method used:

- AVGAS & DIESEL burnt in totes inside half-cut drums
- minor spill (≈ 2 litres) during burning
- oil barrel (1) set on plywood platform (well above ground) to slow down corrosion

2. Barrels

AVGAS : 83
DIESEL 455

2.1 Approximate quantity of barrels: 538 — main: 439, small: 99

2.2 Approximate quantity of piled barrels having contained toxic material (kerosene, gas or diesel) : 538

2.3 Approximate quantity of piled barrels having contained oil, grease or another non-toxic dangerous material: 0

2.4 Approximate quantity of empty barrels contaminated by a dangerous material other than those described in question 2.2 and 2.3 and identify these dangerous materials if required :

0

2.5 Description of the storage area for the empty barrels contaminated by a toxic material and considered as dangerous material:
Area: 180 m^2 Volume: 155 m^3

2.6 Description of storage area for empty barrels contaminated by a non-toxic dangerous material and considered as solid waste:
Area: 45 m^2 Volume: 36 m^3

2.7 Distance from the storage area of barrels considered as dangerous materials to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : 25 m. 30 m main second lake
Resource or zone or habitat involved:

2.8 Distance from the storage area of barrels considered as solid waste to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____ m.

Resource or zone or habitat involved: _____

3. Metallic Debris (Barrels not included)

3.1 Approximate volume of metallic debris or other inert material contaminated on its surface by a toxic substance (gas, diesel, kerosene, etc.) or by oil, grease or other dangerous material: N/A m^3

3.2 Description of the storage area of the metallic debris and other inert material with surface contamination by a dangerous material as covered in question 3.1:
N/A

4. Dismantling of building(s)

4.1 Has one or more buildings been dismantled? No
(If not, go directly to Section 6)

4.2 If a building was put down, what is the approximate volume of dismantled material considered as solid waste or dry material ? _____ m^3

4.3 For the dismantled material considered as dangerous material, provide the approximate volume of each of the material (floor tiles, wall panels, paint scales, etc.):

_____

_____

4.4 Management of dismantled material contaminated or containing PCBs in amount that are beyond the allowable quantities as described in the Regulation on hazardous Materials:

_____

_____

4.5 Describe the storage area of dismantled material contaminated or containing PCB's in amount that are beyond the allowable quantities as described in the Regulation on hazardous materials:

_____

_____

4.6 Distance from the storage area of dismantled material considered as dangerous material to the nearest waterway or water body: _____ m

4.7 Distance from the storage area of dismantled material considered as dangerous material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____ m.

Resource or zone or habitat involved: _____

5. Hazardous Residual Materials

5.1 Quantity of each of the hazardous residual material found on the site (e.g. paint scale contaminated with PCBs, lead/acid batteries, etc.) to be sent to an authorized centre in confirmity with Regulation on hazardous materials:

_____

_____

_____

5.2 Provide the name of the authorized centre where the hazardous residual material collected at the site will be shipped. Provide the name of the different carriers and plces where the hazardous material will transit until it reaches the authorized centre:

6. Solid Waste and Dry Materials (Barrels not included)

6.1 Approximate volume of solid waste and dry material collected on the site: 15 m^3

6.2 Description of the storage area for the solid waste and dry material collected on the site and/or originating from the dismantling of the building(s):

- mainly wood from meat storage structure + back house (Tilt)
- misc. Various metallic debris (good items mostly)

6.3 Distance from the storage area of the solid waste and the dry material collected on the site or originating from the dismantling of building(s) to the nearest waterway or water body: 45 m

6.4 Distance from the storage area of the solid waste and dry material to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique):* 45 m.

Resource or zone or habitat involved: lake

OTHERS

7. Contaminated Soils see remarks

7.1 Provide information on approximate volumes and areas of contaminated soils

Criteria	Volumes (m^3)	Areas (m^2)
> C		
B-C		
A-B		

Criterias indicative of soil contamination:

Parameters	Criteria A ppm	Criteria B ppm	Criteria C ppm
Petroleum Hydrocarbons C_{10} - C_{50}	300	700	3500
Benzene	0.1	0.5	5
Toluene	0.2	3	30
Ethylbenzene	0.2	5	50
Xylenes	0.2	5	50
PCBs	0.05	1	10

7.2 Distance from contaminated soils > C to nearest waterway or water body: _____ m
Distance from contaminated soils B-C to nearest waterway or water body: _____ m
Distance from contaminated soils A-B to nearest waterway or water body: _____ m

7.3 Distance from contaminated soils > C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique)* : _____m.

Resource or zone or habitat involved: _____

7.4 Distance from contaminated soils B-C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en oeuvre au Québec de la Convention sur la diversité biologique)* : _____m.

Resource or zone or habitat involved: _____

7.5 Distance from contaminated soils A-B C to the nearest resource or zone or habitat with a particular environmental sensitivity (e.g. resources covered in the document *Stratégie de mise en* œuvre au Québec de la Convention sur la diversité biologique) : _____m.

Resource or zone or habitat involved: _____

7.6 Has soil samples been collected for biotreatment studies? _____
If so, how many samples were collected ? _____

7.7 Was bioremediation work performed on contaminated soils? _____
_____
_____

8. Miscelleneous

8.1 Is there a project to reuse the site or the buildings? If so, for what purpose?
NO
_____

8.2 Has a sign board been installed ? NO

8.3 Were broken windows repaired with LEXAN ? N/A

8.4 Has a First Aid kit been left on site ? N/A

9. SATISFACTION OF MUNICIPALITIES

9.1 Are the Communities satisfied with the work performed?

____

10. Remarks / Comments:

- Fuel odor permeate docking area - contaminated site ≈ 12 m x 15 m just 2 meters away from the lake
- Fuel pipeline dismantled : over 20 steel pipes collected and moved beside the helicopter pad.
- 1 oil barrel still full put on plywood platform ←
- area very wet makes work very hard
- no bioremediation work at the identified contaminated site : area is marshe-like (no oxygen) so another method may need to be used.
- Petroflag kit not available to measure actual concentration but author believes attention should be paid

Signature (KRG Work supervisor) : [signature]

Date: June 23rd 1999

NOTES

- Distances greater than 1 km are expressed as « > 1000 m ».
- Resources covered in the document *Stratégie de mise en œuvre au Québec de la Convention sur la diversité biologique* include the following:

- Critical or sensitive habitat for the biodiversity (muskeg, marshland, swamp...) ;
- Protected areas (park, ecological reserve, habitat and refuge for wildlife...) ;
- Species that are, or that are susceptible to become, endangered or vulnerable and their habitats (This one will not be assessed, unless stated otherwise, due to the absence of qualified biologist on the site during the work phase).

All information allowing a better understanding of field state or a better understanding of work performed can be added to this form. For example, this form could be more descriptive by adding plans, drawings, pictures ...

Observations, drawings, calculations, estimations and analytical results used to estimate volume and areas of contaminated soils will be added to this form.

- This Form draws in part from the *National Classification System for Contaminated Sites* published by the CCME in March 1992.

31/05/99

Appendix G

Site 333A. Caribou entangled by scattered cable.

June 1999

Site 215 Power room (Note:) Generators removed prior to 1980.

June 1999

Site 215 Electric room before clean-up.

June 1999

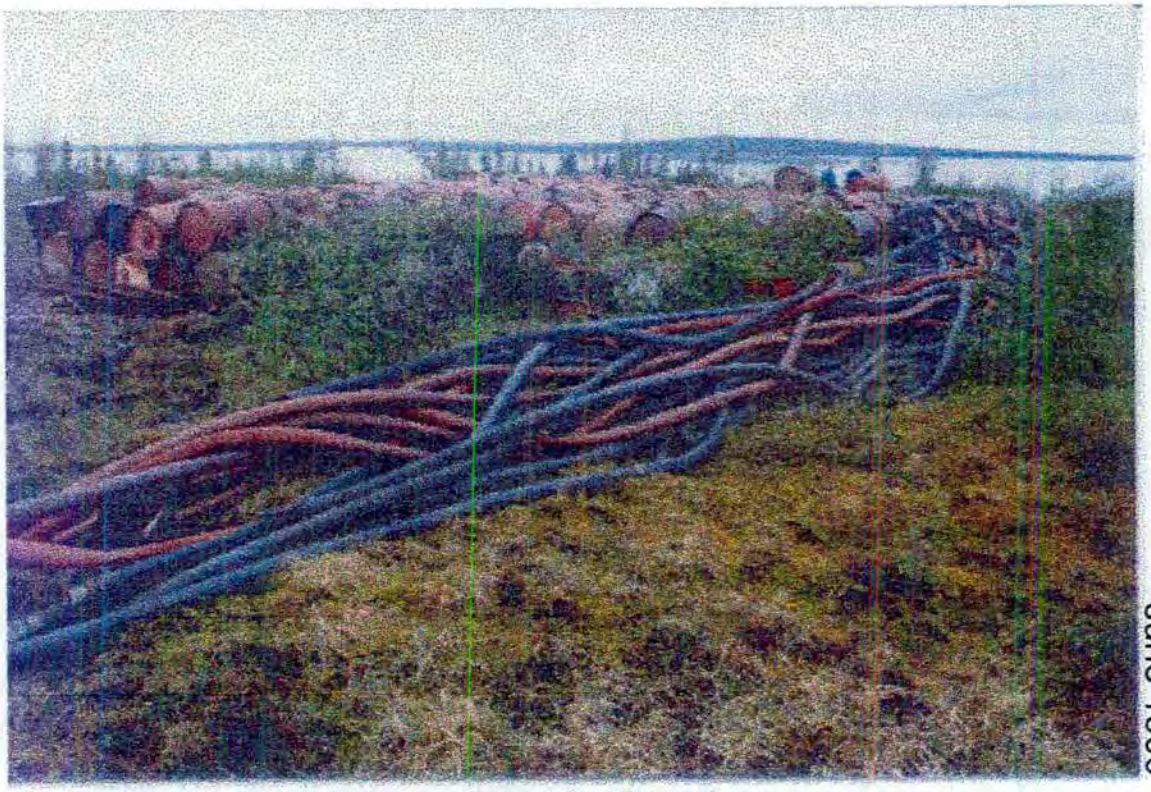
Site 215 Overhead cable conduit taken down.

June 1999

Site 215 Largest dumpsite (heavy metallic debris)

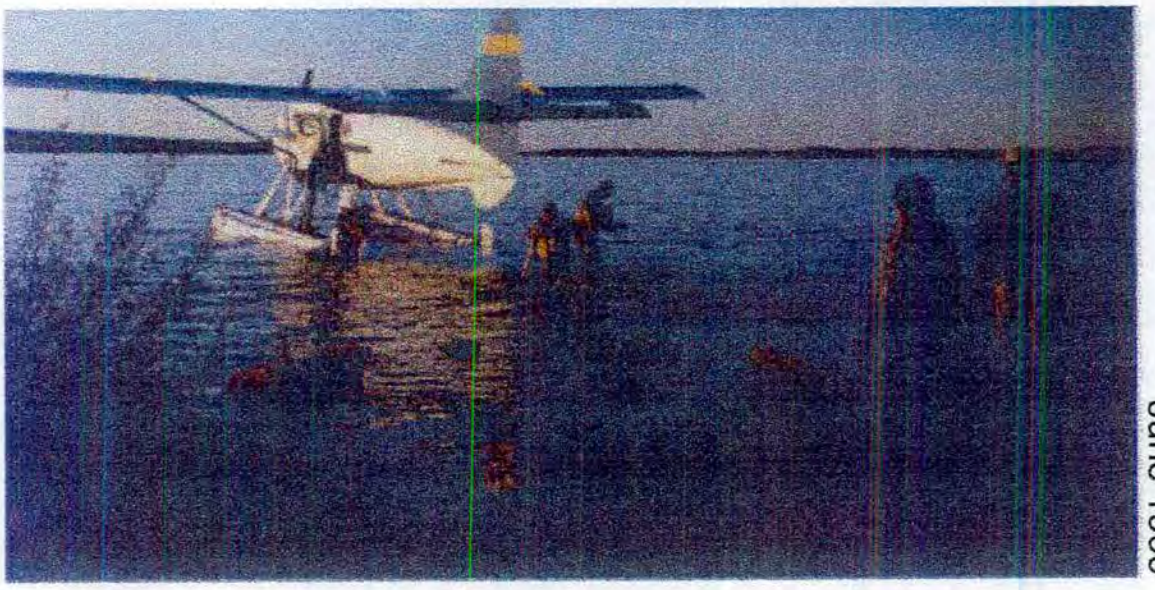
June 1999

Site 218A Flexible pipes in the water before removal.



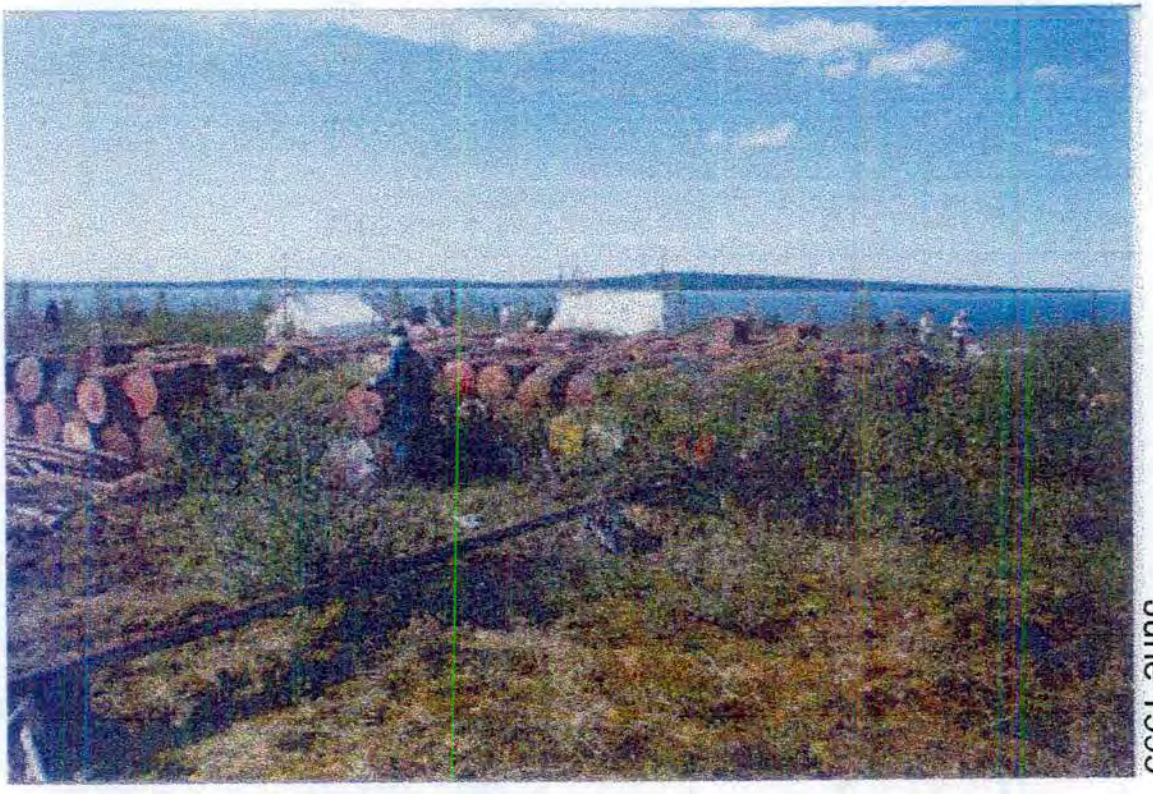
June 1999

Site 218A Main barrel depot and flexible pipes.



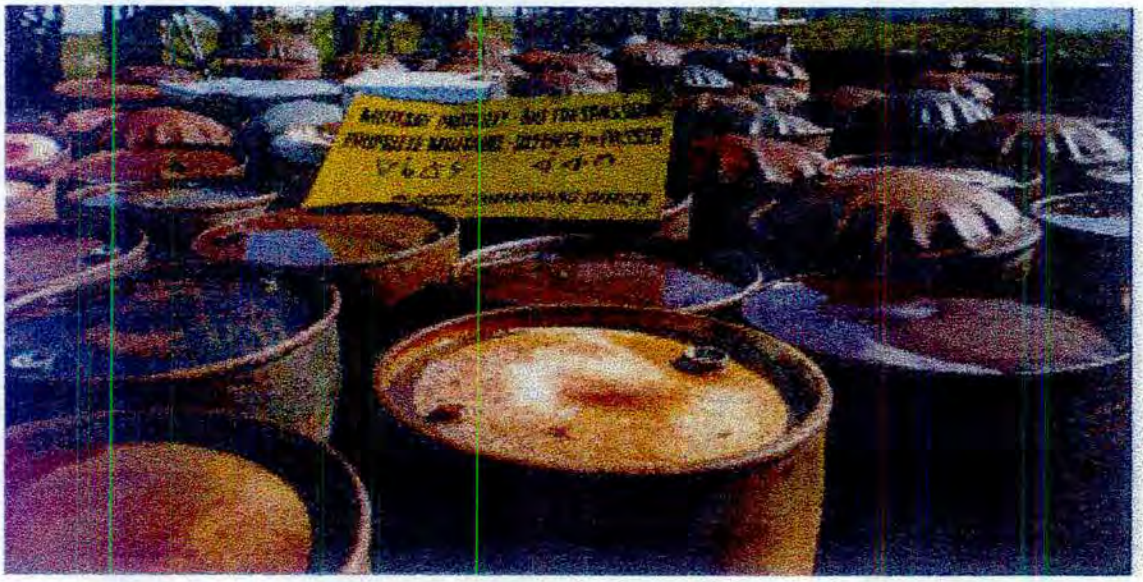
June 1999

Site 218A Clean-up crew deplaning supplies.



June 1999

Site 218A Main barrel depot.



June 1999

Site 218 Main barrel depot.

June 1999

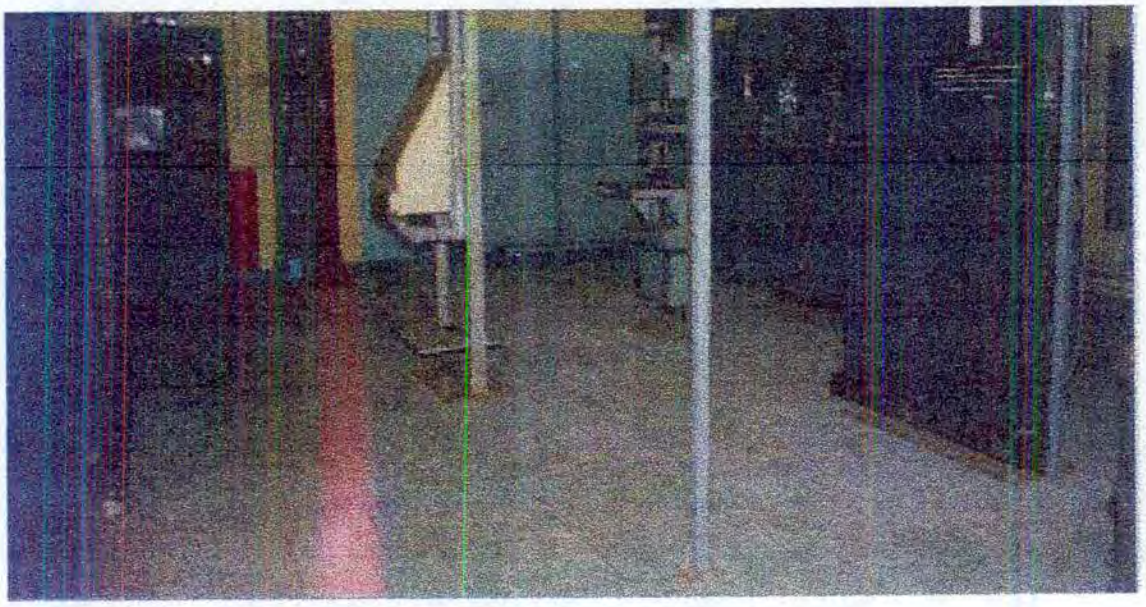
Site 218 Safely stored batteries.

June 1999

Site 218 Work crew at lake side.

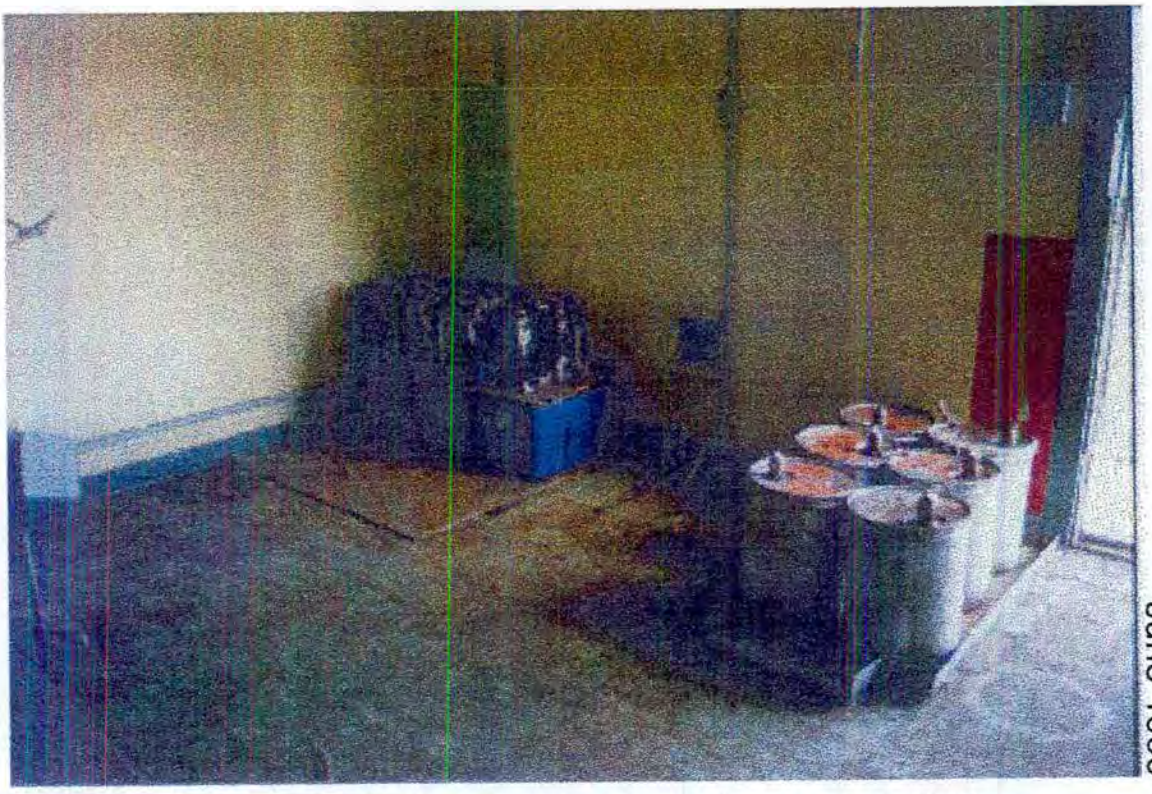
June 1999

Site 218 RCAF logo on empty barrels by the lake.



June 1999

Site 221 Cleaned up electrical room.



June 1999

Site 221 Cleaned up power room with safely stored batteries and oil cans.

June 1999

Site 221 Contaminated soil (heavy oil)

June 1999

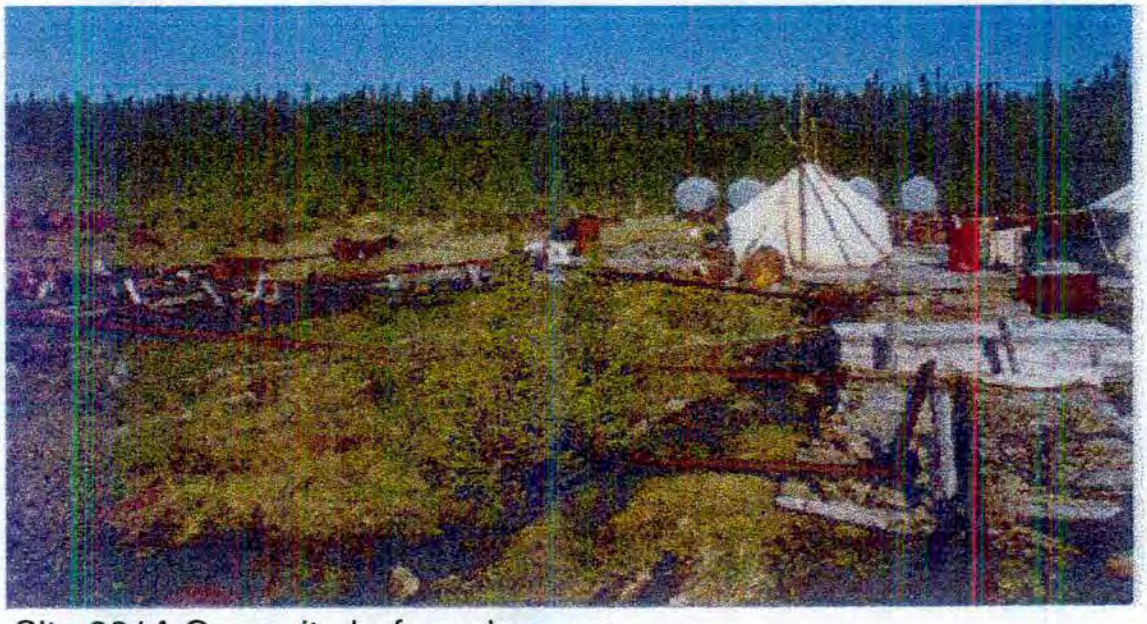
Site 221 Main fuel depot.

June 1999

Site 221A Work crew dismantling 3 inch fuel pipeline.

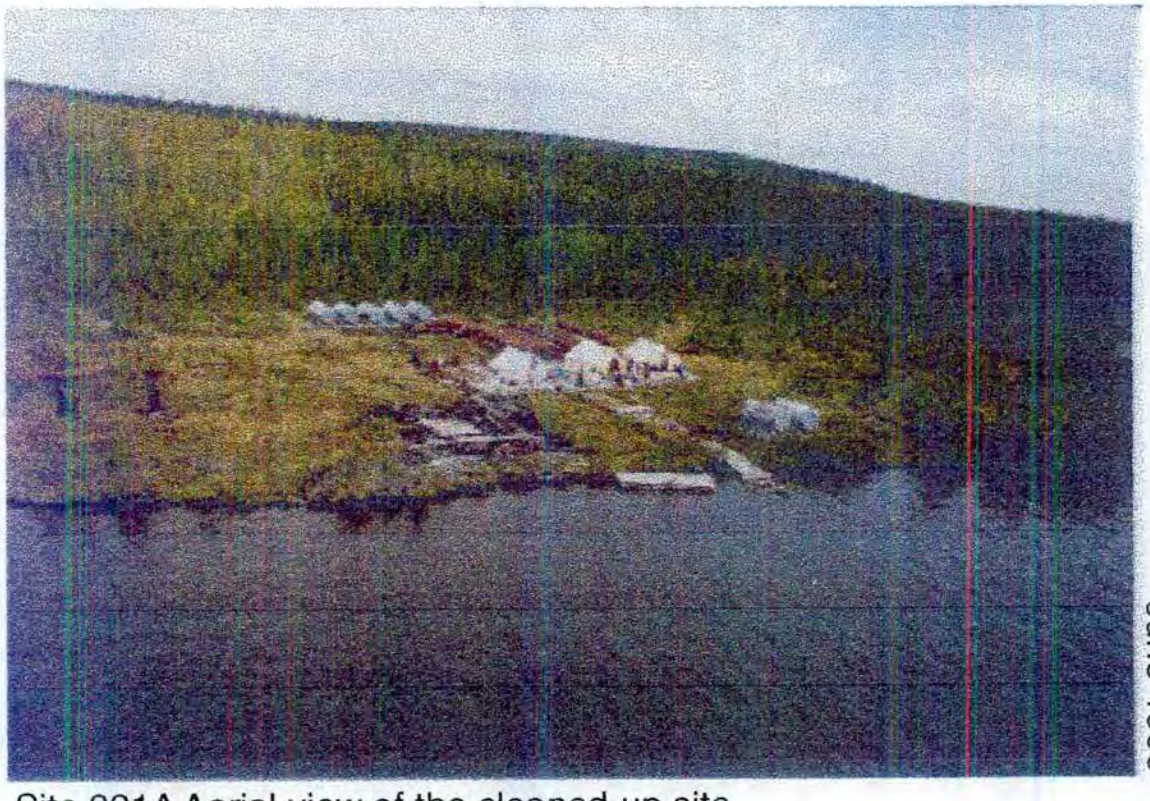
June 1999

Site 221A Barrels taken out the lake.



June 1999

Site 221A Campsite before clean-up.



June 1999

Site 221A Aerial view of the cleaned-up site.

Site 330. View of crated radar parts and heaters. Operations building in background.

Site 330. Barrel dump at the foot of the hill.

Site 330. One of several dumpsites in the surrounding forest.

Site 330. Dump to be cleaned up behind operations building.

Site 330. Buried winch by bunkhouse.

Site 330A. Barrels and rotting dock in foreground.

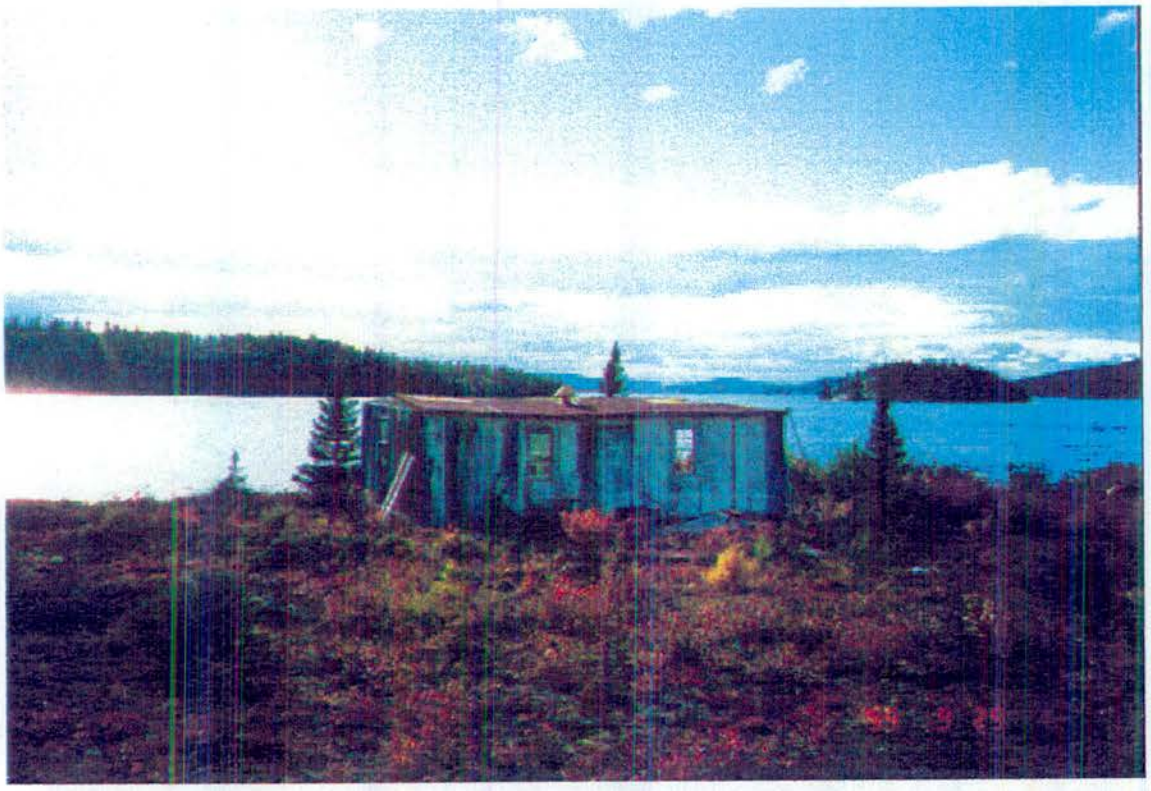
Site 333. Substructure of operations building and stored chemicals.

Site 333. Can of ethyl hydrate from beneath operations building.

Site 333. Checking diesel reservoirs for residue.

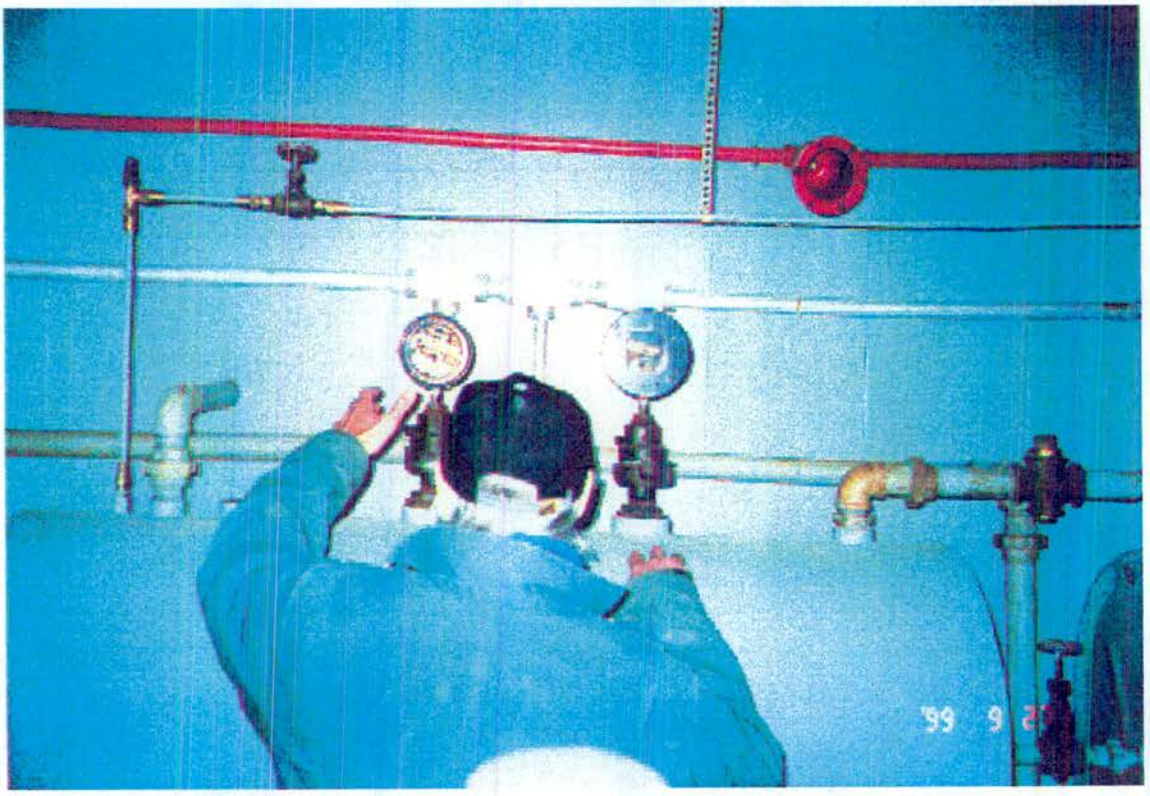
Site 333. Barrel piles around site.

Site 333. Barrel pile near lake, off site.



Site 333A. Cabin. Lakeward half of the roof and one wall is missing.

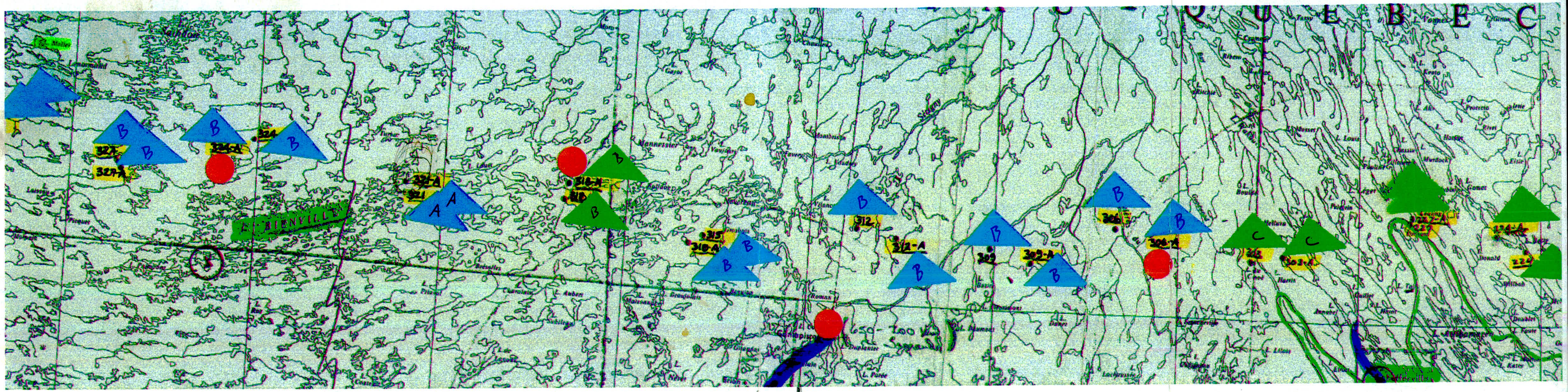
Site 333A. New structure and dump in foreground built on site.



Site 339. Mercury switches in the generator room of the operations building.

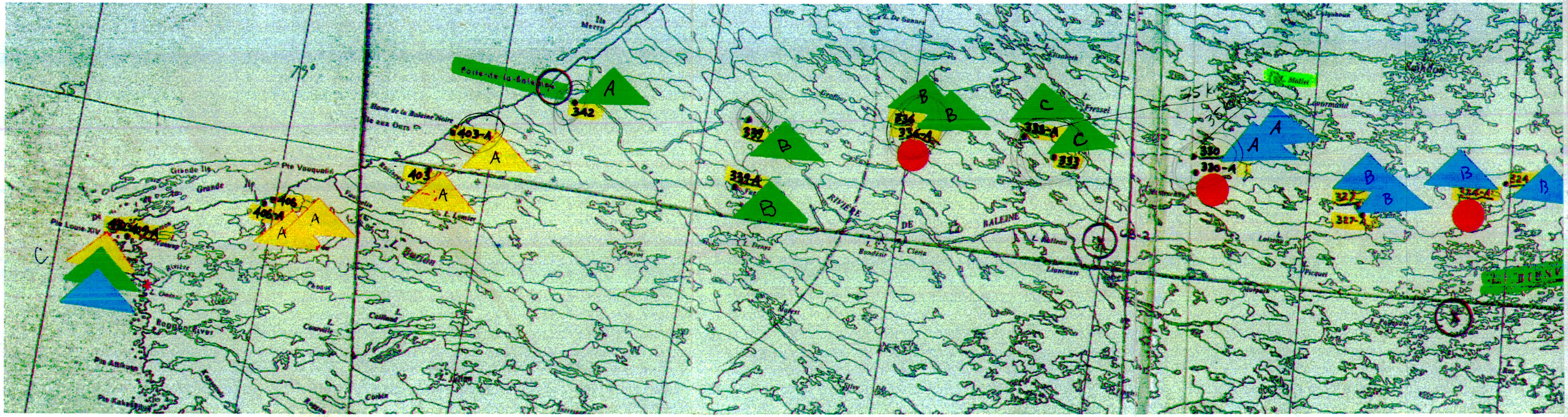
Site 339A. Barrels piled above lake near bunkhouse.

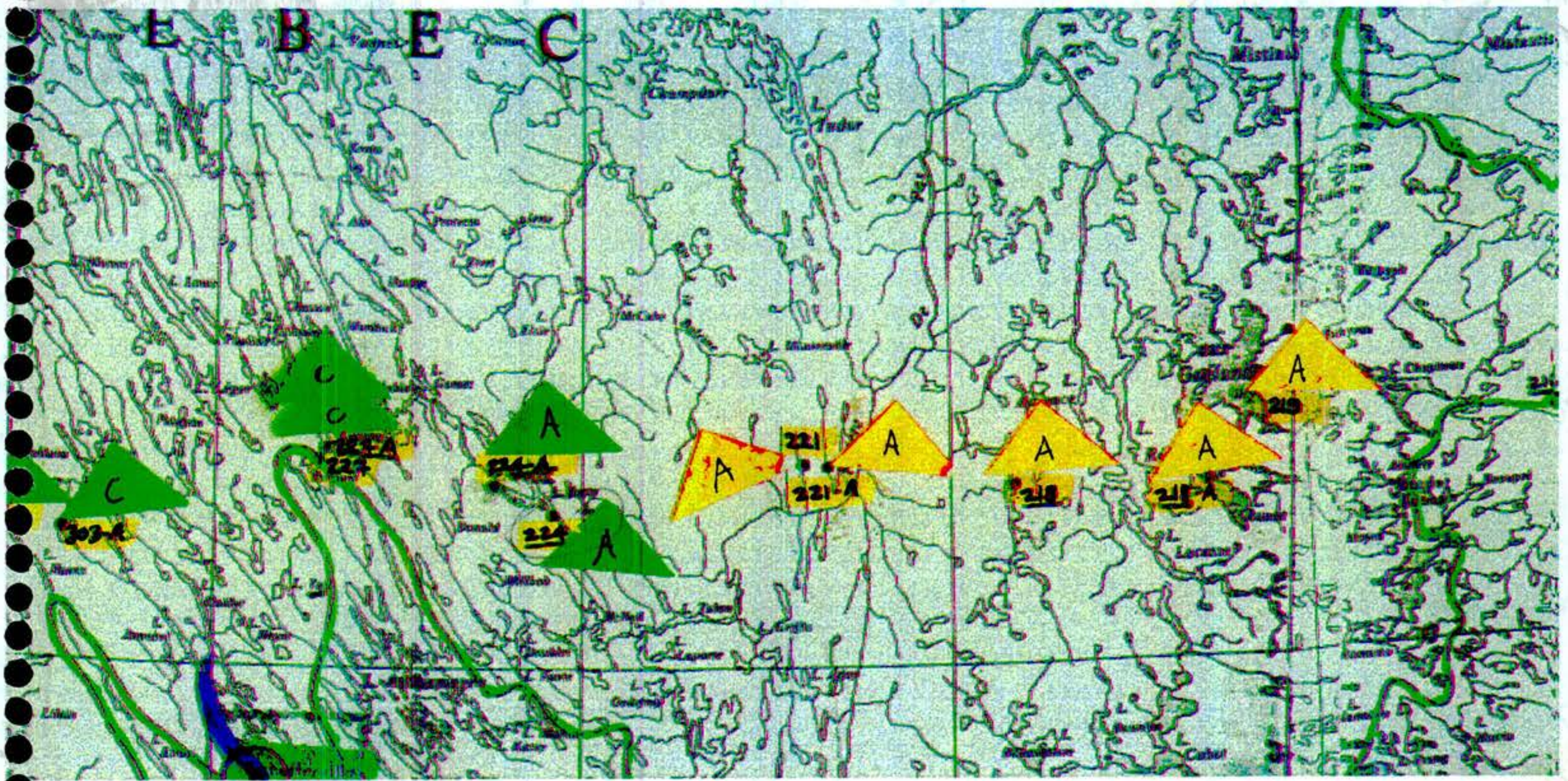
Appendix H



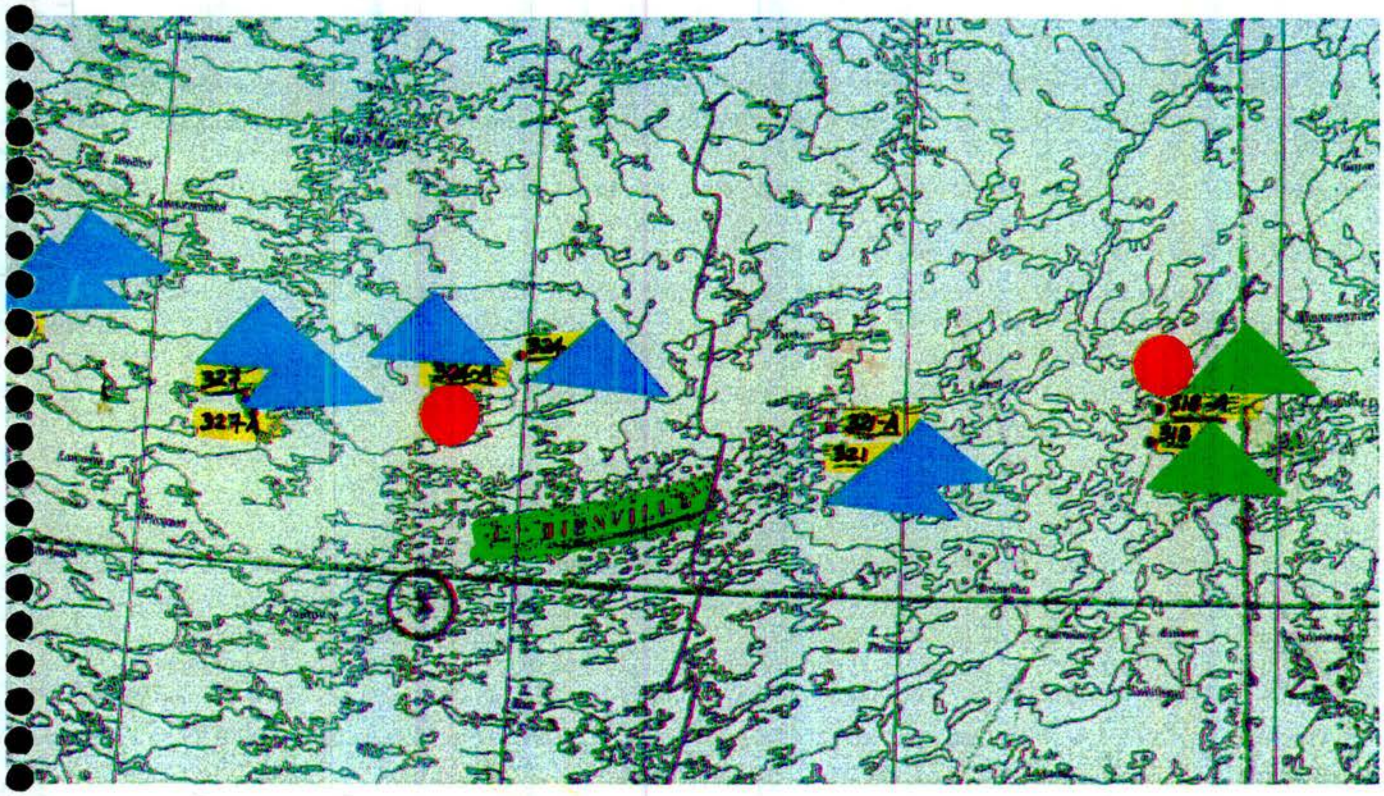
↑ quoi?

Inuit/Cree | Naskapis



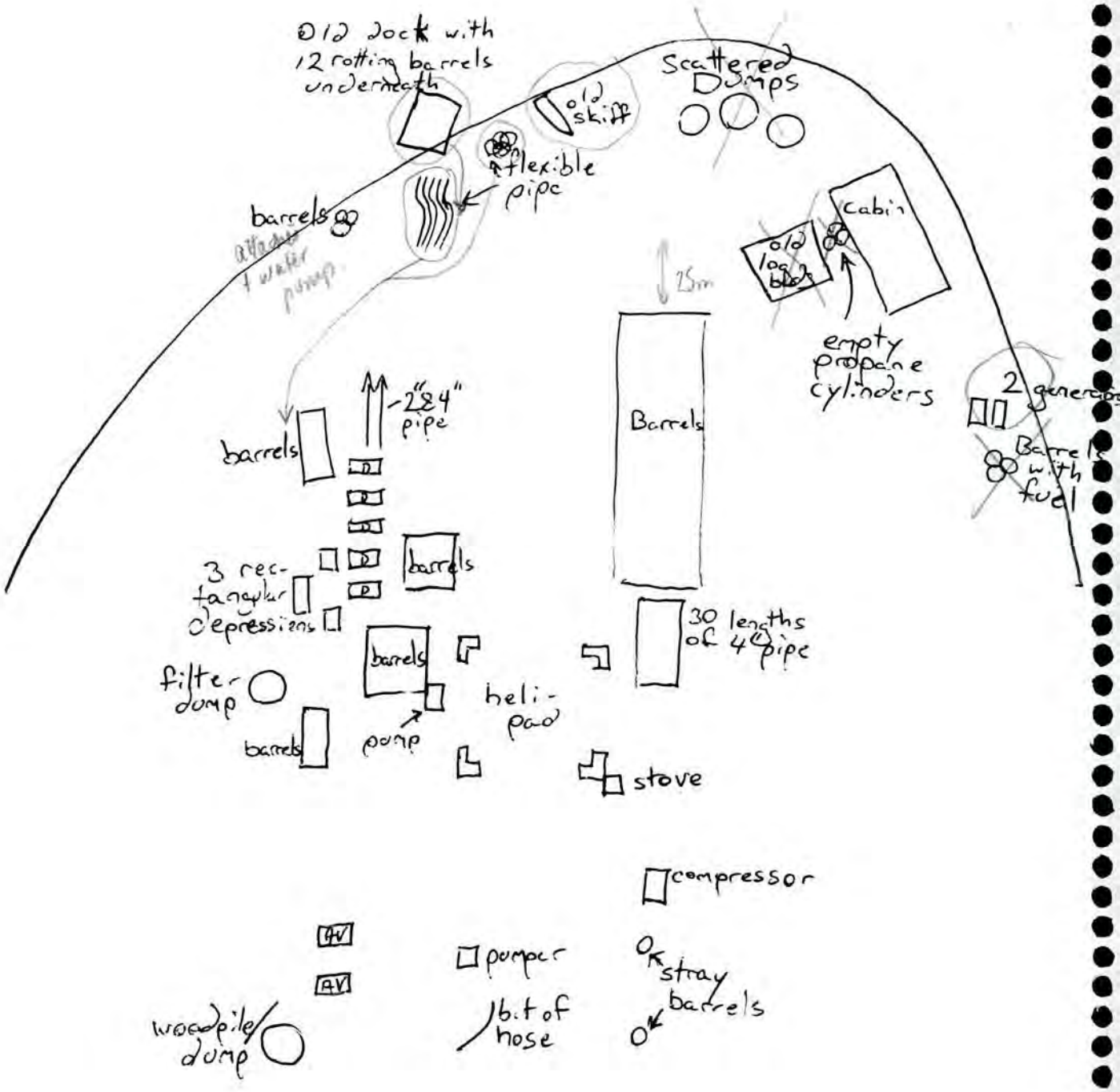


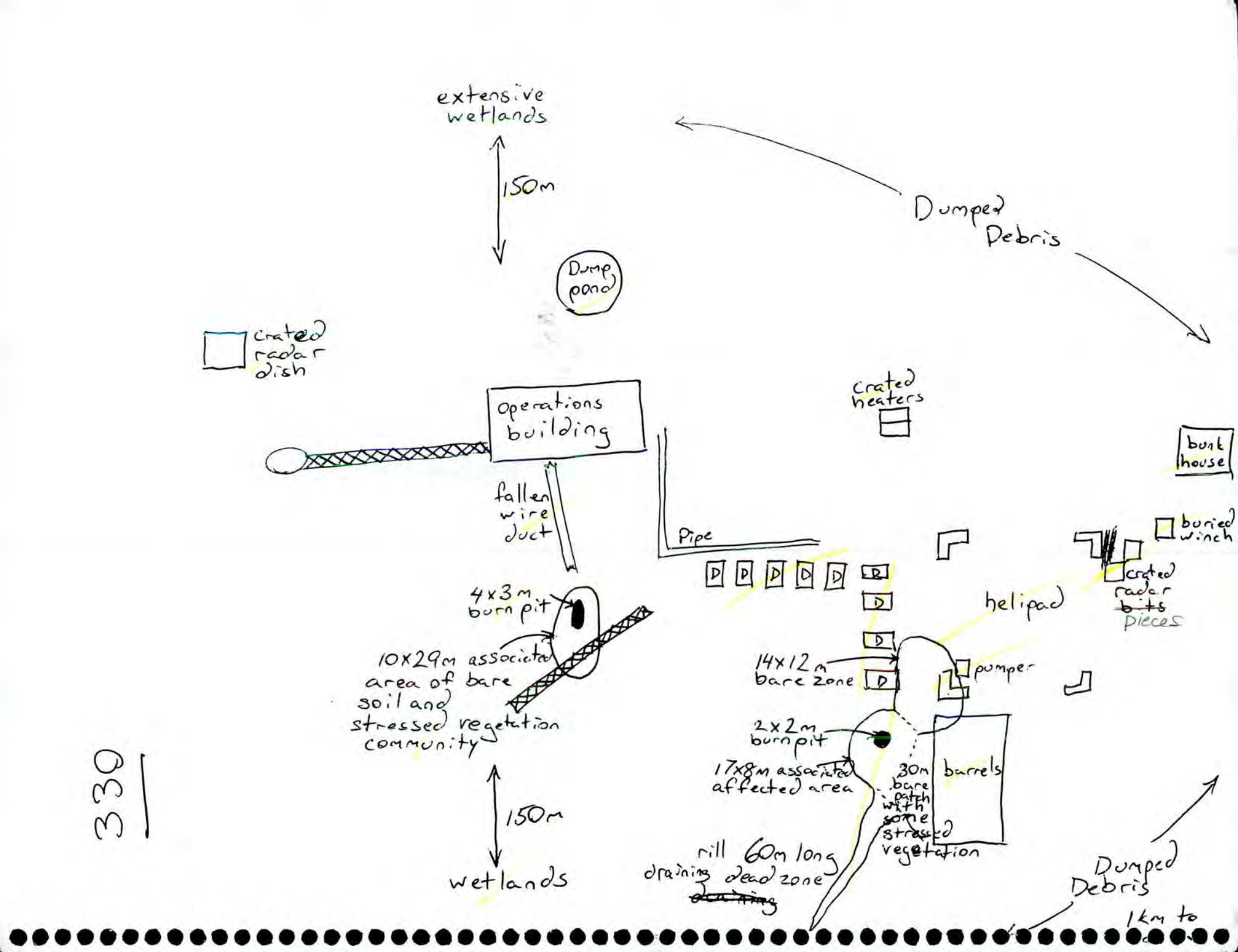
Legend?



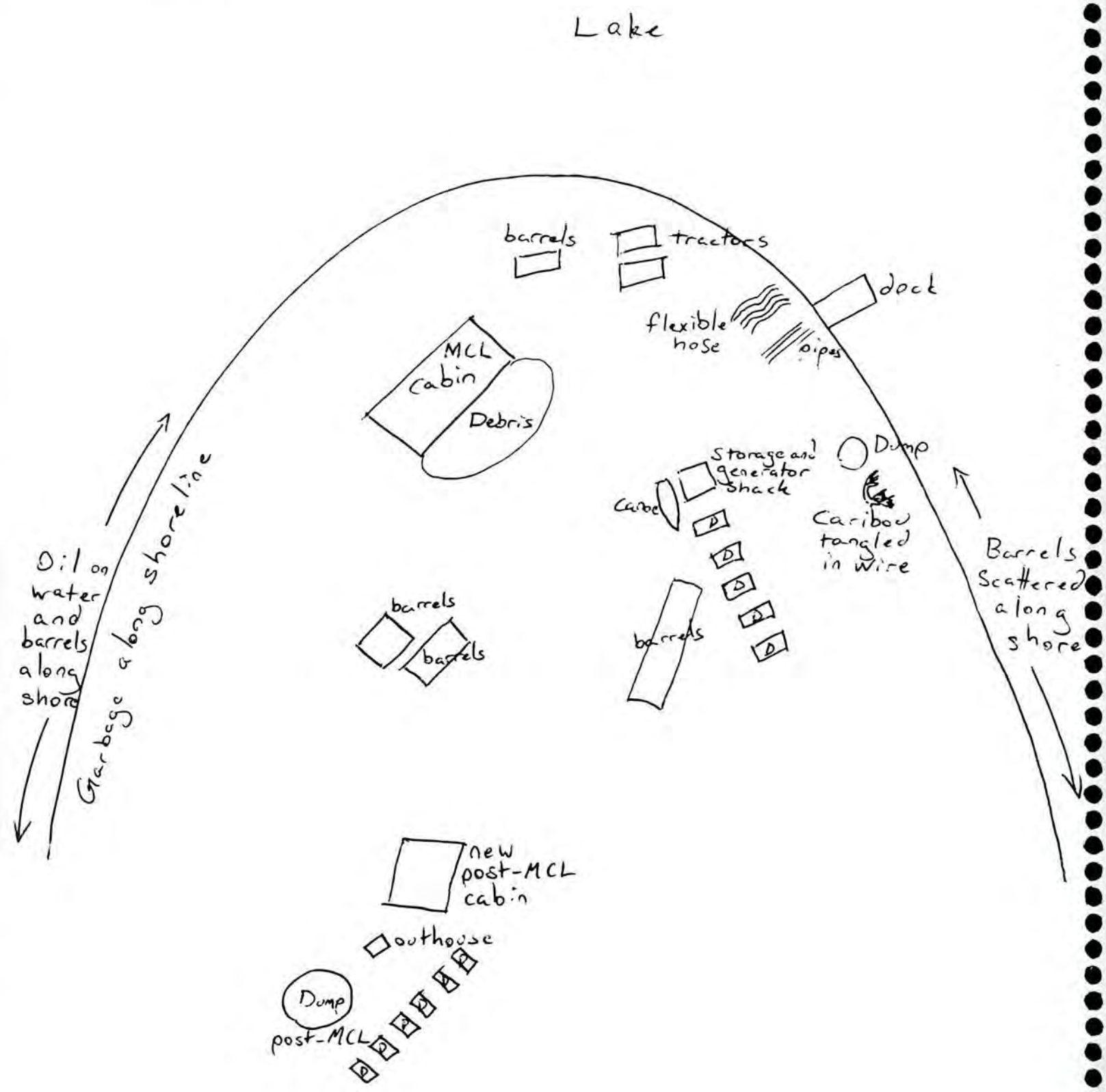
Appendix I

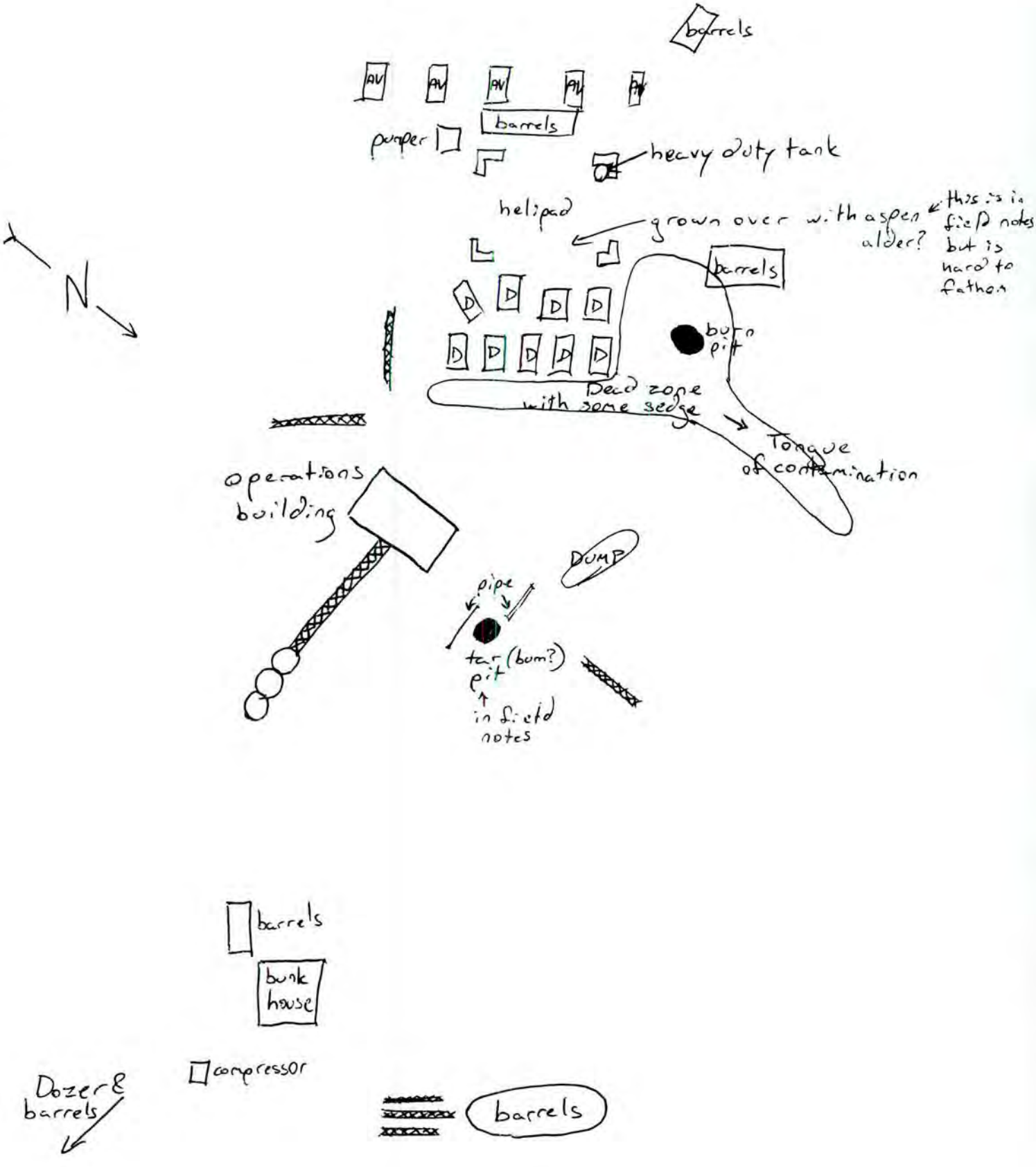
330 A


Lake
Old dock with 12 rotting barrels underneath
old skiff
Scattered Dumps
flexible pipe
barrels
cabin
old log
25m
empty propane cylinders
2 generators
Barrels with fuel
Barrels
2"&4" pipe
barrels
3 rectangular depressions
barrels
barrels
30 lengths of 4" pipe
filter dump
heli-pad
barrels
pump
stove
compressor
ATV
ATV
pumper
stray barrels
bit of hose
woodpile/dump

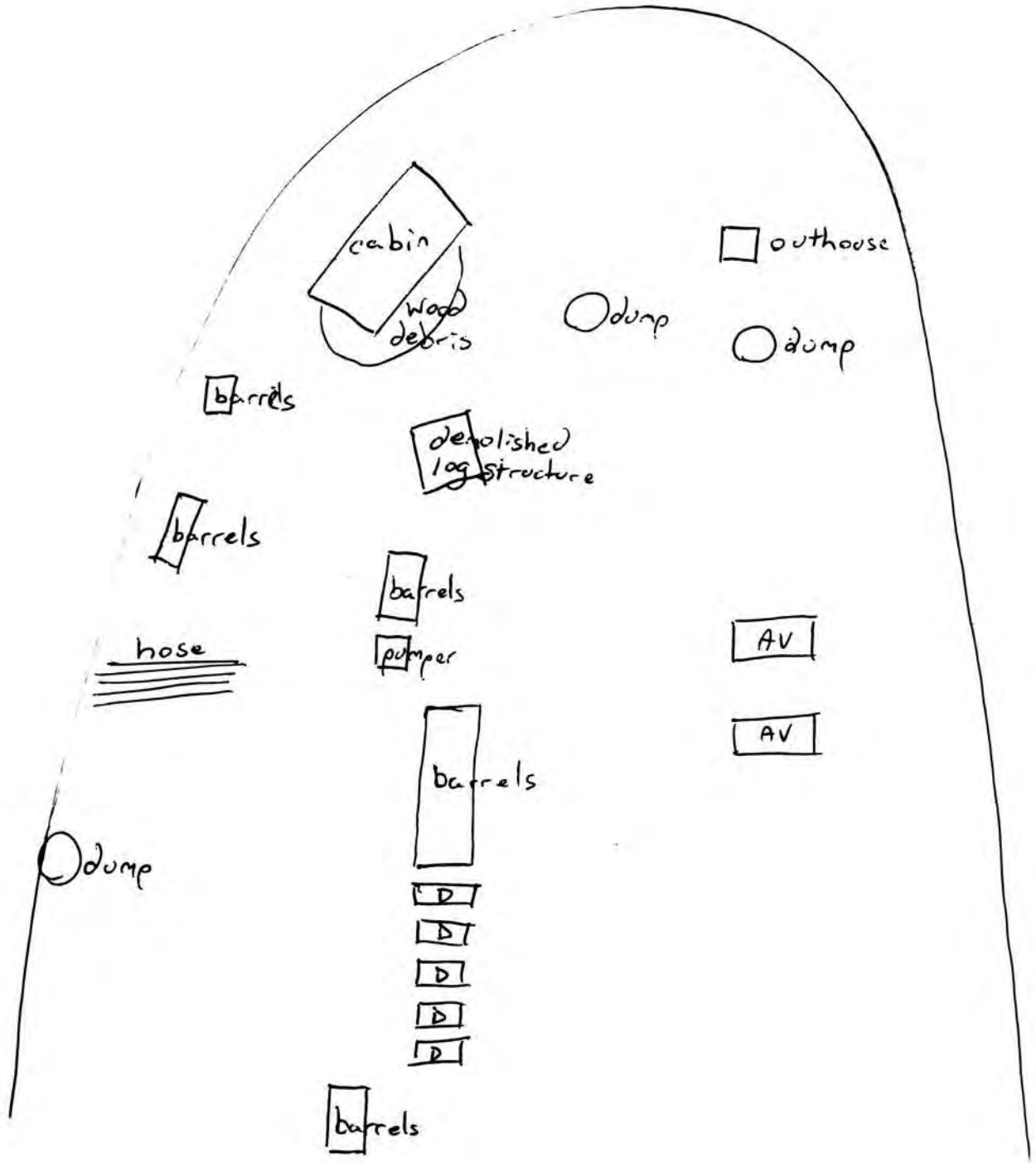

extensive wetlands
150m
Dumped Debris
Dump pond
crated radar dish
operations building
crated heaters
bunk house
fallen wire duct
Pipe
buried winch
crated radar bits
pieces
helipad
4x3m burn pit
10x29m associated area of bare soil and stressed vegetation community
14x12m bare zone
pumper
2x2m burn pit
17x8m associated affected area
30m bare path with some stressed vegetation
barrels
150m
wetlands
rill 60m long draining dead zone
Dumped Debris
1km to

333A -

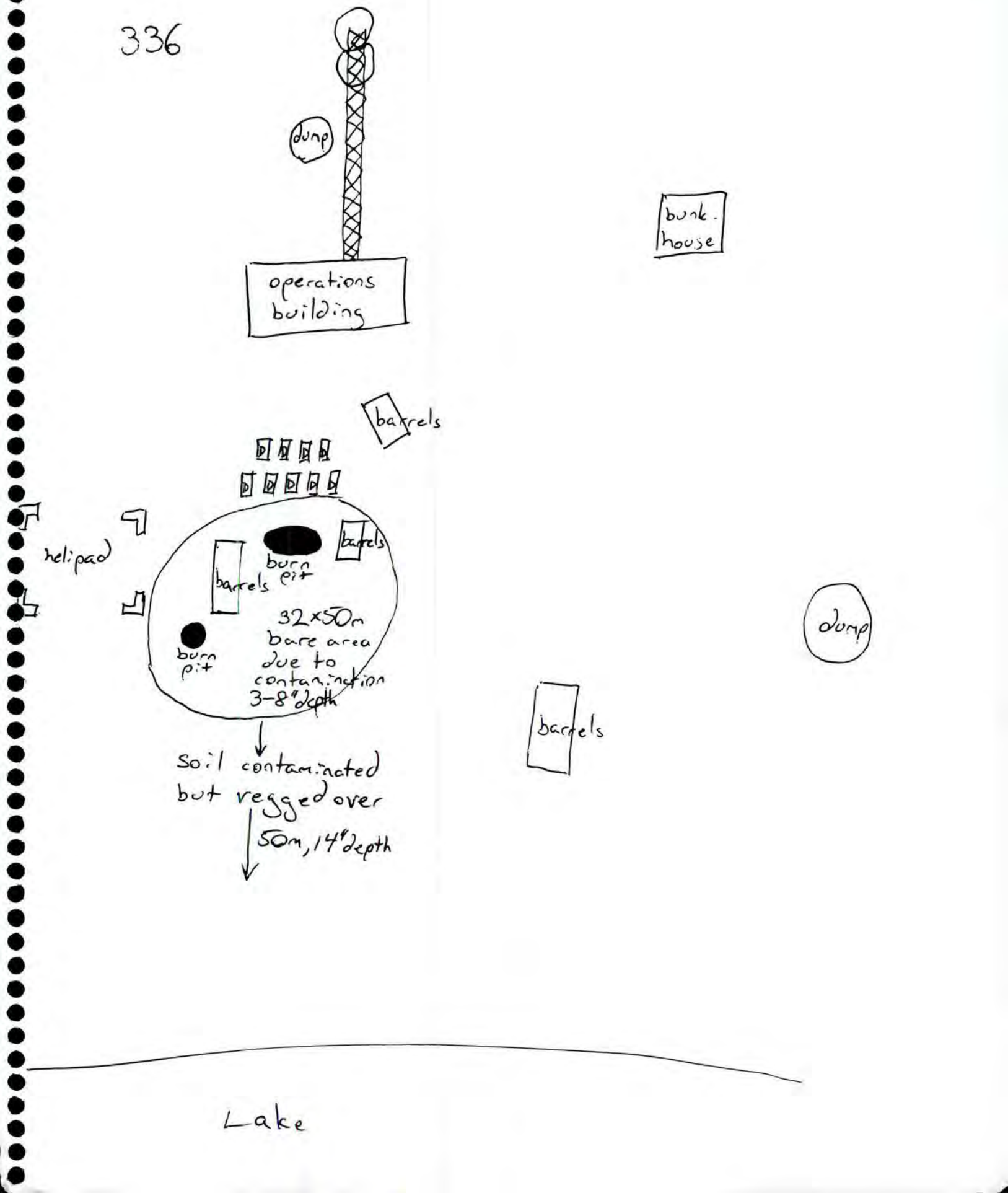

Lake
barrels
tractors
dock
flexible hose
pipes
MCL cabin
Debris
Storage and generator shack
Dump
Caribou
Caribou tangled in wire
Oil on water and barrels along shore
Garbage along shoreline
barrels
barrels
barrels
Barrels Scattered along shore
new post-MCL cabin
outhouse
Dump post-MCL


barrels
AV
AV
AV
AV
AV
barrels
pumper
heavy duty tank
helipad
grown over with aspen alder?
this is in field notes but is hard to fathom
N
barrels
burn pit
Dead zone with some sedge
Tongue of contamination
operations building
DUMP
pipe
tar (burn?) pit
in field notes
barrels
bunk house
compressor
Dozer & barrels
barrels
Lake

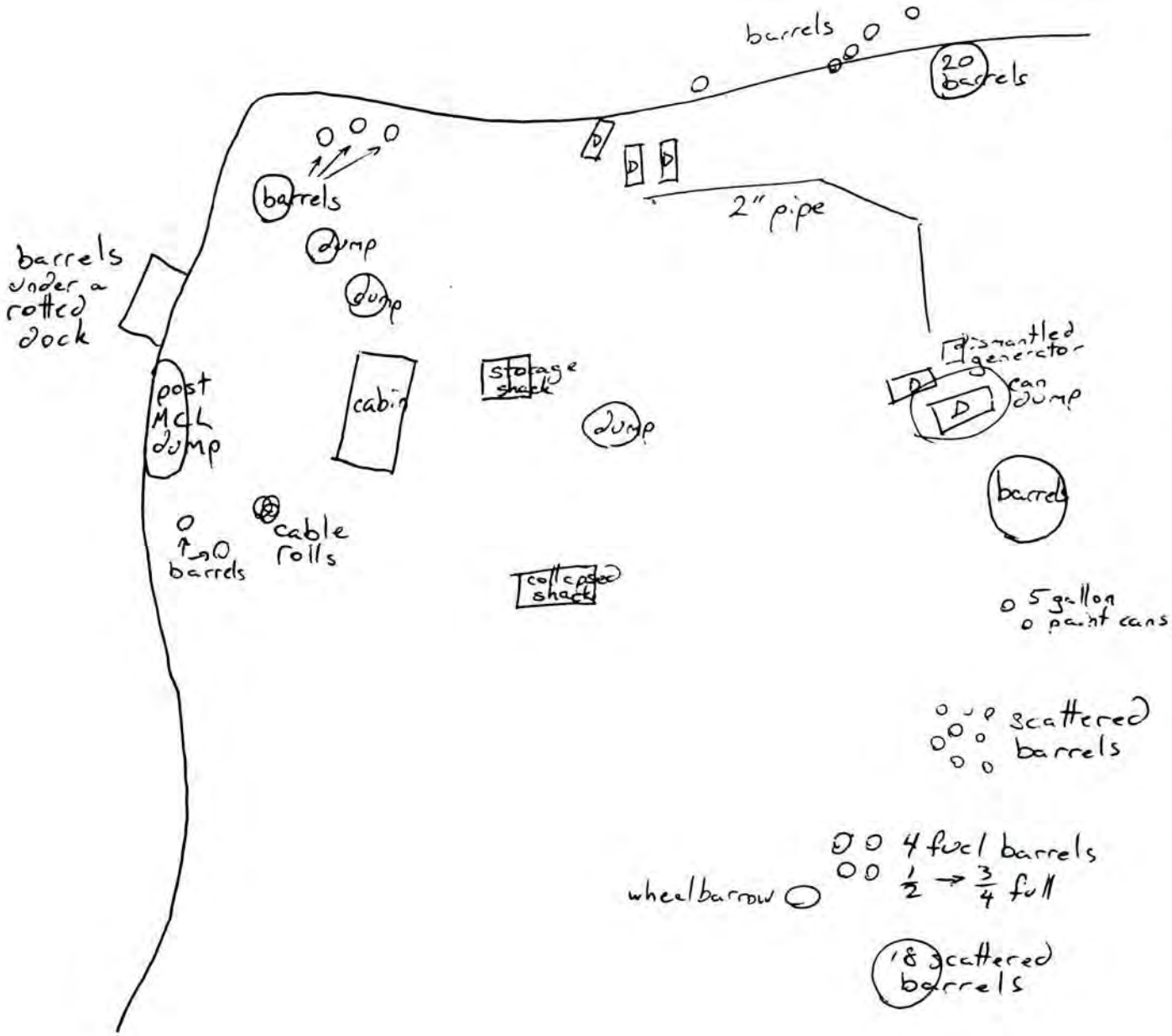
336A


cabin
wood debris
outhouse
dump
dump
barrels
demolished log structure
barrels
barrels
pumper
hose
AV
AV
barrels
dump
D
D
D
D
D
barrels

336

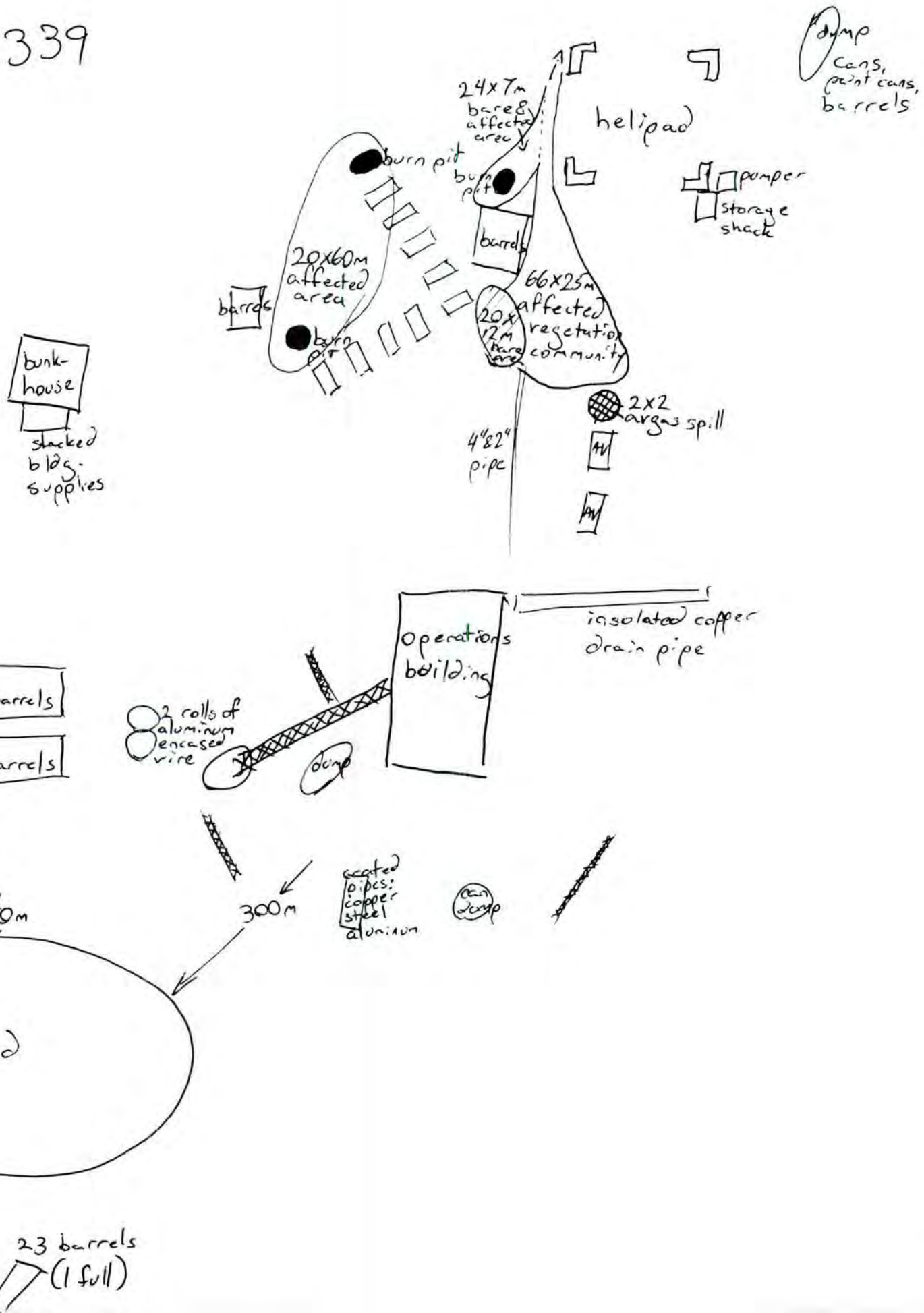

dump
operations building
bunk. house
barrels
helipad
barrels
burn pit
barrels
32x50m bare area due to contamination 3-8" depth
burn pit
dump
barrels
soil contaminated but regged over
50m, 14" depth
Lake

339A

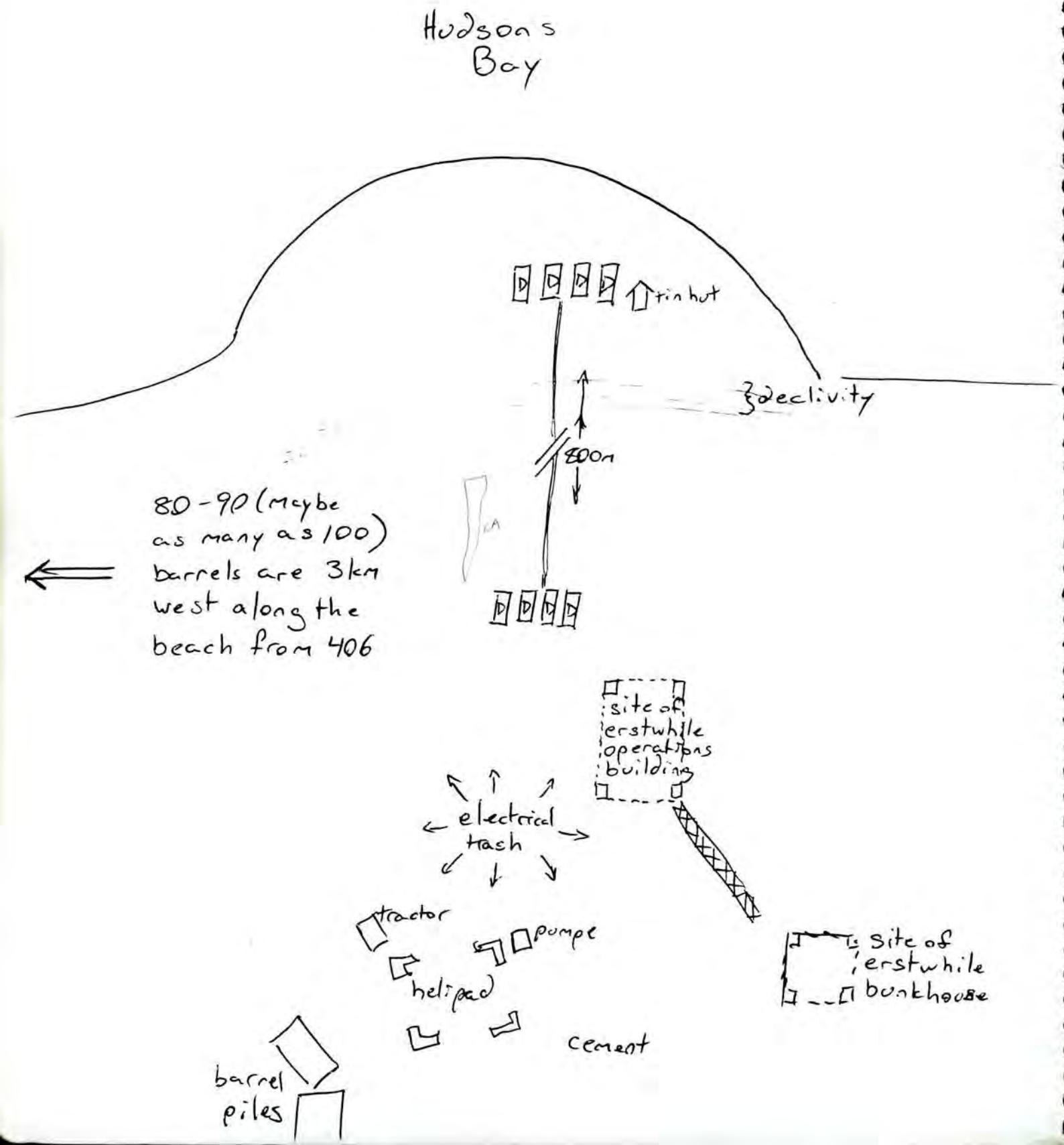


(195 barrels total)

339


dump
cans, paint cans, barrels
24x7m bare & affected area
helipad
burn pit
burn pit
pumper
storage shack
barrels
20x60m affected area
barrels
66x25m affected vegetation community
20x12m bare area
burn pit
bunk-house
stacked bldg. supplies
2x2 argon spill
4"&2" pipe
insolated copper drain pipe
operations building
barrels
barrels
2 rolls of aluminum encased wire
dump
barrels
80m
300m
coated pipes: copper steel aluminum
dump
Pond
23 barrels
(1 full)

406


Hudsons Bay
tin hut
declivity
800m
80-90 (maybe as many as 100) barrels are 3km west along the beach from 406
site of erstwhile operations building
electrical
trash
tractor
pumps
helipad
cement
site of erstwhile bunkhouse
barrel piles