

May 3, 2012

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SUBJECT : *Brief Regarding the Complete Restoration of Mid-Canada Line sites in Nunavik*

Madames,

Established under Chapter 23 of the *James Bay and Northern Québec Agreement* (JBNQA), the Kativik Environmental Advisory Committee (KEAC) is a consultative body to responsible government, regional and local authorities in matters relating to environmental and social protection in Nunavik. In this regard, it is the preferential and official forum for the governments of Canada and Quebec as well as the Kativik Regional Government (KRG) and Northern Villages.

The Mid-Canada Line refers to a Doppler radar detection system for aircraft stretching across Canada from Labrador to British Columbia, along the 55th parallel. The Mid-Canada Line was built between 1954 and 1957 and there are 42 stations located in Québec, which were operated by the Department of National Defense (DND) from 1958 to 1965. The Québec government was retroceded these sites in 1966 after they were abandoned by the DND.

From 1988-2002, in collaboration with the DND, the Québec Ministry of Environment (MENV), and Environment Canada, the Kativik Regional Government (KRG) undertook 2 separate phases of work to remove the hazardous waste from these sites, including a large volume of hydrocarbons. In addition, buildings were reinforced or dismantled to

improve public safety on the sites. However, there remain over 16,000 barrels and various metal debris, including heavy equipment, on all 42 sites nor have the buildings been inspected for further decay during the last 10 years.

The Mid-Canada Line sites are of particular concern to Cree, Inuit and Naskapi communities who use these areas for traditional activities. Although some restoration has been made in the past, these communities remain firmly committed to the complete rehabilitation of the sites.

The Kativik Environmental Advisory Committee (KEAC) has studied the documentation associated with past cleanup efforts and have reached the conclusion that further remediation work is necessary to improve public safety and to better protect the environment. Please find enclosed the KEAC brief that summarizes the project and provides several recommendations regarding the next phase of cleanup work on the 35 sites located in Nunavik.

The KEAC asks that you review these recommendations and consider opening discussion with the KRG regarding this topic.

Respectfully yours,

A handwritten signature in black ink, appearing to read 'Sylvie Létourneau', written in a cursive style.

Sylvie Létourneau
Chairperson

cc. Maggie Emudluk, Chairperson, KRG



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Comité consultatif de l'environnement Kativik
Kativik Environmental Advisory Committee

**WORK NECESSARY TO COMPLETE THE MID-CANADA LINE CLEAN-UP
PROJECT**

MAY 2012

INTRODUCTION

The Mid-Canada Line refers to a Doppler radar detection system for aircraft (Early Warning System), nicknamed the McGill fence, stretching across Canada from Labrador to British Columbia, along the 55th parallel. The Mid-Canada Line was built by the federal government between 1954 and 1957. The 42 stations located in Québec (35 sites north and seven sites south of the 55th parallel) were operated by the Department of National Defense (DND) from 1958 to 1965. The sites were abandoned in 1965. At that time, all equipment, buildings, fuel tanks, barrels, pipelines, pumping stations, machinery, as well as hydrocarbons and contaminated soil were left behind. The detection antennas, some of which were longer than 100 m, were lowered to the ground to eliminate aviation hazards. After the federal government abandoned the Mid-Canada Line, the 42 sites in Québec were ceded to the Government of Quebec in 1966.

In Québec, there are 22 Doppler radar detection sites located approximately 40 km apart and 20 supply sites, each generally located less than 2 km from a detection site. Figure 1 is a map of the 42 sites along the 55th parallel.

Since 1985, there has been a significant amount of restoration work carried out at these 42 sites. The clean-up projects involved a series of rehabilitation measures aimed at ensuring public safety and environmental protection as well as mitigating the current and potential environmental impact of the Mid-Canada Line sites. The measures included stabilizing and demolishing buildings, recovering and removing waste hydrocarbons, recovering and removing hazardous materials, eliminating threats to public safety, stacking empty barrels into piles, collecting waste and performing bio-remediation work on soil contaminated with hydrocarbons.

However, there still remains a significant amount of debris on the sites as well as potential hazards to the environment and to the communities that frequent these areas. Rehabilitation work should be continued in order to ensure better environmental protection and an adequate level of public safety.

This report describes, in brief, the clean-up work undertaken in the past as well as recommendations regarding further work that should be performed to ensure the complete and final clean-up of these sites.

CLEAN-UP: PHASE 1

In 1985, an inventory of the Mid-Canada Line stations located in Québec and Labrador was completed by representatives of the DND, Environment Canada (EC), the Ministère de l'Environnement du Québec (environment, MENV) and the Ministère du Loisir, de la Chasse et de la Pêche (recreation, hunting and fishing, MLCP) (Berrouard *et al.*, 1986). This inventory revealed that the sites posed a risk to the public and to the environment because of the presence of unstable buildings, a small quantity of chemicals and a substantial quantity of hydrocarbons, approximately 320 000 L distributed over 27 of the 42 sites.

Due to the high risk to the environment, in 1987, the MENV and the Kativik Regional Government (KRG) signed an agreement and carried out an operation to dispose of the hydrocarbons, based on the 1985 inventory data, by means of controlled burning. The fieldwork was completed under the supervision of the KRG with Cree, Inuit and Naskapi workers, depending on the sector. As a result, approximately 320 000 L of hydrocarbons were eliminated at 27 sites (Berrouard *et al.*, 1986). This operation later came to be considered the first phase of the Mid-Canada Line Clean-up Project.

CLEAN-UP: PHASE 2

Contribution Agreement

In 1998, a contribution agreement was negotiated and signed by EC, the DND, the MENV, the Canadian Intergovernmental Affairs Secretariat (CIAS) and the KRG. The agreement defined the principles for the parties to work together and presented their respective roles and contributions. The agreement also outlined the development of a work plan by partners and signatories, including the establishment of acceptance criteria for cleaning activities on the sites.

The partners were required to jointly define the objectives of the initiative. Specifically, EC played an advisory role during preparation of the work plan and provided technical advice concerning on-site bio-remediation work. The DND contributed most of the funding for the initiative and was responsible at the federal level for approving the work carried out at the sites as well as related payments. The MENV was responsible for monitoring the work carried out at the sites, decision-making concerning the field work, funding technical support costs and approving at the provincial level the work carried out at the sites as well as related payments. The KRG was the project proponent and co-ordinator. It acted as the official voice of the Inuit, Cree and Naskapi communities and contributed funding through labour force training and institutional development. The KRG was responsible for obtaining all permits and certificates of authorization required by law and regulation, for ensuring compliance with all laws including the provisions of the *James Bay and Northern Québec Agreement* (JBNQA), for requesting approval of the work carried out at the sites as well as related payments and, finally, for producing a final report on the clean-up work completed and an assessment of the project.

Public Consultations

In 1998 and 1999, two series of public consultations were held in the communities of Chisasibi, Whapmagoostui, Kuujjuarapik and Kawawachikamach. The objective of the consultations was to inform the communities of the contents of the contribution agreement, to prioritize the clean-up work, as well as to identify the sites considered most important and that had the greatest impact on the communities. The work plan was also discussed as were the results of previous soil, surface water and building material analyses. The communities consulted identified the sites they considered priorities and were receptive to the initiative.

Federal Screening

In 1998 and 1999, the DND conducted an environmental and social impact assessment (screening) pursuant to the *Canadian Environmental Assessment Act*. The assessment concluded that the initiative would have a positive environmental impact.

Work Plan and Acceptance Criteria

A work plan was officially approved in 1999 and the partners agreed that the work carried out should comply with the applicable regulations. These regulations related primarily to the management of non-hazardous waste, the management of hazardous materials and the management of contaminated soils.

In 2000, a document entitled *Critères d'acceptation des travaux, Projet Mid-Canada* (work acceptance criteria, Mid-Canada Line Clean-up Project) was prepared by the MENV in accordance with the work plan and applicable regulations. The objectives of the clean-up work were established to address the following concerns:

- the sites must not pose a risk to public health and safety;
- the work must not cause unacceptable environmental impacts;
- the work must comply with applicable laws and regulations;
- the visual appearance of the site must be acceptable;
- the work must give priority to reuse of the sites;
- the quality of the work must comply with the requirements of the Québec government, represented by the MENV.

The acceptance criteria were based on the following factors:

- safety;
- waste (buildings, barrels, metal, etc.);
- hazardous materials;
- contaminated soil;
- visual appearance.

Authorization and Impact Study pursuant to the Environment Quality Act

Pursuant to applicable environmental procedures under Chapter 23 of the JBNQA and *Environmental Quality Act*, the KRG applied to the MENV, through the committees established under the JBNQA, for certificates of authorization for the sites located above the 55th parallel. In 1998, the Kativik Environmental Quality Commission exempted the project from the environmental and social impact assessment and review procedure. Following this decision, the MENV issued an exemption from the assessment and review procedure under section 192 of the *Environment Quality Act*, allowing clean-up work at the 35 sites north of the 55th parallel to proceed.

Also in 1998, the KRG applied for permission to carry out work at the seven Mid-Canada Line sites south of the 55th parallel. These sites are situated outside of the territory in which the KRG typically carries on its activities. The MENV responded officially to the KRG request, based on a recommendation made by the Evaluation Committee (COMEV), that the project be submitted to the evaluation procedure under Chapter 22 of the EQA. The response included a directive outlining the nature and scope of the impact study that the KRG would have to submit to the MENV for the seven sites. In 2002, the KRG submitted the impact study to the MENV. Following the COMEX recommendation, the MENV refused to authorize KRG to proceed with the proposed clean-up work at the seven sites south of the 55th parallel, although it authorized certain work for reasons of safety.

Sampling programs and Bio-Remediation Study

Prior to proceeding with clean-up work and remediation measures at the Mid-Canada Line sites, the contribution agreement partners agreed on a sampling strategy aimed at meeting the stated site rehabilitation objectives and complying with both federal and provincial environmental regulations. The purpose of the sampling strategy was to clearly identify the environmental problems and challenges at the sites, while maintaining a proper budget allocation between the characterization phase and the rehabilitation phase.

The sampling program involved the collection of samples of soil, surface water, paint flakes, as well as building and insulation materials for analysis purposes at sites 336, 339, 339A, 403 and 410.

Briefly, with regards to the analysis of PCB concentration, none of the water samples taken revealed these contaminants based on the nine analysis parameters. For its part, soil contamination varied with the site and was largely the result of residual hydrocarbons that had leaked from fuel tanks and barrels. A soil bio-remediation study was conducted and the process was demonstrated to be effective in relatively dry soil. In addition, samples of insulating material potentially containing asbestos were forwarded to a specialized laboratory and the results indicated that the samples contained 10–25% amosite (a type of asbestos) and 75–90% non-fibrous material. The results of this sampling program are described in the environmental and social impact study (Brunelle and Barrett, 2002b).

Clean-up Work

For rehabilitation purposes, the Mid-Canada Line was divided into two regions: the Kawawachikamach area in the east covers sites 215 to 312; the Whapmagoostui–Kuujjuarapik area in the west covers sites 315 to 410. Work under the second phase of the Mid-Canada Line Clean-up Project began in 1999 and was completed in December 2002. A description of the activities undertaken at the sites is provided in the following paragraphs.

Buildings: The buildings were examined to verify their structural condition and to ensure that they did not threaten public safety and health. Unstable structures and those considered dangerous were repaired and stabilized or demolished. Cables and metal rods which posed a potential danger to snowmobilers were cut and placed with other debris.

Paint scraped from the walls and other debris was placed in strong bags or barrels and stored in the equipment rooms that hold fire extinguisher canisters and electronic equipment. Broken windows were repaired with a type of Plexiglas, while doors were repaired or replaced with sheets of plywood. Whenever possible, doorways were not permanently blocked in order to preclude vandalism. Waste from any demolition work was piled neatly on the site.

Antennas: Antennas, which had been lowered to the ground when the sites were closed, were not dismantled, as they are generally bulky and can be seen by snowmobilers in winter.

Pipes, pumping station and metal frames: Pipes and pumping stations were inspected to ensure that there were no hydrocarbons or leaking present. Sections of pipes leading to lakes were dismantled and stacked with other waste. Metal frames, such as refrigerators, stoves, oil-burning heaters and so forth, were placed in waste disposal areas. Heavier frames, such as machinery, were left where they were found.

Generating units: The main buildings at the detection sites generally have three generators. Each generator is topped by an approximately 60-litre oil tank and equipped with a 20-litre pan to receive spent oil. The oil tank and pan were emptied and the oil was drained directly into easily transportable containers or barrels. Diesel tanks were checked for residual fuel and completely transferred into barrels.

Barrels and fuel tanks: Empty barrels scattered around the site were collected and stacked. Any barrels situated too close to a body of water were moved and stacked. Barrels that were not empty were opened and their contents examined.

All barrels containing hydrocarbons were removed from the sites by helicopter and sling, or by floatplane, and were transported to a transit site before being shipped (by airplane or truck) to an authorized recycling centre.

Debris:

a) Non-hazardous debris: Debris collected inside the main buildings was placed in strong plastic bags or barrels which were, in turn, stored out of the way in the equipment rooms. Bulky and heavy debris was left where it was found.

b) Hazardous debris: At the detection sites, batteries and mercury switches were removed from the main buildings, along with other hazardous materials (anti-freeze, solvents, etc.), to be transported from the site.

Mercury switches were carefully removed, placed in heavy-duty containers and, then, removed from the sites by helicopter or airplane. After being stored temporarily in Kuujuaq, the mercury switches were finally shipped to an authorized recycling centre.

Each of the 18 generator units possessed six batteries (54 units). Other, smaller and lighter, emergency batteries were also sometimes found in the main buildings. Placed in heavy-duty containers, the batteries and other hazardous materials were transported to a staging area, before shipment to an authorized recycling centre.

Contaminated soil

Searches for contaminated soil were conducted systematically at each site. First, the appearance and smell of areas bare of vegetation and strategic locations (near fuel tanks, barrels, buildings, equipment, etc.) were examined by digging holes with a shovel. If the smell of hydrocarbons was detected, the area was surveyed at several points, from its centre outwards, in order to determine the extent of the contamination and evaluate its size.

For each contaminated area greater than 1 m², bio-remediation work was performed, except where there was new growth, steep slopes, water-saturated soil, less than 15 cm of soil over bedrock or a stony substrate.

Information sign and first-aid kit

Information signs in five languages (Cree, Naskapi, Inuktitut, French and English), which provide a brief description of the clean-up project and indicate that any buildings may be used for survival purposes, were installed in one structurally sound building on each site. An emergency first-aid kit was also installed near each information sign.

Assessment of sites north of the 55th parallel

Certificates of completion were issued for the 35 sites located north of the 55th parallel, thereby completing the second phase of the Mid-Canada Line Clean-up Project. Table 1 provides a summary of the quantities (removed and remaining) of equipment, debris, hazardous materials, hydrocarbons and contaminated soil at the 35 sites north of the 55th parallel.

Assessment of sites south of the 55th parallel

In 2002, verifications and work to ensure public safety and environmental protection were carried out at sites 339, 403, 406 and 406A. No work was carried out at site 342, 409A or 410, although an on-site review was conducted at site 410. Table 2 provides a

summary of the quantities (removed and remaining) of equipment, debris, hazardous materials, hydrocarbons and contaminated soil at the seven sites south of the 55th parallel.

CONCLUSIONS AND RECCOMENDATIONS OF THE KEAC

In 2012, there remains a large quantity of buildings, fuel tanks, barrels and various kinds of debris at the sites located north of the 55th parallel. In addition, nearly 23% of the soil contaminated with hydrocarbons inventoried on these sites have not been bioremediated.

The Mid-Canada Line sites are of particular concern to Cree, Inuit and Naskapi communities who wish for the complete rehabilitation of the sites. Responsibility for this work rests with the DND, which abandoned materials at these sites, and with the Québec government, which owns the sites.

Even though the work carried out at the 35 sites situated north of the 55th parallel complies with the acceptance criteria established under the contribution agreement, the clean-up of these sites remains only partially complete. New agreements providing for funding and technical support between the groups and government departments concerned are needed. As well, supply sites, which are often adjacent to bodies of water, should receive special attention as these are zones used by Inuit, Cree and Naskapi. To this end, the KRG should begin discussions with the communities concerned and initiate negotiations with the governments regarding the completion of clean-up work to the satisfaction of the Inuit, Cree and Naskapi communities.

Until such clean-up work is completed, the condition of the sites will continue to deteriorate and eventually compromise public safety and environmental protection. A new and final phase of the clean-up project should therefore allow for the verification of building conditions and for necessary repairs or demolition work.

As well, approximately 16,000 empty barrels remain stacked at the sites. Some contain a certain amount of hydrocarbons that could not be recovered, but that could leak into the natural environment as rust eats away at the barrels. A new and final phase of the clean-up project should therefore provide an appropriate method for recovering these barrels as well as methods for recovering metal debris at the sites that may have value if recycled.

As was demonstrated through laboratory analysis and on-site tests at two sites, the effectiveness of bio-remediation work on soil contaminated with hydrocarbons was satisfactory. Bio-remediation work has also limited the spread of hydrocarbons, confining contamination to specific areas. A new and final phase of the clean-up project should therefore include additional bio-remediation work in large contaminated areas.

Finally, as various work must be performed to ensure the complete and final clean-up of the sites situated north of the 55th parallel, the KEAC would like the governments to initiate discussions with the KRG with a view to reaching a new agreement.

Table 1 Review of the quantities (removed & remaining) of equipment, debris, hazardous materials, hydrocarbons and contaminated soil at the 35 Mid-Canada Line sites north of the 55th p

Site no.	Equipment Remaining on Site					Debris* (m ³)	Hazardous materials removed			Hydrocarbons removed (L)				Soil (m ²)	
	Buildings	Generators	Empty fuel tanks	Barrels	Heavy equip.		Batteries	Mercury sw.	Others	Oil	Diesel	Grease	Others	Contaminated	Treated
215	1 + 1 shelter demolished	0	2	81	1 bulldozer	20+	0	8	tar	130	200	0	0	80	80
218	1	2	6	272	1 bulldozer	30+	8	3	-	140	375	0	25	25	25
218A	1 cabin demolished	n/a	10	705	-	34+	n/a	n/a	-	0	100	0	200	60	60
221	1	1	17	156	-	36+	18	15	-	120	500	0	0	25 + 25 on rock	23
221A	0	n/a	7	615	-	20+	n/a	n/a	-	200	1100	0	200	15	0 (drainage)
224	1	1	8	91	-	20	1 emergency	3	-	540	0	0	0	0	0
224A	1 shelter demolished	n/a	0	672	-	50+	n/a	n/a	-	0	0	0	0	25	25
227	1	0	2	70	-	undet.	0	0	-	0	0	0	0	0	0
227A	1	n/a	3	283	-	3+	n/a	n/a	-	800	2600	0	0	1	1
303	1	0	0	90	-	28+	3	0	-	0	0	0	0	137	137
303A	0	n/a	4	800	-	5+	n/a	n/a	-	0	0	0	0	10	6
306	2	3	9	332	1 snowmobile 1 Herman Nelson	undet.	18	16	-	100	0	0	0	120	120
306A	0	n/a	2	504	-	3+	n/a	n/a	-	0	0	0	0	5+	0 (drainage)
309	2	3	18	196	1 helicopter	5+	18	17	-	300	60	0	300	100+	100
309A	0	n/a	16	468	1 snowmobile	8+	n/a	n/a	-	0	0	0	0	22	12
312	2	3	9	196	1 bulldozer	35+	6	19	Anti-freeze, paint, Molybdenium Disulfide (200mL)	250	20	0	2	65	65
312A	1	n/a	7	708	-	3+ 15+	n/a	n/a	paint	0	0	0	600	48	48
315	2	3	9	126	-	and caulking	12	14	-	400	0	0	600	135	35
315A	1 + 1 cabin	n/a	7	525	-	undet.	n/a	n/a	-	0	40	0	600	7	7
318	2	3	9	400	1 muskeg	50+	13 + 4 emergency	10	-	240	0	0	0	100	56
318A	1 + 1 shed	n/a	7	915	-	undet.	n/a	n/a	-	0	0	0	130	49	45
321	2	3	3	63	1 helicopter	undet.	18	5	-	500	0	45	0	160	5?
321A	1 shelter demolished + 1 cabin	n/a	10	600	-	7+	n/a	n/a	-	0	0	0	0	43	43
324	2	3	9	489	-	20+	16	undet.	-	350	0	13	0	184	184
324A	(1 structure)	n/a	0	97	-	2+	n/a	n/a	-	0	0	0	0	0	0
327	2	3	13	1280	-	undet.	16	15	-	300	0	0	0	120	120
327A	0	n/a	9	200	2 muskegs	25+	n/a	n/a	-	0	850	0	0	115	11
330	2	3	9	530	-	undet.	18	4 + ?	-	355	150	20	30	285	168
330A	1	n/a	7	912	1 compressor 2 generators	undet.	n/a	n/a	-	0	400	0	400	3	3
333	2	3	14	1338	1 bulldozer 1 Herman Nelson	15+	8	6 + ?	Ethyl hydrate	300	85	0	0	180	142
333A	1 shelter demolished (+ 1 Cree camp)	n/a	10	449	2 muskegs	17+	n/a	n/a	-	0	400	0	0	55	55
336	2	3	9	1080	-	20+	20 + 2 small	5 + ?	anti-freeze, tar, paint	300	0	0	0	368	357
336A	1	n/a	7	245	1 generator	20+	n/a	n/a	-	362	400	0	180	8	8
339A	1 (+ 1 Cree cabin)	n/a	4	233	1 snowmobile 1 generator	55+	n/a	n/a	-	0	400*	0	0	150	150
403A	0	n/a	13	388	1 snowmobile	5+	n/a	n/a	-	0	0	0	0	4	0
Total	37 + 4 shelters demolished	37	269	16109	22	544+	173	114+	-	5687	7280	78	3267	2704	2091

* Estimate referring to the quantity of debris collected or total quantity (may be underestimated).

** Barrels left on-site at the request of the Cree and with MENV approval.

n/a: not applicable

undet.: undetermined

Table 2 Review of the quantities of equipment (removed and remaining), debris, hazardous materials, hydrocarbons and contaminated soil at the seven Mid-Canada Line sites south of the 55th parallel

Site no.	Equipment remaining on site					Debris* (m ³)	Hazardous materials removed			Hydrocarbons removed (L)				Soil (m ²)	
	Buildings	Generators	Empty fuel tanks	Barrels	Heavy equip.		Batteries	Mercury sw.	Others	Oil	Diesel	Grease	Others	Contaminated	Treated
339	2	3	11	955		20	6 (+2 emergency)	8 (+)	paint	170	205	0	0	452	0
342	1 foundation	0	0	≈500		200	0	?		0	0	0	0	15	0
403	1	3	9	≈500		30	not assessed	not assessed		not assessed	370	0	0	20	0
406	0	0	4	≈1200	Tractor	30	12	?		0	3895	0	0	105	0
406A	1 tin cabin	n/a	4	2	1 compressor 1 generator	5	n/a	n/a		0	0	0	0	0	0
<i>Subtotal</i>	4	6	28	≈3150	-	285	6 (+2 emergency)	8 (+)	-	170	4470	0	0	592	0
Site no.	Equipment remaining on site					Debris* (m ³)	Hazardous materials removed			Hydrocarbons removed (L)				Soil (m ²)	
Buildings	Generators	Empty fuel tanks	Barrels	Heavy equip.	Batteries		Mercury sw.	Others	Oil	Diesel	Grease	Others	Contaminated	Treated	
406B	0	n/a	0	218		10	n/a	n/a		0	0	0	0	not assessed	0
409A	10	n/a	4	≈500		not assessed	n/a	n/a		0	0	0	0	0	0
410	4		5 large 2 standard	≈500	2 Herman-Nelson chaudières	not assessed	4	not assessed	paint, asbestos	not assessed	not assessed	not assessed	not assessed	1043	0
<i>Subtotal</i>	14			≈1218		-	4	not assessed	-	not assessed	not assessed	not assessed	not assessed	1043	0
Total	18	6	28	≈4368	-	295 +	6 (+2 emergency)	-	-	170 +	4470 +	0 +	0 +	1635	0

* Estimate

: not applicable

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