



**ASSESSMENT AND REMEDIATION OF ABANDONED MINING EXPLORATION
SITES IN NUNAVIK**

**PROGRESS REPORT
FOR YEAR 2006-2007 OF THE PROJECT**

**Kativik Regional Government
Renewable Resources Department**

March 2007

PROJECT LEADERS AND TEAM MEMBERS

Kativik Regional Government (KRG)

Michael Barrett, Assistant Director
Renewable Resources Department
mbarrett@krg.ca

Caroline Larrivée, Land Use Planner
Renewable Resources Department
clarrivee@krg.ca

Jean-François Henri, Project Coordinator
Renewable Resources Department
tapirhenri@yahoo.ca

P.O. Box 9
Kuujuuaq (QC) J0M 1C0
Tel.: (819) 964-2961
Fax: (819) 964-0694

Naskapi Nation of Kawawachikamach

(Workers)
Peter Paul Mameanskum
Louis John Einish
Wabush Vollant
Patrick Nattawappio
(Cook)
Hannah Tooma Einish

Innu Nation of Matimekush-Lac John

(Workers)
George Jourdain
Benedic Mckenzie

Northern Village of Tasiujaq

(Workers)
Charlie Nayome
Joseph Kauki
Sandy Kritik

Northern Village of Aupaluk

Charlie Akapahatak
Etua Iggyogg

Acknowledgments

We would like to express our sincere gratitude to the Naskapi Nation of Kawawachikamach and the Innu Nation of Matimekush-Lake John for their participation in the second phase of the Blue Lake clean-up project. We also want to thank NORPAQ Air Charters as well as Adoschaouna Naskapi Services. Without their support and co-operation, the Blue Lake project would not have been accomplished successfully. We want to thank the communities of Tasiujaq and Aupaluk involved in the first phase of the clean-up project of site PJ-1. Finally, we would like to thank Chantale Côté, from Environment Canada, for her participation in the project.

As well, we would like to express our gratitude to Cruise North Expeditions for its contribution again this year in the clean up project on the PJ-17 site. Our sincere thanks go to Mr. Dougald Wells (CNE president), the crewmembers and all the voluntary participants who helped in the clean-up efforts for this site. We also want to thank the community of Aupaluk for their logistic support in the realization of this clean up work.

The Kativik Regional Government also thanks the mining exploration companies, Anglo American Exploration Canada and Canadian Royalties Inc., as well as Natural Resources Canada who carried out cleanup efforts and communicated relevant information to help validate the existence of abandoned mining exploration sites located in the Northern Quebec region. Finally, we thank all organizations and informants contributing to update the inventory and prioritization of abandoned mining exploration sites in Nunavik.

TABLE OF CONTENTS

1. Introduction.....	5
2. Contribution agreement.....	6
3. Clean-up project.....	6
3.1 Site KAW-35.....	6
3.2 Site PJ-1.....	12
3.3 Sites PJ-17 (CNE).....	20
3.4 Clean-up in the Akulivik area.....	22
4. Inventory up-date.....	22
4.1 Kangiqsujuaq-Salluit sector.....	23
4.2 Recommendations.....	26
5. Activities scheduled for year 4.....	26
6. References.....	27

LIST OF FIGURES

Figure 1 Location of site KAW-35

Figure 2 Location of site PJ-1

Figure 2 Location of site PJ-17

LIST OF TABLES

Table 1 - Hazardous material collected and removed from the Blue Lake (KAW-35) site

Table 2 - Detailed expenditures for the fieldwork carried out on site KAW-35

Table 3 - Hazardous materials collected and stored on PJ-1 site

Table 4 - Assay results of soil samples collected on site PJ-1

Table 5 - Remaining hazardous materials on the PJ-1 site

Table 6 – Detailed expenditures for the remediation work carried out on site PJ-1

Table 7 - Hazardous and residual materials collected from PJ-17 site

Table 8 - Abandoned mining exploration sites in the Kangiqsujuaq-Salluit sector

Table 9 – Estimation of expenditures for 2007-2008

LIST OF APPENDICES

Appendix A - Pictures of remedial measures at site KAW-35

Appendix B - Pictures of remaining material and installations at site KAW-35

Appendix C - Pictures of remedial measures at site PJ-1

Appendix D - Pictures of remaining material and installations at site PJ-1

1. INTRODUCTION

This progress report describes the activities carried out as a follow-up to the *Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik* study conducted by the Kativik Regional Government (KRG) and Makivik Corporation in 2001-2002. The study revealed that there remain hundreds of non-validated abandoned mining exploration sites in northern Quebec. The four-year contribution agreement with Environment Canada will make it possible to complete the assessment of these sites. The methodology for this project is the one recommended in the March 2003 report.

Following the recommendations stated in the KRG's two-year inventory report, a work plan was prepared and conducted on two major abandoned mining exploration sites: the site KAW-35, located in the Schefferville area on the shores of Blue Lake, and the site PJ-1 located almost mid-way between the northern communities of Tasiujaq and Aupaluk. These sites were validated and characterized as major sites with a high prioritization for rehabilitation. Clean-up procedures were established and equipment purchased to carry out the restoration of these sites. This report describes all the clean-up measures carried out on the sites during summer 2006. These pilot projects are the initial phases to a more ambitious clean-up project of abandoned mining exploration sites found throughout the Northern Quebec territory.

An up-date to the inventory of abandoned mining exploration sites was done during the 2006 work season. Local informants had indicated hundreds of potential abandoned mining exploration sites during the 2001-2002 assessment and a subsequent site assessment phase, carried out during summer 2006, consisted of validating the information regarding some of these potential sites. New potential sites were also validated with the collaboration of currently active mining exploration companies and organizations working in Nunavik.

The report also presents the work planned for the 2007-2008 period of the four-year project as well as recommendations for further clean-up activities of such contaminated sites in the region.

2. CONTRIBUTION AGREEMENT

In December 2004, the KRG signed a four-year contribution agreement in the amount of \$152,000 with Environment Canada (EC) through its Northern Ecosystems Initiative program. Before March 2008, both parties agree to (see objectives):

- increase awareness on the impacts of contamination to northern ecosystems and promote the capacity of northern communities to play an active role in related research and remediation activities;
- participate in field assessments and complete the inventory and characterization of the abandoned mining exploration sites located north of the 55th parallel to provide an overview of the current situation;
- evaluate the direct and cumulative impacts of the abandoned mining exploration sites, make recommendations and develop remedial measures to minimize those impacts to environment and public health.
- respond to the requests made by Inuit, Naskapi and Innu communities to assess the environmental impacts of abandoned mining exploration sites in Northern Quebec.

An amount of \$50,000 was available in the 2006-2007 year to complete validation work on major and intermediate sites and continue the clean-up work of certain major sites on a pilot project basis.

3. CLEAN-UP PROJECT

This section presents the fieldwork carried out on the KAW-35 and the PJ-1 sites. It also provides a summary of additional clean up work, performed during summer 2006, on other abandoned mining exploration sites located in Nunavik.

3.1 Site KAW-35

The site KAW-35 is located on the shores of Blue Lake at about 65 km E-N-E of the community of Kawawachikamach (see Figure 1). The site was assessed during the 2001-2002 inventory project and designated as a priority for cleanup according to the content of the material found, the level of contamination and the threat posed to the surrounding environment. A pilot project to clean up the site and verify methodological procedures and rehabilitation measures was initiated in 2004. For more information on the site (background, etc.), please refer to the project progress report for 2005-2006.

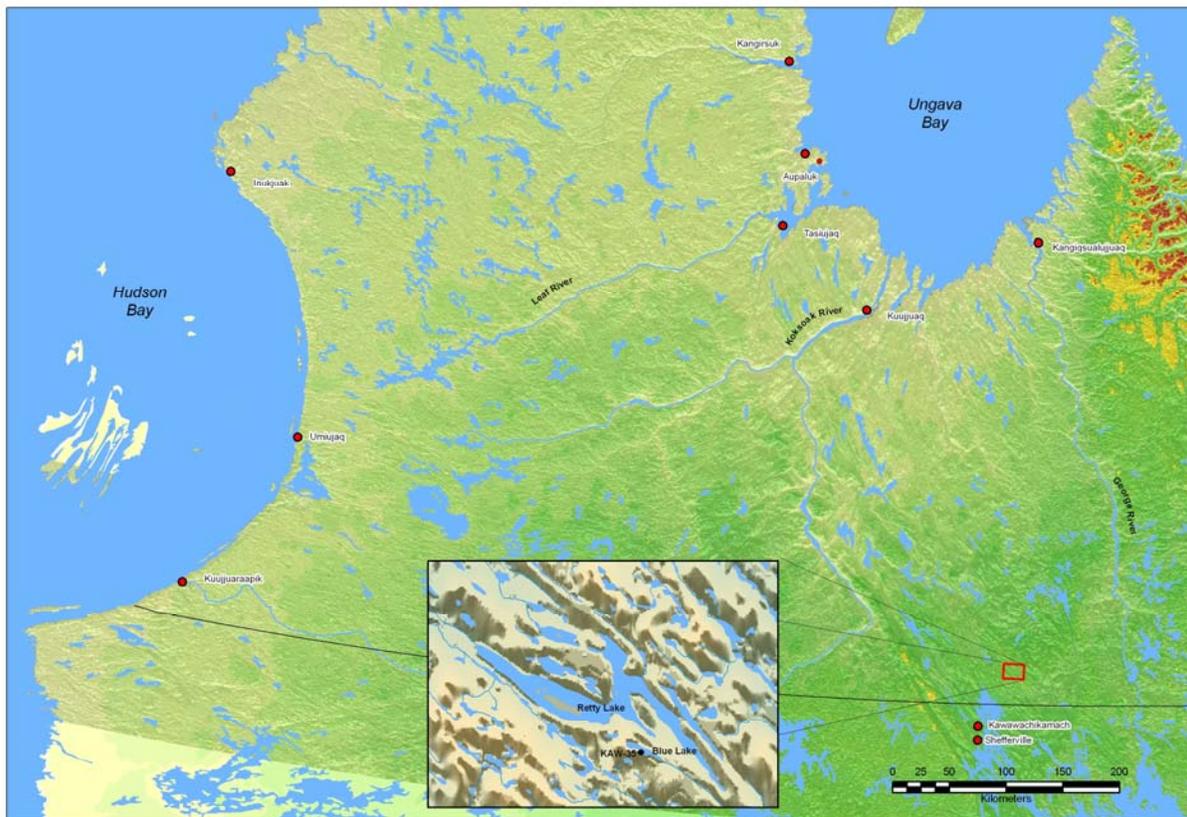


Figure 1 Location of KAW-35 site

Coordination of fieldwork

The first phase of the pilot project was conducted in 2005. A total of 1,640 litres (8 barrels) of diesel and 1,435 litres (seven barrels) of Jet-B fuel were collected and removed from the site. The team also collected various hazardous materials scattered throughout the site. Along with the hydrocarbon residues contained in barrels, solvent products, batteries, HF acid containers, corrosive acids, oil filters, paints and spray cans were carefully taken out of the site and transported to an authorized disposal centre in the south of the province.

The work plan for the 2006 fieldwork was based on the recommendations proposed in the 2005-2006 progress report. The second phase of this pilot project consisted principally in collecting and removing all the remaining hazardous material present on the site. Another objective was to remove as many scattered barrels as possible within the time spent on site. The coordination of the pilot project involved a team of five people hired within the Naskapi community of Kawawachikamach and two from the Innu Nation of Matimekush-Lake John for a total of 8 workers on site, including the project co-ordinator. The team carried out an 18-day field campaign, between July 6th and July 23rd 2006.

Hazardous material

Barrels that still contained hydrocarbon (diesel and Jet-B fuel) residues were opened and their contents transferred into watertight barrels for removal from the site by floatplane. In total, approximately 200 barrels from sector 1 on the shores of Blue Lake and roughly 150 scattered barrels inland (sector 2: N 55° 13.70' W 66° 07.42') were collected.

A total of 820 litres (four barrels) of diesel and 410 litres (two barrels) of Jet-B fuel were collected and removed from the site. Approximately 100 litres of diesel was recovered from the 4,400 litre generator reservoir. Proper equipment and safety procedures were used while handling the barrels and transferring the hydrocarbons in new drums.

The work team also collected various hazardous materials present on the site. Along with the hydrocarbon residues contained in barrels, hazardous material gathered in the previous year fieldwork (chemicals products, batteries) was collected, placed in safe containers, properly packaged and identified for their definitive removal from the site. All the hazardous material handling and packaging was done under the supervision of the project co-ordinator and with the collaboration of NORPAQ Air Charters for IATA air regulation. Under the supervision of Adoschaouna Naskapi services, all hazardous material was properly identified following Transport Canada regulations for transportation from Schefferville to Sept-Îles by train. Appropriate environmental clean-up measures were carried out during every step of hazardous materials handling and management.

Residual material (barrels)

Once the barrels were emptied, they were “de-headed”, washed and decontaminated with a sodium carbonate/sodium metasilicate solution (VYTAC ACX product) and chemical absorbents. The clean barrels were cut in half, stowed (four barrels in one) and taken out by floatplane. A total of 308 empty barrels were moved out from the KAW-35 site to the Adoschaouna storage site in Schefferville before being definitely transported to an authorized treatment facility in Sept-Îles.

All the hazardous and residual materials collected and removed from the KAW-35 site are listed in Table 1. Appendix A of this report presents pictures from the field campaign.

TABLE 1
Hazardous materials collected and removed from the Blue Lake (KAW-35) site

Product	UN identification	Quantity	Container
Ethylene glycol	UN 1170	2X 20L	Sealed plastic container (original)
Batteries (electrolytic acids)	UN 2794	4 X (2 cubic feet)	Wooden palette with chemical absorbents
Terpinolene	UN 2541	1X 20 L	Sealed plastic container (original)
Diesel	UN 1202	4 X 205L	Metallic barrels
Gas	UN 1203	2 X 205L	Metallic barrels
Empty barrels		308	n/a
Oil filter		10	Sealed plastic container

Transportation, storage and elimination of hazardous materials

All hazardous material was transported out of the site by floatplane to Schefferville where it was temporarily and securely stored at the Adoschaouna site before being brought by train to a treatment facility in Montreal (Appendix A, photos 12-14). A *Shipper's declaration of dangerous goods* form was attached to the hazardous materials, in accordance with the applicable Dangerous Goods regulation.

An authorized treatment centre, Onyx Industries Inc., was contacted and informed of the nature and quantity of hazardous materials collected on site. The material left Schefferville by train to Sept-Îles and was sent to the company's treatment centre in Montreal. Hydrocarbon residues contained in barrels were kept in Schefferville to be filtered and re-used by Adoschaouna as furnace fuel.

Contaminated soil remediation

Bio-remediation was not applied on the contaminated zone (samples S-2, S-3) identified during the 2005 field campaign. The zone corresponded to the area under the generator reservoir where the assay results showed concentrations exceeding the C₁₀-C₅₀ concentrations limit for residential land use (Rf.: *Règlement sur la protection et la réhabilitation des terrains*, Gouvernement du Québec). The soil was less than 15 cm over the bedrock or stony substrate. The soil was also rocky (50% stone and rock) and too difficult to manipulate without machinery.

Safety

Worker safety was the primary concern during the project. Workers received a health and safety training before beginning the clean-up work.

Unstable or dangerous components, such as metallic antennas, suspended wires and stairs were demolished. These structures were almost all part of the housing trailers located in sector 1 of the site. They no longer pose a threat for public safety.

Non-hazardous debris

Metallic and non-combustible debris was collected and piled in various places on-site. Bulky and heavy debris was left where it was found. Some combustible debris was burned on site following MENV regulations.

Recommendations

As per the terms and objectives set out in the contribution agreement with Northern Ecosystems Initiative, the pilot project for the rehabilitation of KAW-35 site is complete. Nevertheless, despite the work carried out during the 2005 and 2006 campaigns, its remediation is not entirely complete. If some additional work was to be undertaken in the future, the following recommendations should be respected.

There are presently 20 barrels filled with barrel tops, ready to be taken out by floatplane or moved to the non-combustible material deposit. Some barrels (+/- 30) can be found scattered on site as their removal would not have been safe. These barrels potentially contain a certain amount of hydrocarbon residues. Any additional hazardous products found on site would have to be taken out and sent to a treatment centre.

The condition of the buildings on-site is still poor, in deterioration and could eventually lead to issues of public safety. A future phase of clean-up measures on this site could involve the stabilization and/or demolition of these structures. All metallic and non-combustible debris could also be collected and placed in the non-combustible material deposit. Finally, any remaining combustible debris could be burned on site according to Environment Québec regulations. Pictures showing remaining materials and structures on site are presented in Appendix B.

Project expenses

Table 2 presents an account of the expenses related to this pilot project.

TABLE 2
Detailed expenditures for the fieldwork carried out on site KAW-35
(period July 6 to July 23rd, 2006)

REVENUE	NEI	Total
NEI	\$31 190	\$31 190
EXPENDITURES		
Salaries		
7 technicians @ 160\$X18 jours	\$1 280	\$20 160
Project coordinator	\$5 320	\$13 320
Equipment (purchase)		
(tools, material, campign supplies, ...)	\$1 800	\$1 950
Equipment rental		
(tents, generator, Honda, ...)	\$2 700	\$6 700
Supplies (food)	\$2 400	\$4 285
Fuel	\$1 390	\$1 510
Transportation logistics	\$11 800	\$21 800
Transportation of hazardous material		\$1 750
Disposal of hazardous material (Onyx Ind.)		\$425
Travel expenses	\$3 000	\$7 030
Report production	\$500	\$1 000
Communication	\$500	\$500
Administration	\$500	\$500
Total expenses	\$31 190	\$80 430

3.2 Site PJ-1

The site PJ-1 is the largest abandoned site found during the inventory work in 2001-2. Also identified as TQ-20, P-24K/13-3 and G-24/13-4 by the GÉTIC (Duhaime and Comtois, 2002), it is located between Leaf Bay and Lac aux Feuilles, almost mid way between the communities of Aupaluk and Tasiujaq (see Figure 2). The site was designated as a priority for rehabilitation because of the threat posed for public safety and environmental health based on the content of the material and the state of the structures present.

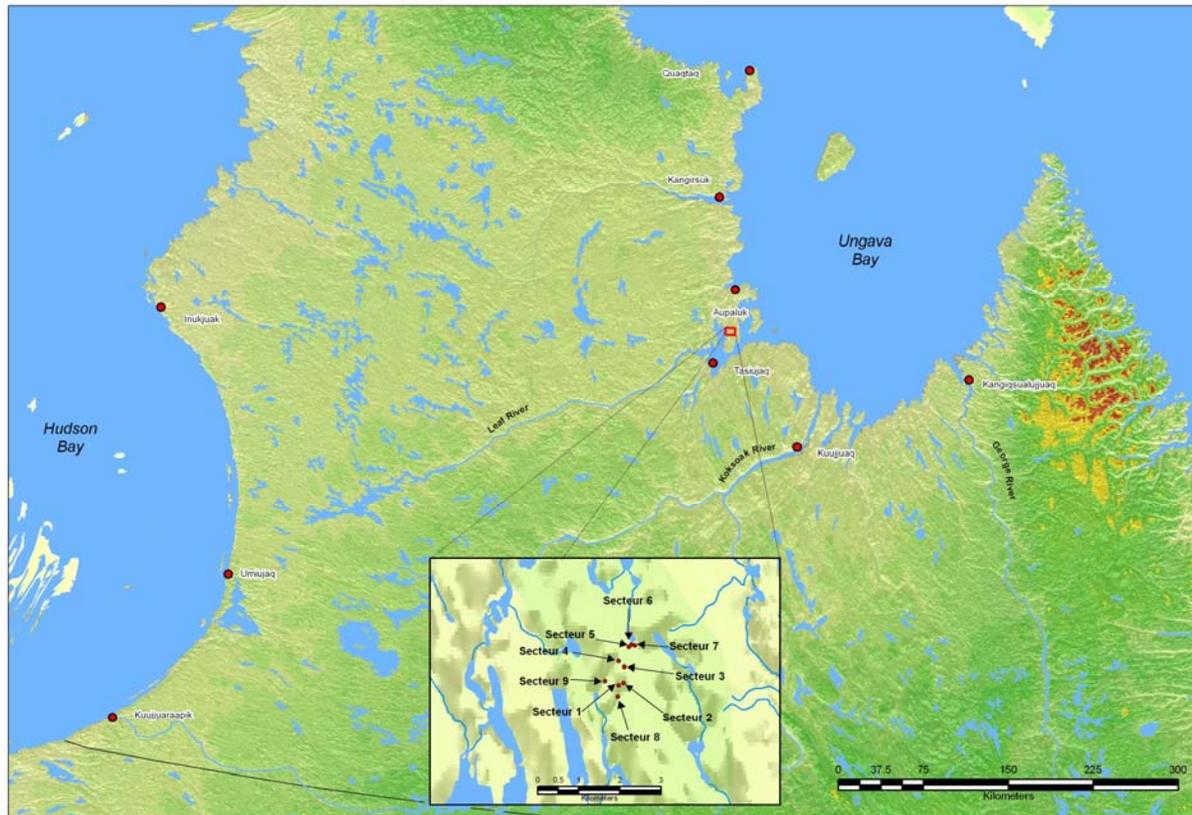


Figure 2 Location of PJ-1 sites

Background

The site was not merely an exploration site but at the hub of mining activities in the region. It included a mining gallery and tailings at the time the mining company went bankrupt. It is a very large site, covering more than 3 km² and is made up of nine sectors including an area for mining exploitation, another for ore segregation, living quarters, a chemical storage area and some waste disposal sites.

In addition to the presence of heavy equipment (bulldozers, truck, crushers, etc.) there are also a lot of pipes, metal parts, core trays, rubber hoses, ten 40K litre diesel tanks, 2 transformers, 20

batteries, pails of grease, many barrels still containing approximately 2,500 litres of diesel as well as a wide variety of waste.

This site was abandoned without any restoration although the Québec government, through its Natural Resources and Wildlife department has jurisdiction over the site. This year, the Department provided financial support to help initiate clean-up work on a pilot project basis. The funding covered expenditures such as salaries, transportation to and from the site as well as material needed to conduct clean-up work.

Coordination of clean-up measures

The work plan was based on the inventory work done in 2001-2002, considering the nature and quantity of material and debris found on-site. The first phase of this pilot project consisted in assessing the extent of the clean-up required and its feasibility. In addition to assembling the hazardous materials to store them properly on site, the fieldwork consisted in gathering as many of the scattered barrels as possible. The work also consisted in securing any hazardous structures and beginning soil remediation for contaminated areas.

The fieldwork for site PJ-1 involved a team of three people hired within the Inuit community of Tasiujaq and two from the community of Aupaluk for a total of six workers on site including the project coordinator. The project was conducted over 18 days between August 8th and August 25th 2006.

Hazardous materials

Barrels that still contained hydrocarbons or residues (diesel, oil and anti-freeze) were opened and their contents transferred into watertight barrels for removal from the site. A total of 615 litres of diesel (three barrels), 405 litres of anti-freeze (two barrels) and 1,435 litres of motor oil (seven barrels) were collected and stored on site. Proper equipment and procedures were used while handling the barrels and transferring the residues into new drums.

The team also collected various hazardous material scattered throughout the site. Along with the residues contained in barrels, pails of lubricant, batteries, lithium grease tubes, oil filters, paints and spray cans were carefully collected and safely stored on-site. Batteries were also removed from three generator units located in sector 4. Appropriate measures were applied during every step of the handling and management of this material. Subsequent clean up efforts would require proper packaging, labelling and transportation of this material to an authorized disposal centre. The hazardous materials collected from sectors 4, 5 and 6 were temporarily stored on site in a wooden shed near the house trailers in sector 5.

Residual material (barrels)

Once the barrels were emptied, they were “de-headed”, washed and decontaminated with a sodium carbonate/sodium metasilicate solution (VYTAC ACX product) and chemical absorbents. The barrels collected from sectors 5 and 7 were cleaned, cut in half, stowed (three barrels in one) and piled on site. Barrels from sector 4 were cleaned and piled together but not cut. A total of 170 empty barrels were opened, cleaned and piled on site.

All the hazardous and residual materials collected and stored from the PJ-1 site are listed in Table 3. Appendix C of this report presents pictures from the field work.

TABLE 3
Hazardous materials collected and stored on PJ-1 site

Product	UN identification	Quantity	Storage location
batteries (electrolytic acids)	UN 2794	4 X (2 ft ³) 8 X (1 ft ³)	staging area (sector 4)
lithium grease tubes	UN 1415	50	wooden shed (sector 5)
threading oil	UN 1202	1 X 4L	wooden shed (sector 5)
spray cans (3 X engine starting liquid 1 X paint)	UN 1950	4 x 1L	wooden shed (sector 5)
propane (full or half full)	UN 1978	18	sectors 4 and 5
diesel	UN 1202	3 X 205L	sector 4
motor oil	UN 1202	7 X 205L	sectors 4 and 5
clean empty barrels		167	sectors 4-5-6
oil filters		15	wooden shed (sector 5)
oil filters		30	staging area (sector 4)
extinguisher		16	wooden shed (sector 5)
pails of lubricant		11 X 20L	wooden shed (sector 5)
antifreeze		2 X 205L	sector 4

Transportation, storage and elimination of hazardous materials

All of the hazardous material collected has been securely stored on site but will ultimately have to be taken out. Fourteen of the used batteries collected from sector 4 have already been transported to the village of Tasiujaq by helicopter and transported by sealift to an authorized hazardous waste management centre in southern Quebec (Appendix C, photos 12-17). The batteries left Tasiujaq by sealift to the port in Sainte-Catherine and were brought to Onyx Industries' treatment facility in Montreal. Residues contained in barrels were kept on site but should also be taken out. Some residues are still in their original barrels and will have to be transferred to watertight drums prior to any transportation or manipulation.

Contaminated soil remediation

Bio-remediation efforts were conducted on two contaminated zones (PJ1-13, PJ1-20) which were identified during the 2001-2002 assessment. These two areas presented high levels of hydrocarbon (C₁₀-C₅₀) and APH (aromatic polycyclic hydrocarbons) concentrations. The work consisted in turning the contaminated soil with a shovel, and adding and mixing into the soil substances that accelerate the breakdown of the hydrocarbons. The substances employed were fertilizers, dolomite lime and organic material consisting of vegetation or moss found on site. The quantities employed were approximately 0,1 kg/m² of fertilizer, 0,5 kg/m² of dolomite and approximately 1kg/m² of sphagnum or moss. (Appendix C, photo 18, 19).

Soil sampling

At the end of the field campaign, three soil samples were collected at depths varying between 0 to 10 cm (PJ-13-2A, PJ-20-2) and 10 to 20 cm (PJ-13-2B). These samples still showed significant levels of contamination, above regulation standards ranging from 110,000 to 170,000 mg/kg (Rf.: *Règlement sur la protection et la réhabilitation des terrains*, Gouvernement du Québec).

Soil samples were taken according to the CCME (1993) and MDDEP (2001) guidelines. Quality control analyses respected Environment Canada guidelines. A certified private laboratory (Maxxam Analytic inc.) completed the analyses. The 2006 analysis results reveal a C₁₀-C₅₀ concentration average 40 % lower than the results from the 2001-2002 assessment. Table 4 presents the results from the various analyses.

TABLE 4
Assay results of soil samples collected on site PJ-1

<i>date</i>	<i>ref. #</i>	<i>location</i>	<i>sample</i>	<i>depth (cm)</i>	<i>parameters</i>	<i>results</i>	<i>MDDEP criteria</i>	<i>C10-C50 Δ 2002-2006</i>
23/08/ 2006	PJ1-13-2A	sector 4	sector 4 S-W section near drums, wooden boxes	0-10	C ₁₀ -C ₅₀	110,000	3,500**	54%
		58° 58.21'N						
	Maxxam: 06-2100	69°35.61'W			2-méthyl- naphthalen e	11	10**	
23/08/ 2006	PJ1-13-2A	sector 4	sector 4 S-W section near drums, wooden boxes	0-20	C ₁₀ -C ₅₀	120,000	3,500**	50%
		58° 58.21'N						
	Maxxam: 06-2101	69°35.61'W			2-méthyl- naphthalen e	2	1*	
23/08/ 2006	PJ1-20-2	sector 6	sector 6 soil under pails of lubricant	0-10	C ₁₀ -C ₅₀	170,000	3,500**	23%
		58° 58.24'N						
	Maxxam: 06-2099	69°35.54'W			Chrysene	7	1*	

Measured parameters: Petroleum products (C₁₀-C₅₀), APH (aromatic polycyclic hydrocarbons).

* Results exceeding the limit for residential land use (Rf.: *Règlement sur la protection et la réhabilitation des terrains* du Gouvernement du Québec).

** Results exceeding the limit for residential and commercial land use (Rf.: *Règlement sur la protection et la réhabilitation des terrains*, Gouvernement du Québec).

Safety

Workers' safety was the primary concern during the project. Workers received a health and safety training before commencement of the work.

Three mine shafts, located in sector 1 and leading to the main mining gallery, were closed with temporary fences. Two of the shafts were closed with steel and wood structures founded on site. The main gallery was completely closed off with wood and secured with a steel fence.

The main kitchen trailer was cleaned and repaired at the beginning of the fieldwork. Broken windows and doors were repaired or replaced while waste collected inside was piled neatly outside with other debris. The trailer was used during the field campaign as a lunch room area. Appendix C of this report presents pictures of the fieldwork.

Non-hazardous debris

Metallic and non-combustible debris was collected and piled in various areas on-site. Metal parts and rusted barrels were removed from lakeshores and ponds. Bulky and heavy debris was left

where it was found since no equipment was available to remove it. Some combustible debris was burned on site according to MDDEP regulations.

Recommendations

The clean up efforts carried out on site PJ-1 in August 2006 served to assess the extent of the work needed to fully remediate the site and evaluate the feasibility of such a project. It also served to begin remediation of the site by assembling together and properly storing on site some of the hazardous products.

There are presently twelve barrels full of oil, diesel and anti-freeze properly stored on site in watertight drums. These barrels will eventually have to be removed from the site. There are also 170 clean barrels piled on site (sectors 4, 5 and 6) and ready to be moved to a non-combustible deposit. Approximately 240 additional barrels are scattered throughout the site in sectors 1, 2, 3, 8a, 8b and 9. These barrels still contain a certain amount of residues that weren't removed during the field campaign. These would have to be gathered, cleaned and taken out of the site. All other hazardous material should be transported to an authorized disposal facility for treatment. Table 5 describes what materials remain on site. Appendix D presents the pictures showing this material.

**TABLE 5
Remaining hazardous materials on the PJ-1 site
(from the KRG 2001-2002 assessment)**

Product	UN identification	Quantity	Sector/location
batteries (electrolytic acids)	UN 2794	3	8b
paints	UN 1263	3 X 4L	2
grease	UN 1415	1 X 2kg	2
liquid carbonic		4 big tanks	4
propane tank	UN 1978	1	8a
first aid kit with peroxide		1	8a
oil filters		36	1,2,3,9
scattered barrels (residues)		241	1,2,3,8a,8b,9
fire extinguishers		4	8b

The condition of the three shafts leading to the main gallery is still poor but no longer presents any serious hazard for public safety. The fences and structures installed during the fieldwork

remain temporary and should be reinforced during the next phase of the clean-up. The main gallery itself was secured and poses no threat for public safety.

The condition of the buildings and dwellings is also still poor. The structures will continue to deteriorate and could pose problems in terms of safety. The next phases of the project should also include the stabilization and/or demolition of these buildings. All metallic and non-combustible debris should be collected and assembled together in a non-combustible material deposit. The disposal site will have to be established according to government regulations (*L.R.Q. c. Q-2, r.3.2*). Soil remediation should be continued on the PJ1-13 and PJ1-20 areas, as well as the other contaminated areas identified in the KRG 2001-2002 report. Finally, any debris burning on site must be done in accordance with MDDEP regulations.

Equipment will be needed on site to handle some of the material and an ATV is essential to transport the material on site, because of the distance and the topography between sectors. For example, the distance between the current base camp (sector 5) and sector 8 is approximately 1.5 km. The base camp may have to be relocated to sector 8 to perform work on sectors 8 and 9 (refer to Figure 2). Removing the residues from the site to the closest village could also be done by snowmobile during the winter.

Project expenses

Table 6 presents an account of the expenses related to this pilot project.

TABLE 6
Detailed expenditures for the remediation work carried out on site PJ-1
(period August 8th to August 25th 2006)

REVENUE	NEI	Total
NEI	\$16 500	\$16 500
EXPENDITURES		
Salaries		
5 technicians @ 160\$X18 jours		\$14 400
Project coordinator	\$5 320	\$13 500
Equipment (purchase)		
(tools, material, campign supplies, ...)	\$2 000	\$3 100
Equipment rental		
(tents, generator, Honda, ...)		\$600
Supplies (food)	\$1 670	\$4 500
Fuel	\$2 930	\$3 000
Transportation logistics		\$18 050
Transportation of hazardous material	\$1 450	\$1 750
Disposal of hazardous material (Onyx Ind.)		\$500
Travel expenses	\$1 630	\$5 100
Report production	\$500	\$1 000
Communication	\$500	\$500
Administration	\$500	\$500
Total expenses	\$16 500	\$66 500

3.3 Sites PJ-17 (CNE)

During the period of September 5th to 11th, 2006, Cruise North Expeditions (CNE), with the collaboration and support of Makivik Corporation, the KRG and the community of Aupaluk, conducted clean-up activities of one site designated as major and located close to the village of Aupaluk. The initiative was a voluntary contribution from the CNE personnel, the *M/V Lyubov Orlova* crewmembers and the passengers representing corporate sponsors participating in the cruise expedition.

The site PJ-17, designated as major (KRG, 2001-2002), is located in the Hopes Advance Bay about ten kilometers north-west from the community of Aupaluk (see Figure 3) at Merganser Point. This well known site, used as a base by the “Ungava Iron Ores Company”, was the most accessible for the cruise vessel due to its location near the shoreline. Some hazardous and residual materials collected from the site were loaded onto the CNE vessel where they were securely stored and transported to a treatment centre for proper disposal.

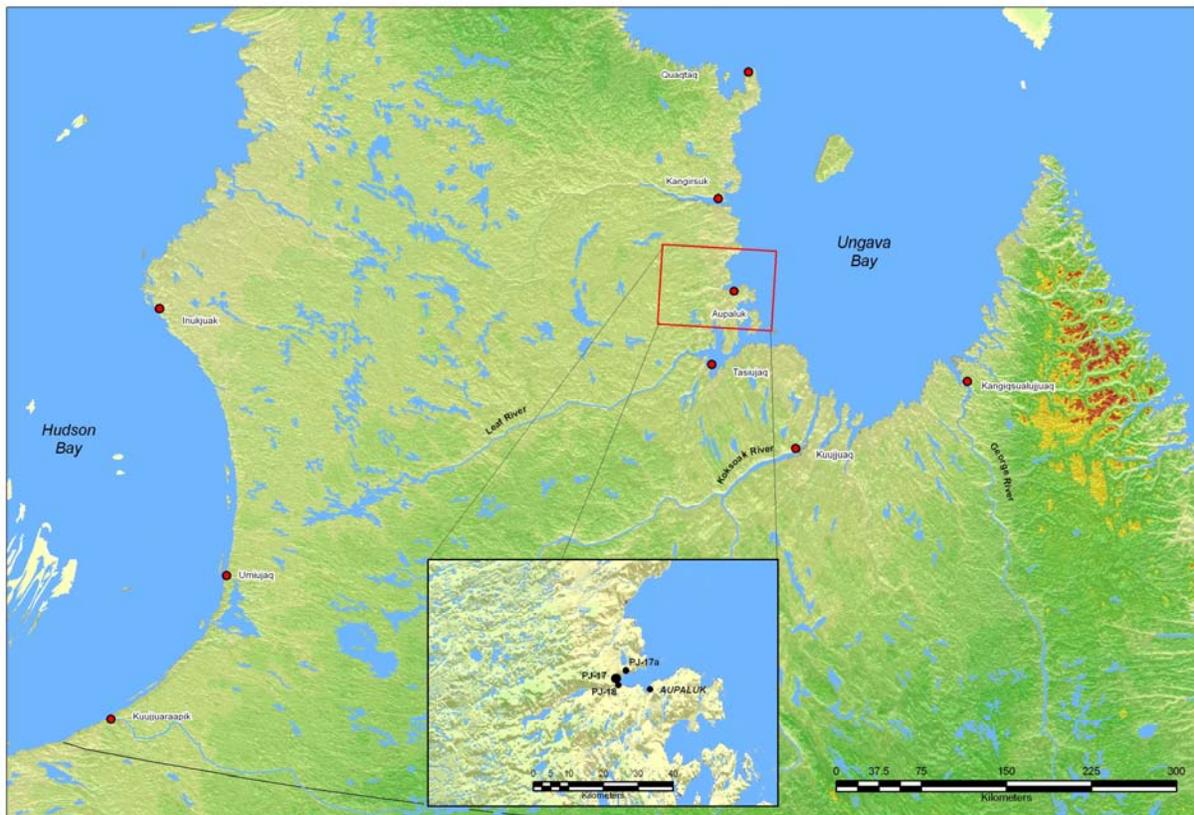


Figure 3 Location of PJ-17

Coordination of remedial measures

A total of 18 people participated in the clean-up efforts and managed to remove a significant quantity of waste, some hazardous, from three distinct sites. Please refer to the KRG inventory report for a complete description of the sites.

Approximately 80% of the area was “swept” by hand, with approximately eight cubic metres of waste material collected into five separate piles, and filling about 30 empty barrels with scrap materials to facilitate future disposal. This work included:

- the dismantling of two 30ft antenna towers into sections and salvaging a large coil of stainless steel cable;
- transportation of all this material to tidewater, for re-use by the community of Aupaluk;
- taking down a power pole with a large transformer attached;
- collecting, coiling and securing about 500ft of waste cable; and
- burning scrap wood and paper.

Table 7 presents the list of material removed from the site.

TABLE 7
Hazardous and residual materials collected from PJ-17 site

Designation	Quantity	Notes
45 gallon barrels (205 L)	142	3 barrels with diesel residues
Batteries (truck)	6	
Propane tanks	6	2 partially full of propane
Metal debris, misc.	2 m ³	collected in ten 205 L barrels

A significant amount of waste remains at this site, including:

- 1 building (17' x 10' standing wood structure)
- 1 truck
- 8 motors
- 2 sled/runways
- 2 large steel trailer rollers
- 1 transformer
- 80 – 45-gal. drums filled with creosote or similar product, dried and hardened to rock
- 30 – 45 gal. drums filled with scrap materials, including steel, glass and roofing shingles
- 26 propane tanks, and a further 10 or so cubic meters of scrap metal, mostly located inside the building

All of the waste collected from these sites was loaded onto the ship using zodiac boats, and transported to Europe for proper disposal.

3.4 Clean-up in the Akulivik area

In the fall of 2004, Qekeirriaq Landholding Corporation (LHC) of Akulivik and Anglo-American Exploration Canada validated an abandoned site located about 75 kilometres east of the village of Akulivik. The site was classified as a major site and designated as NEW-1 in the March 2005 progress report for this project. Inscriptions found on the barrels indicated that they had been left in the area during a geodesic survey conducted by Natural Resources Canada (NRCan) in 1984.

In January 2005, the Qekeirriaq LHC sent pictures to the KRG's Renewable Resources Department showing the material found on site and provided the precise geographic coordinates (61°06.50N 76°59.60W). An assessment of the site indicated several types of debris scattered near sources of water. A visit to the site in 2005 by KRG representatives showed that some barrels containing airplane fuel were beginning to leak and contaminating the adjacent streams. The LHC was very concerned by the existence of this site and the impacts of contamination on the environment and wildlife populations.

In 2006, Qikiqtaaluk Environmental inc. (QE) was mandated by NRCan to undertake an environmental site assessment (ESA) and proceed with the removal of waste material from the site.

4. INVENTORY UP-DATE

The following section presents the up-dated information on abandoned sites and the status of already assessed sites in the Kangiqsujuaq-Salluit sector. The coding for the potential sites (K-55...) originates from the 2002 GETIC inventory report. Each code represents the informant's village (abbreviation) or National Topographic System (NTS) code followed by a chronological number. The potential site locations and coding of the GETIC report correspond accurately to the locations designated by the informants during the two-year inventory project conducted by the KRG.

With the help and collaboration of organizations working in Nunavik and currently active mining exploration companies, particularly in the Kangiqsujuaq-Salluit sector (also known as the Ungava Trough), a validation of the few remaining potential abandoned sites was conducted.

The mining exploration companies, governmental organizations, and charter companies contacted for this information include:

- **Environmental Services of Raglan**
- **Xstrata corporate, nickel group, Exploration Department**
- **Novawest Resources Inc.**
- **Anglo-American Exploration Canada**
- **Canadian Royalties Inc.**
- **Cruise North Expeditions (CNE)**
- **Ministère des Ressources naturelles et de la Faune du Québec**

4.1 Kangiqsujaq-Salluit sector

Status of sites located on Xstrata nickel mining properties.

During summer 2006, Xstrata sent the KRG a list of the abandoned sites present on their exploration mining properties. Some of the sites assessed as potentially abandoned proved to be located inside the mine's active sites (open pit). The sites listed in Table 8 are not exhaustive. Activities to complete the characterization and prioritization of the abandoned sites will be on-going until the end of the project.

Xstrata also provided updated information regarding clean up efforts carried out by the company on their mining properties in 2006. Twenty barrels (three full of diesel) and debris (metal, wood, plastic, etc.) were collected and removed from the site P-35H12-2000.

Status of sites located on Canadian Royalties inc. mining properties.

In October 2006, Canadian Royalties provided updated information regarding clean up efforts carried out on orphan sites located on their mining properties for the 2006 period. These sites were validated during previous assessment or validation work and are presented in Table 8.

TABLE 8
Abandoned mining exploration sites in the Kangiqsujuaq-Salluit sector (updated as of Fall 2006)

Validated potential sites on Xstrata's properties

Site code	Location					Classification	Description
	Map	Grid	Zone	Coordinates (E and N)			
P-35G06-1	35G06	UTM	18	484250	6816000	minor	Old camp (1960's) mostly debris
P-35G06-3	35G06	UTM	18	498130	6813200	minor	Mostly debris
K-55	35H06	UTM	18	606476.012	6800844.250	No debris	
K-54	35H07W	UTM	18	607210.545	6801544.755	No debris	

Cleaned abandoned sites on Xstrata's properties

I-14	35H11	UTM	18	595000E	6827300N	cleaned by Xstrata	
<u>G-35G08-1001</u>	35G08	UTM	18	529640	6816850	cleaned by communities	
G-35G09-3(SW-36)	35G09	UTM	18	537400	6828765	cleaned by communities	

Active mining sites (Raglan mine area)

Site code	Location					Classification	Description
	Map	Grid	Zone	Coordinates			
G-35H12-5	35H12	UTM	18	565000	6837200	active mining site	pit area, zone 3
G-35H12-6(K-26)	35H12	UTM	18	567000	6837280	active mining site	pit area, zone 2
G-35H12-5	35H12	UTM	18	565000	6837200	active mining site	pit area, zone 3
G-35H12-6(K-26)	35H12	UTM	18	567000	6837280	active mining site	pit area, zone 2

Clean-up activities on *Canadian Royalties'* properties

Site code	Location					Classification	Clean-up Description
	Map	Grid	Zone	Coordinates			
KAN-5	35H12	Long/Lat	18	73°45.28' W	61°30.19' N	minor	wood burned, scrap-barrels moved at Mequillon camp removal 2007-2009
KAN-8	35H12	Long/Lat	18	73°45.45' W	61°30.55' N	minor	wood burned, scrap-barrels moved at Mequillon camp removal 2007-2009
KAN-10	35H10	Long/Lat	18	72°49.3' W	61°31.58' N	intermediate	wood burned, scrap-barrels removed, work is complete
KAN-12	35H12	Long/Lat	18	73°44.28' W	61°30.77' N	minor	barrels moved at Mequillon camp, removal 2007-2009
KAN-2	35H12	Long/Lat	18	73°31.11' W	61°32.51' N	intermediate	wood burned, metal stacked, houses removed to be completed in 2007-2009
KAN-4	35H12	Long/Lat	18	73°40.18' W	61°30.92' N	intermediate	drums collected, removal 2007-2009
KAN-3	35H12	Long/Lat	18	73°37.28' W	61°31.83' N	minor	prepare removal winter 2007 to 2009
KAN-11	35H12	Long/Lat	18	73°37.27' W	61°32.62' N	minor	removal winter 2007 to 2009
K-61	35H11	Long/Lat	18	73°27'06" W	61°33'16" N	active site	scrap-barrel removal in 2007-2009
K-28	35H11	UTM	18	591290E	6822119N	active site	wood burned, barrels piled, fuel drums and calcium chloride removed barrels removal in 2007-2009
K-41	35H12	Long/Lat	18	73°44.74' W	61°30.79' N	minor	wood burned, scrap-barrels moved at Mequillon camp removal winter 2007 to 2009
K-42	35H12	UTM	18	566399E	6819079N	minor	wood burned, scrap-barrels moved at Mequillon camp removal winter 2007 to 2009
K-45	35H12	UTM	18	566633E	6819397N	minor	wood burned, scrap-barrels moved at Mequillon camp removal winter 2007 to 2009
K-27	35H12	Long/Lat	18	73°19.89' W	61°36.24' N	intermediate	drums stacked, removal winter 2007 to 2009
K-36	35H12	Long/Lat	18	73°16.63' W	61°31.39' N	minor	to be cleaned
K-37	35H12	Long/Lat	18	73°37.43' W	61°31.07' N	intermediate	materials stacked, removal winter 2007 to 2009

4.2 Recommendations

The new validated sites should comprise a more precise description and characterization. Detailed pictures along with an accurate inventory of the nature and quantity of materials, equipment, as well as the estimated volume of contaminated soil on each site would allow their classification, their prioritization and ultimately, the development of an efficient region-wide plan for remediation.

Furthermore, the assessment and validation of the potential abandoned mining exploration sites is not complete since other locations indicated by informants remain to be visited. A systematic aerial survey of these remaining potential sites will allow a more comprehensive and complete database. Work to this effect will be on-going until the end of the NEI-funded project.

5. ACTIVITIES SCHEDULED FOR YEAR 4 (April 1, 2007 - March 31, 2008)

The following activities are planned for the final year (Year 4) of the project:

- Assess the remaining major and intermediate sites identified in the 2001 and 2002 projects;
- Continue the assessment and validation of the potential abandoned mining exploration sites throughout Nunavik;

Table 9 presents a preliminary account of expenditures for the Year 4 of the project (April 1st, 2007 to March 31st, 2008).

TABLE 9
Estimation of expenses for Year 4 of the project
(April 1st, 2007 to March 31st, 2008)

REVENUE	
Revenue Northern Ecosystems Initiative	\$50,000.00
Total revenue	\$50,000.00
EXPENDITURES	
<i>Field validation of abandoned mining exploration sites</i>	
Salaries	
Coordinator	\$10,000.00
Technical assistants	\$6,000.00
Helicopter airfare (sites assessment)	\$30,000.00
Travel expenses (airfare, lodging, accommodation)	\$3,500.00
Report production (including translation costs)	\$500.00
Total expenditures	\$50,000.00

6. References

- Barrett, M., Lepage, H., 1999. Projet de nettoyage environnemental, Administration régionale Kativik/Société Makivik, mai 1998, 6p.
- Barrett, M., Lanari, R., 2003. Remedial measures and completion of the assessment of Nunavik's abandoned mining exploration sites. Kativik Regional Government, Makivik Corporation, 27 p.
- Duhaime, G., Comtois, R., 2000. Inventory and Characterization of Abandoned Mining Exploration Sites in Nunavik: Pilot Project. GÉTIC, Université Laval. Collection Recherche. March 2000. 67 p. + Appendices.
- Duhaime G. and Comtois, R., 2002. Inventory and characterization of abandoned mining exploration sites in Nunavik. GÉTIC, Université Laval, Québec, Collection Recherche. 43 p. + Appendices
- Kativik Regional Government, 2003. Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik. Final Report on a Two-Year Project (2001-2002). Kativik regional Government, Makivik Corporation, Kuujuaq. 67 p. + Appendices.
- Vachon, A., 1987. Étude environnementale du projet d'exploration minière Blue Lake. ROCHE Ltd., 20 p.

APPENDIX A

Pictures of remedial measures at site KAW-35



Picture 1: Work team (Blue Lake 2006)



Picture 2: Barrels piled on site in 2005



Picture 3: Barrels "deheading" station.



Picture 4: Working station (sector 1)



Picture 5: Scattered barrels (sector 2)



Picture 6: Scattered barrels piled on sector 2



Picture 7: Working station in sector 2



Picture 8: Sector 2



Picture 9: Draining of 4,400L tank (diesel)



Picture 10: Use of ATV on site



Picture 11: Hazardous waste collected from sector 3



Picture 12: Chemical product "methyl-hydrate" collected from the site



Picture 13: Hydrocarbons collected on site



Picture 14: Otter used for transportation



Picture 15: Contaminated area identified in 2005



Picture 16: Combustible debris piled and burned on site



Picture 17: Dangerous structures identified in 2005



Picture 18: Structures dismantled in 2006



Picture 19: Generators



Picture20: Generator structures dismantled



Picture 21: Stowed Barrels stored in Schefferville

APPENDIX B

Pictures of remaining material and installations at site KAW-35



Picture 1: Remaining clean barrels on site (sector 1)



Picture 2: Remaining barrels on site (generator tank, sector 1)



Picture 3: Scattered barrels (towards sector 3)



Picture 4: Clean barrels piled on site (behind generators)



Picture 5: View inside a trailer

APPENDIX C

Pictures of remedial measures at site PJ-1



Picture 1: General view of PJ-1 (sector 4)



Picture 2: View of the sector 5 and the base camp



Picture 3: Work team (PJ-1, 2006)



Picture 4: Kitchen trailer (first day)



Picture 5: Kitchen after cleaning



Picture 6: Scattered barrels piled on site; sector 5



Picture 7: Working station; sector 5



Picture 8: Barrel cleaning station, sector 5



Picture 9: Cleaned barrels, piled, sector 5



Picture 10: Cleaned barrels, piled, sector 6



Picture 9: Cleaned barrels, piled, sector 4



Picture 10: Residues transferred into new drums; sector 4



Picture 11: Residues collected and stored on site, sector 4



Picture 12: Batteries collected from generator units, sector 4



Picture 13: Batteries for disposal



Picture 14: Batteries for disposal being hauled to Tasiujaq



Picture 15: Hazardous material storage shed, sector 5



Picture 16: Extinguishers stored in the wooden shed



Picture 17: Lubricant pails and grease tubes stored (wooden shed sector 5)



Picture 18: Soil remediation project (PJ-13 area, sector 6)



Picture 19: Soil remediation project (PJ-20 area, sector 4)



Picture 20: Metal fence installed for main gallery (sector 4)



Picture 21: Mine shaft fence and cover installed



Picture 22: Mine shaft cover installed



Picture 23: Rusted metal pieces retrieved from pond; sector 4



Picture 23: Combustible debris piled and burned; sector 4

APPENDIX D

Pictures of remaining material and installations at site PJ-1



Picture 1: Trailer, sector 5



Picture 2: Temporary fence installed around mine shaft



Picture 3: Barrels and propane tank piled, sector 4



Picture 4: Remaining heavy equipment, sector 4



Picture 5: Remaining hazardous material; sector 2



Picture 6: Scattered barrels; sector 2



General view of sector 8

