



**SUMMARY REPORT ON THE REHABILITATION WORK AT THE 18 “MAJOR”
ABANDONED MINERAL EXPLORATION SITES IN NUNAVIK CARRIED OUT
DURING THE SUMMER OF 2009**

AND

UPDATE ON THE GENERAL RESPONSE PLAN



Kativik Regional Government

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1 INTRODUCTION

In 2001 and 2002, verification of 193 possible abandoned mineral exploration sites was performed in Nunavik, the territory of Québec north of the 55th parallel. The results of that verification are described in the *Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik: Final Report on a Two-Year Project (2001–2002)* produced by the Kativik Regional Government (KRG) and the Makivik Corporation in March 2003. The final report indicates that, of the 193 possible sites, 90 were confirmed to be abandoned mineral exploration camps. Eighteen of these were classified as requiring major clean-up work, 27 intermediate clean-up work and 45 minor clean-up work. This classification takes into account the quantity of material and equipment present at each site as well as the nature and scope of contaminated soil and surface water.

Further to the recommendations derived from the 2001–2002 inventory work and with funding from Environment Canada's Northern Ecosystem Initiative (NEI) and from the Ministère des Ressources naturelles et de la Faune (natural resources and wildlife, MRNF), in 2005 and 2006 the KRG implemented two rehabilitation pilot projects of "major" abandoned mineral exploration sites, KAW-35 (2005–2006) and PJ-1 (2006). At the same time, Cruise North Expeditions has voluntarily undertaken since 2005 to clean up a third "major" abandoned mineral exploration site, PJ-17. These initiatives represent the initial stage of a proposed Nunavik-wide clean-up project. Specifically in August 2003, the KRG and the Makivik Corporation proposed a funding mechanism and recommendations for the assessment and rehabilitation of abandoned mineral exploration sites (Barrett and Lanari, 2003). The proposal focused in particular on the 18 "major" clean-up sites and promoted a partnership between Northern Québec communities, the mining industry and the different levels of government. In March 2007, the mineral industry took up the challenge and created the Fonds Restor-Action Nunavik (FRAN) to rehabilitate abandoned mineral exploration sites in Nunavik dating as far back as several decades. In October 2007, a formal contribution agreement was signed by the KRG, the Makivik Corporation, the MRNF and the FRAN. The agreement has made it possible to proceed with the clean-up of all the 18 "major" sites using the expertise developed during the above-mentioned pilot projects.

This report compiles all the information currently available on the 18 "major" clean-up sites. Firstly, this report describes the clean-up work carried out during the 2009 season while providing an overview of the progress of clean-up work since 2005. The nine sites discussed are: KAW-35, PJ-1, PJ-17, TW, SW-34, SAL-1, WB-3, K-61 and K-28. Appendix 1 includes five maps that indicate all the 18 major sites in relation to nearby communities (Figure 33-37). Secondly, the report will outline future rehabilitation plans based on the 2009 work completed and the budget needed to ensure this work is undertaken.

2 CONTRIBUTION AGREEMENT

In October 2007, an agreement concerning the clean-up of abandoned mineral exploration sites in Nunavik was signed by the KRG, the Makivik Corporation, the MRNF and the FRAN. The purpose of the agreement is to ensure the clean-up of 18 “major” sites, before March 31, 2012. The sites are identified in the *Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik: Final Report on a Two-Year Project (2001–2002)* produced by the KRG and the Makivik Corporation in March 2003.

The KRG is responsible for the management of the clean-up work at the 18 sites covered under the agreement. The cost of the 6-year project was estimated at four million, one hundred thousand dollars (\$4.1 million). The KRG is responsible for drafting a timetable and anticipated budget for each year of work. In 2009 the cost of the clean-up work was estimated at approximately one million dollars (\$1,075,580).

3 DESCRIPTION OF CLEAN-UP WORK UNDERTAKEN IN 2009

This section provides an updated description of the sites where clean-up work was carried out during the 2009 season. It should be noted that at the beginning of the 2009 fieldwork, occupational safety training was delivered on each site by the project coordinator and a helicopter safety briefing was delivered by the helicopter pilot.

Each site is described individually with supporting figures, while Table 1 provides a summary of the information about each site gathered in 2007.

Table 1: Summary of the information gathered on 14 “major” abandoned mineral exploration sites in Nunavik.
Update on the information contained in the 2001–2002 inventory.

Site	Co-ordinates	Ranking (according to 2001– 2002 inventory)	Comparisons with the 2001–2002 inventory
KAW-45	55° 33.68' N 67° 21.20' W	16	<ul style="list-style-type: none"> - contaminated soil (2 m²) observed in 2001–2002, but not in 2007; - 19 barrels (residue: 150 L); - other debris: matches 2001–2002 inventory.
TQ-1	57° 57.68' N 69° 40.16' W	6	<ul style="list-style-type: none"> - active outfitting camp (Gérardo Camp), Safari Nordik; - renovations carried out since 2001–2002; - between 15 and 20 barrels (old and new with residue); - note: within a radius of 1 km around the site, 2 x 50 barrels were observed (residue > 10,000 L).
TQ-4	58° 15.23' N 70° 07.20' W	15	<ul style="list-style-type: none"> - site used occasionally since 2001–2002; - equipment removed (heating stove, ice auger, gas); - contaminated soil (2 m²) observed in 2007, but not in 2001–2002; - other debris: matches 2001–2002 inventory.
PJ-10	59° 15.07' N 70° 06.52' W	9	<ul style="list-style-type: none"> - matches the 2001–2002 inventory.
TW	60° 05.45' N 69° 55.48' W	4	<ul style="list-style-type: none"> - matches the 2001–2002 inventory; - possibility of acid mine drainage?
K-28	61° 34.65' N 73° 14.75' W	11	<ul style="list-style-type: none"> - partial clean-up work carried out by CR; - active drilling site located nearby – Mesamax Camp (CR); - CR plans to remove all barrels by 2009; - contaminated soil (5 m²): no rehabilitation measures applied by CR.
K-61	61° 33.25' N 73° 27.25' W	7	<ul style="list-style-type: none"> - active mineral exploration site – Expo Camp (CR); - original buildings demolished or renovated by CR and new buildings constructed; - other debris: matches 2001–2002 inventory, plus CR is now storing at the site debris gathered from nearby minor and intermediate sites; - CR plans to remove all barrels and debris by 2009; - contaminated soil (75 m²): no rehabilitation measures applied by CR.

Table 1 (continued): Summary of the information gathered on 14 “major” abandoned mineral exploration sites in Nunavik.
Update on the information contained in the 2001–2002 inventory.

Site	Co-ordinates	Ranking (according to 2001– 2002 inventory)	Comparisons with the 2001–2002 inventory
WB-3	61° 29.41' N 72° 18.09' W	10	- matches the 2001–2002 inventory.
KV-1	61° 25.64' N 76° 45.46' W	14	- matches the 2001–2002 inventory.
SAL-1	61° 31.14' N 74° 53.01' W	18	- the number of 1-L oil containers was underestimated (90 instead of 3); - other debris: matches 2001–2002 inventory; - note: of the 18 sites requiring “major” clean-up, this site was ranked last. However, given the quantity of barrels (over 300) and debris, the site will require more clean-up work than the sites ranked 10th to 17th.
SW-27	61° 28.76' N 76° 22.93' W	12	- matches the 2001–2002 inventory.
SW-42	61° 23.92' N 74° 34.40' W	13	- a pile of 1- to 20-L metal containers was not observed during the 2001–2002 inventory; - other debris: matches the 2001–2002 inventory.
WB-9	61° 27.35' N 74° 33.22' W	5	- no inventory was carried out in 2001–2002; - 2007 inventory (refer to section 3.2.2 WB-9); - the site is no longer owned by Falconbridge; - new nearby camp operated by CR; - ownership of site WB-9, Jean-Marie Arseneault?
WHA-1	56° 24.08' N 75° 39.30' W	17	- not visited in 2007 (due to logistical and distance issues); - site requires little clean-up.

3.1 Labrador Trough

3.1.1 *Kawawachikamach Sector*

KAW-35

The abandoned mineral exploration site KAW-35 (55° 13.94' N, 66° 07.27' W) is located near Lake Retty, 60 km east-northeast of Kawawachikamach and Schefferville. The site covers 0.15 km² and comprises three sectors. The 2001-2002 inventory ranked this site 8th in importance for rehabilitation. However, following the extensive work that has been carried out in recent years, it may be stated that this site was under-ranked. It should have instead been ranked in the top three sites requiring the most clean-up work.

A team of 10 workers (five Naskapi and five Innu) as well as the project coordinator carried out clean-up work at the site between October 5th and 14th, 2009. The main objectives for the team in 2009 were i) to reduce the number of piles of metal scattered around the site; ii) to cut the 8 trailer frames and tin sheets into manageable, transportable pieces; iii) to inspect and clean out if possible the 2 transport trailers located approximately one kilometre North of the main site.

All of the metal frames of eight buildings (trailers), which had been burned in 2008, were cut into smaller pieces and piled nearby for transportation. Figure 1 and 2 show before and after views of the site where the trailers were located. Tin sheets that had been removed from these trailers in 2008 were also cut into smaller pieces and piled. Approximately nine thousand pounds (9,000 lbs) of metal from the trailers were later transported by helicopter to Kawawachikamach, loaded into a trailer and transported to Schefferville where it was then transported via train by Services Naskapi Adoschaouna to Sept-Iles to a metal recycling facility. A helicopter was used this year because the floatplane service was unavailable, accounting for a greater transportation cost than estimated.



Figure 1: Trailer frames remaining on site KAW-35 from 2008 fieldwork.



Figure 2: A photo of the area after trailer frames have been removed from KAW-35 (October 2009)

The work crew were also able to inspect the contents of two transport trailers that are located north of the site (Figure 3). They are said to contain mostly small metal pieces. A pile of metal rods are located next to the trailers.



Figure 3: The 2 transport trailers that are located 1 km north of the main site of KAW-35.



Figure 4: A pile of metal ready for transportation by floatplane in 2010 on site KAW-35.

A small pump house located on the shore of a small lake to the North of the site was emptied and burned in compliance with MDDEP regulations.

Sector 2 contains a large quantity of mine tailings. A water sample taken from the now-flooded mine workings revealed an acid pH of 3.27 (21.7°C). This level of acid pH points to acid mine drainage. Due to the slope of the site, water drains towards the lake. Because an outfitting camp is located nearby, the site KAW-35 is visited often. Action is recommended to reduce the impact of acid mine drainage.

The Naskapi Nation of Kawawachikamach and the Innu Nation of Matimekush-Lac John contributed to the rehabilitation work at site KAW-35 by providing the necessary workers. Nunavik Rotors assisted with the transportation of waste to the temporary storage site in Kawawachickamach.

Work, to continue on this site in 2010, is further discussed in section 6.1.1 of this document.

3.1.2 Tasiujaq Sector

PJ-1

The abandoned mineral exploration site PJ-1 (58° 57.71' N, 69° 35.85' W) is located midway between the communities of Aupaluk and Tasiujaq. The site covers more than 3 km² and comprises nine sectors. The 2001-2002 inventory ranked this site number one in importance for rehabilitation. Extensive work has been completed on this site since 2006.

A team of 10 workers (the project coordinator, an environmental technician and eight Inuit) carried out clean-up work at the site between July 23 and 27, 2009. Clean-up work took place on each in the sectors.

Clean-up efforts in Sectors 1, 2 and 3 were concentrated on collecting the remaining material to be piled together for easier transportation by helicopter during the next work term. Any remaining combustible items were burned on site.

Sector 4 is the largest sector at this site. In July 2009, most of the work was concentrated in this area. Again, piles of similar items such as barrels, scrap metals, tires, and hoses were assembled together to easier transportation by helicopter. A number of wooden crates were opened and their contents (mostly thick rubber hoses and engine parts) inventoried and piled together. The crates and all combustible material in this sector were burned in compliance with MDDEP regulations. Figure 5 shows an overview of Sector 4 during clean-up work in July 2009.

Sector 4 also contains a large quantity of mine tailings. A water sample taken in 2007 near the mine tailings revealed a neutral pH of 6.79 (15.9°C). This neutral level of pH indicates the absence of acid mine drainage.

Sector 5 contains two trailers, one of which was used as a kitchen facility for the crew. The other trailer contains chiefly plywood, foam insulation, electrical wiring and washroom facilities. Work in this sector consisted of gathering debris into groups for easier transportation.

In the summer of 2009, Sector 7 was inspected and deemed complete. Sector 6 has one pile of debris, containing mostly rubber hoses and small metal parts, remaining. Figure 6 shows the pile of debris found in Sector 6.



Figure 5: Sector 4 of PJ-1, July 2009



Figure 6: Debris found in Sector 6 of PJ-1 (removed in October 2009).

Clean-up work was also carried out in sector 8 during the July 2009 season. The sector contained scattered barrels and a large volume of metal debris. These were gathered and assembled into one main pile for transportation during next season (Figure 7). Finally, the wood debris found in sector 8 was burned on site in compliance with MDDEP regulations.



Figure 7: Pile of metal to be transported from Sector 8 of site PJ-1.

Sector 9 contains approximately 6 empty barrels and several very long metal rods that will have to be cut to facilitate transportation by either helicopter or ski-doo. Access to this sector of PJ-1 is difficult by foot.

Another team of 6 workers (the project coordinator, an environmental technician and 4 Inuit) carried out a second phase of cleaning on October 15 and 16, 2009. This work consisted mostly of transporting material that had been piled in Sectors 6, 5 and 4 by helicopter to the community of Aupaluk. Here the debris was placed into marine containers according to category of waste (Figure 8). These containers were shipped south in November 2009. Approximately twenty thousand pounds (20,000 lbs) of debris was removed from the site during the two days of work. Table 2 lists the items shipped by container.



Figure 8: Some debris from PJ-1 that was transported by marine container in November 2009.

Table 2: Debris shipped by container in November 2009

Product	Container number	Quantity	Sector
hoses	NEAS 703	630 ft ³	4, 5 and 6
scrap metal	NEAS 691	300 ft ³	5 and 6
metal rods	NEAS 691	50 ft ³	5 and 6
wire	NEAS 691	50 ft ³	5 and 6

During the October 2009 fieldwork a small volume of hazardous waste was also removed from PJ-1 by helicopter and transported to Aupaluk for shipment. Table 3 lists the dangerous material that were removed from the site and shipped south of the province to a proper recovery facility. All of this waste was collected in Valleyfield by Biogenie and transported to the appropriate facilities.

Table 3: Hazardous material shipped by container in November 2009 (NEAS 691)

Product	Identification UN	Quantity	Sector
lithium grease (tube)	1415	50	5 (shed)
oil	1202	1 x 4 L	5 (shed)
propane tank	1978	19	5
oil cans	-	55	5 (shed)
fire extinguisher	-	20	5 (shed)
grease	-	11 x 20 L	5 (shed)

A second assessment of the heavy equipment found in sector 4 was carried out in the summer of 2009 by Georges Gagnon of the Makivik Corporation's construction division. Repair and transportation work was carried out by a crew of professionally contracted welders, mechanics and operators in November and December 2009. 4 Inuit workers assisted them. During the nearly 3 weeks of work, this team was able to remove all but one piece of heavy equipment, including a truck, bulldozer, crusher and conveyor, from the site by excavator and tractor. They were transported across the tundra using a winter road and are now in temporary storage in Aupaluk (Figure 9). They will be shipped south of the province in the summer of 2010. One trailer was burned and all of its metal frame and tin were also transported to Aupaluk. The reservoirs that were on the site were used as trailers to haul debris. Some of these remain on site. There are still several large pieces of metal, mostly from a tower structure and rolls of metal mesh remaining on site (Figure 10). They will be removed during the winter of 2010 in a similar fashion.

The Northern Village of Aupaluk contributed a great deal to the rehabilitation work at site PJ-1 by providing the necessary workers and coordinating the supplies and rental logistics within the community. Nunavik Rotors assisted with the transportation of waste to the temporary storage site in Aupaluk.

Work will continue on the site in 2010 and is further discussed in sections 5.5.1 and 6.1.2 of this document.



Figure 9: Heavy pieces of equipment from PJ-1 being transported across the tundra



Figure 10: Items remaining on site PJ-1, sector 5



Figure 11: A photo of PJ-1 Sector 4 in July 2009 and December 2009

3.1.3 Aupaluk Sector

PJ-17

The abandoned mineral exploration site PJ-17 (59°20.29' N, 69°45.93' W) is located roughly 10 km northwest of Aupaluk at Merganser Point, Hopes Advance Bay. The site comprises three sectors. The 2001-2002 inventory ranked this site third in importance for rehabilitation work.

For the fourth year since 2005, the clean-up of this site was carried out by Cruise North Expeditions with the support of the Makivik Corporation and the KRG. Between September 16 and 19, 2009, the crew of the *M/V Lyubov Orlova* and thirteen corporate-sponsor volunteers (Figure 12) participated in the clean-up work.



Figure 12: A group photo of volunteers, *Cruise North* crew and project coordinator on site PJ-17

The hazardous material, as well as scrap metal and other debris collected at the site, was transported by zodiac and helicopter to the ship. Nunavik Rotors assisted with the transportation of waste to the ship and the temporary storage site in Aupaluk. Table 4 provides a list of the material collected. Table 5 is a list of material that remains on site. The large pieces remaining on site could not be lifted by helicopter and can be removed only by heavy equipment. Currently the community of Aupaluk is constructing an access road that will pass through the site. It is recommended that once this road is complete, these pieces be collected and transported to the village for shipment. The garage was left on site by request of the community of Aupaluk.

Table 4: Material removed from the site PJ-17 in 2009.

Product / Item	Quantity
pump	8
large sprocket,	1
rock drills	2
scrap metal (tin)	10 m ³
metal rod	10
rear differential	1
wheel rim,	1
pump housing	3
aluminum panel	4x8 feet
electrical wire/cable	4 km
tractor receiver	1
transmission fly wheel	1
barrel containing miscellaneous scrap metal	14
metal shelf	1
Stove	6
2-stroke engine	1
barrel lids	10
insulators (tops of poles)	8
pail of grease	3
little tractor	1
transformer	1
Ford truck engine and winch	1
Engine blocks	3
transmission	1
skid frames	4
truck frame	1
oil drain table	1
hose	3 m ³
core sample trays	10
blower	1
scrap metal	10 m ³
skid assembly	1
radiator	1
file index	1
oiler	1
axel	1
garbage bags filled with metal scrap and garbage	4
receiver from tractor	1
tail gate	2
large gear	1
long metal rods	20
skidders/grills	3
boxes of long metals rods	3
metal sled/sheet	2

28 propane tanks were transported to Aupaluk by helicopter and stored in one of the containers that were left at the marina and shipped south of the province in November 2009.

Table 5: Material that remains at the site PJ-17.

Product / Item	Quantity	Location
Building	1	
heavy equipment	1	in garage
contaminated soil	125 m ³	main site – sector 1 (near the garage)
large engine piece	1	In the garage
metal sheets	4	Behind the garage
steel roll 30" x 6'	2	along the road between the main site and the bay and along the airstrip

Figures 13 show volunteers during the clean-up work. Work spanned the entire site as this was the final year of the clean-up effort. The site is now complete.

The hazardous and other material transported onboard the *M/V Lyubov Orlova* were deposited at the port of St-John, Newfoundland. There, the company FPCollins assumed responsibility for their recycling (metal debris) and proper disposal.

During the four periods of fieldwork, no bio-treatment measures were applied to the 125 m² of petroleum-hydrocarbon contaminated soil. The application for a certificate of authorization to treat the contaminated soil was submitted in the summer of 2007, but no certificate was issued prior to the fieldwork.

During the 2005, 2006, 2007 and 2009 fieldwork, approximately 325 barrels, 60 propane tanks, thousands of pounds of metal and other debris including metal rods and piping and a considerable quantity of small- and medium-sized debris have been removed from the site. Figures 14 and 15 depict a before and after view of site PJ-17.



Figure 13: Volunteers removing metal and debris from garage on site PJ-17.



Figure 14: BEFORE: Some of the debris transported to the ship by helicopter on site PJ-17.



Figure 15: AFTER: The site is now clear of debris.

3.1.4 Kangirsuk Sector

TW

The abandoned mineral exploration site TW (60° 05.45' N, 69° 55.48' W) is located on the shore of Lake Twin near Kangirsuk. The site comprises one sector. The 2001-2002 inventory ranked this site fourth in importance for rehabilitation work.

2008 fieldwork included the removal of barrels and metal debris from the site by helicopter, which are still being stored in the community of Kangirsuk. A marine container has since been shipped to the community and will be sent south in 2010. Combustible material was burned on site. During the spring of 2009, 4 Inuit removed remaining the remaining items by ski-doo and *qamutik* (Figure 16). Some of these items were stuck in the snow forcing a second group of workers to return in the summer by ATV to remove the 3 remaining barrels and bags of rusty cans.

Only exploratory drilling samples, which are located on stands, and a wooden platform remain on the site. The site is now complete.

The Northern Village of Kangirsuk contributed to the rehabilitation work at site TW by providing the necessary workers. Nunavik Rotors assisted with the transportation of waste to the temporary storage site in Kangirsuk. This waste will be transported south by ship in the summer of 2010.



Figure 16: An example of material that was removed from site TW during spring 2009.



Figure 17: BEFORE: fieldwork conducted in 2007 on site TW.



Figure 18: AFTER: the TW site is now complete (June 2009).

3.2 Ungava Trough – Hudson Bay

3.2.1 Kangiqsujaq Sector

K-28

The abandoned mineral exploration site K-28 (61° 34.65' N, 73° 14.75' W) is located 67 km west of Kangiqsujaq, far from any body of water. The site comprises three sectors. The 2001-2002 inventory ranked this site eleventh in importance for rehabilitation work.

In 2005 and 2006, Canadian Royalties (CR) transmitted to the KRG an updated list of its active camps. Among these camps, the site K-28 (also known as Mesamax Camp) is a drilling site currently operated by CR. A photograph taken during the site inspection on July 3, 2007, shows the location of the site K-28 described in the 2001–2002 inventory, and the location of the new camp. At the time of the inspection, a survey team was present at the site but no mineral exploration work was underway. In 2006, Canadian Royalties (CR) carried out a partial clean-up of the site. According to the information received, wood was burned, the barrels scattered around the site were stacked together, and barrels of diesel and bags of calcium chlorite were removed from the site. In sector 3, except for the tripod and a pile of metal debris at the base of the tripod, all the drilling equipment observed in 2001 has been removed from the site. In 2009 CR continued its clean-up work and removed all the remaining barrels and other debris. The petroleum-hydrocarbon contaminated soil (5 m²) was also removed from sector 1. The site is now complete (Figure 19).



Figure 19: The final clean-up work by Canadian Royalties on site K-28 (August 2009)

K-61

The abandoned mineral exploration site K-61 (61° 33.25' N, 73° 27.25' W) is located 80 km west of Kangiqsujuaq, more than 500 m away from a body of water. The site comprises three sectors. The 2001-2002 inventory ranked this site seventh in importance for rehabilitation work.

The site is currently operated by Canadian Royalties (CR) under the name Expo Camp. Since the 2001–2002 inventory, the original buildings have been demolished or renovated. In 2006, Canadian Royalties began clean-up work on the site which included removing a number of barrels, metal and non-hazardous waste and a muskeg. In 2009 CR continued its clean-up work and removed the remaining barrels and debris as well as petroleum-hydrocarbon contaminated soil (75 m²) from the site.

Figures 20 and 21 show the site before and during rehabilitation work. The site is now complete.

It is worthy to note that CR also conducted clean-up work on 29 minor and intermediate sites found on or near their property, representing a financial commitment of nearly one million dollars.



Figure 20: Expo camp, July 2008



Figure 21: Expo camp, during clean up of July 2009

WB-3

The abandoned mineral exploration site WB-3 (61° 29.41' N, 72° 18.09' W) is located on the shore of Lake Qulusuttalik, roughly 22 km southwest of Kangiqsujaq. The site comprises one sector. The 2001-2002 inventory ranked this site tenth in importance for rehabilitation work.

One day of field work was carried out in September 2009. A team of 2 Inuit and the project coordinator gathered the debris remaining on site, which included barrels filled with scrap metal, metal rods and tin (Figure 22). This debris was transported by helicopter to a temporary storage site in Kangiqsujaq, and along with what was collected during 2008 fieldwork will be stored in a marine container and shipped south of the province during the 2010 shipping season. Exploratory drilling samples, which are located on stands, and a circular wooden platform remain on the site. The site is now complete (Figure 23).

The Northern Village of Kangiqsujaq contributed to the rehabilitation work at site WB-3 by providing the necessary workers. Nunavik Rotors assisted with the transportation of the waste.



Figure 22: Debris collected and placed in nets for the helicopter to transport from site WB-3



Figure 23: The site WB-3 is now complete.

3.2.2 Salluit Sector

SAL-1

The abandoned mineral exploration site SAL-1 (61° 31.14' N, 74° 53.01' W) is located next to Lake Nuvilik, roughly 90 km south-southeast of Salluit. The site comprises one sector. The 2001-2002 inventory ranked this site eighteenth in importance for rehabilitation work.

2008 fieldwork consisted of burning combustible material and 6 wooden structures on site, gathering and transferring, when necessary, roughly 300 barrels and their contents as well as gathering hazardous waste into one general area.

A team of 6 workers (the project coordinator and 5 Inuit) conducted clean-up work on the site from September 7-10, 2009 (Figure 24). All of the debris on site was removed by helicopter to a temporary storage site at Goldbrook's nearby Camp Bélanger. Here the empty barrels were crushed and stacked. All of the debris was transported from the camp to a temporary storage site in the community of Salluit where it has been stored in 3 marine containers and is awaiting transportation by ship in 2010. Table 6 lists the waste removed from SAL-1 and is currently awaiting shipment south of the province.

Table 6: Debris removed from SAL-1 and in storage in Salluit

Product / Item	Quantity
batteries	4
freezer	1
barrels with mixed contents	40
barrels of ash	10
200L empty barrels	4
crushed steel drums	222
20L pails full of scrap metal	2
garbage bags full of cans	10
20L empty pails	2
oil stove with metal scrap	1
cans of motor oil	40
full 100lb propane tank	1



Figure 24: Fieldwork conducted on Site SAL-1 (September 2009)

The Northern Villages of Kangiqsujuaq and Salluit contributed to the rehabilitation work at site SAL-1 by providing the necessary workers. Goldbrook Venture, in particular the team at Camp Bélanger, contributed to the clean-up work by providing food and lodging for the workers and by allowing the use of 2 of their helicopters for transporting the waste to the camp and their chartered Twin Otter to transport the waste to Salluit. This site is now complete.



Figure 25: A picture of SAL-1 taken during the 2001-2002 inventory (September 2001)



Figure 26: A picture of the site SAL-1 taken after September 2009 field work.

SW-34

The abandoned mineral exploration site SW-34 (61° 34,90' N, 74° 28,12' W) is located next to Lake Esker, 90 km southeast of Salluit. The site comprises one sector. The 2001-2002 inventory ranked this site second in importance for rehabilitation work.

The site is spread across the properties of two companies: Xstrata Nickel operates north and east of Lake Esker and Goldbrook to the south and west. Most of the debris is located on the Goldbrook property. The 2001–2002 inventory identified a total of roughly 1500 barrels, chiefly on the Goldbrook property. In addition to barrels, the site contains not less than 40 propane tanks, batteries and used oil filters, equipment, etc.

The 2007 and 2008 clean-up work consisted of gathering the numerous barrels scattered among the site and then emptying and crushing them. Of the 700 barrels found on site, 520 were crushed and stored with a number of propane tanks. Metal waste was gathered into piles throughout the site. Combustible material was also gathered and burned. Some hazardous waste, including batteries and oil filters, was removed from the site.

The site was inspected by the project coordinator and Goldbrook's Camp manager on September 8, 2009. They found approximately 400 crushed barrels, 20 empty propane tanks, 300 empty uncrushed barrels and 20 full barrels gathered in one location near the shore of a lake (Figure 27). About 10 piles of various metal debris are scattered among the site. A second grouping of barrels is located along the shore of the same lake about one kilometre east of the main site and contains nearly 100 empty very rusty barrels and 19 full new barrels (Figure 28).



Figure 27: Site SW-34, Sector containing crushed barrels and propane tanks (September 2009)



Figure 28: A second grouping of uncrushed barrels on site SW-34.

Due to technical and weather difficulties a team of 6 workers (the project coordinator and 5 Inuit) were only able to conduct one day of clean-up work on the site on September 9, 2009. The team was split in 2, with 4 workers remaining on the site to help load the crushed barrels into the helicopter nets. The helicopter then transported the barrels to the Xstrata road near their mining operation at East Lake. Here the 2 other team members unloaded the nets and transferred the barrels into the containers. 160 crushed barrels were transported before work was terminated due to delays and technical difficulties with the helicopter. Work will continue on this site in 2010. This is discussed in greater detail in sections 5.5.2 and 6.2.1 of this document.

The Northern Villages of Kangiqsujaq and Salluit contributed to the rehabilitation work at site SW-34 by providing the necessary workers. Goldbrook Venture, in particular the team at Camp Bélanger, contributed to the clean-up work by providing food and lodging for the workers and by allowing the use of 2 of their helicopters for transporting the waste.

4 EXPENDITURES INCURRED DURING 2009 FIELDWORK

Table 7 indicated the estimated expenditures during the fieldwork undertaken from June-December 2009. Some costs were under or over-estimated during previous cost assessments. Except for PJ-1, an environmental technician was not hired for 2009 so the salary allotted for that person was not used. Transportation costs for KAW-35 increased due to the use of helicopter rather than floatplane. Also, Cruise North's contribution was higher than expected for the completion of PJ-17. Furthermore, costs such as the salary for the project coordinator, are difficult to approximate for each site.

Table 7: Estimated Expenditures for work carried out in 2009

Income	
ARK surplus 2008-2009	89,886.00
MRNF income	\$388,957
FRAN income	\$388,957
Total	\$867,800

In kind Contribution							
SITE	PJ-1	KAW-35	SW-34	SAL-1	PJ-17	TW	WB-3
Xstrata Nickel			\$2,419				
Makivik (NEAS)	\$25,000			\$10,000		\$5,000	
Cruise North Expedition					\$118,000		
Goldbrook Venture			\$18,000	\$18,000			
Total	\$25,000	\$0	\$20,419	\$28,000	\$118,000	\$5,000	\$0

Expenses (for KRG)							
SITE	PJ-1	KAW-35	SW-34	SAL-1	PJ-17	TW	WB-3
Salaire coordonateur	\$9,000	\$6,000	\$4,000	\$4,000	\$5,000	\$2,500	\$2,500
Salaire technicien	\$2,761	\$0	\$0	\$0	\$0	\$0	\$0
Salaires travailleurs	\$26,455	\$16,640	\$1,600	\$3,200	\$0	\$1,750	\$320
Professionel/technicien specialise	\$100,800	\$0	\$0	\$0	\$0	\$0	\$0
Transport dechets							
Transportation materiel	\$74,150	\$43,372	\$10,875	\$38,029	\$19,248	\$3,665	\$1,500
Élimination des déchets	\$7,055						
Billets d'avion	\$20,100	\$852	\$1,131	\$1,131	\$0	\$0	\$2,000
Depenses de voyage	\$2,985	\$1,198	\$1,640	\$1,640	\$0	\$0	\$0
Materiel	\$136,136	\$11,702	\$355	\$356	\$7,475	\$2,387	\$0
Communication et traduction	\$740	\$740	\$740	\$740	\$740	\$740	\$740
Chemical analysis (soil)	\$0	\$0	\$0		\$0	\$0	
Sub-Total	\$380,182	\$80,504	\$20,341	\$49,096	\$32,463	\$11,042	\$7,060
Administration (10%)	\$38,018	\$8,050	\$2,034	\$4,910	\$3,246	\$1,104	\$700
TOTAL	\$418,200	\$88,554	\$22,375	\$54,006	\$35,709	\$12,146	\$7,760
<i>Total with in-kind contribution</i>	<i>\$443,200</i>	<i>\$88,554</i>	<i>\$42,794</i>	<i>\$82,006</i>	<i>\$153,709</i>	<i>\$17,146</i>	<i>\$7,760</i>

5 UPDATE ON GENERAL RESPONSE PLAN

The work scheduled for the 2009 season was carried out, generally as indicated in General Response Plan 2008-2012 (GRP) (KRG, 2007). The GRP remains the reference document for the organization of rehabilitation work in the coming years. The purpose of this section is to update the plan according to the work carried out in 2009.

During the summer of 2009, the GRP was not completely implemented. Work on SW-34 did not advance due to both weather and technical difficulties. Efforts were instead focused on completing SAL-1, in that same area. It should be noted that based on the amount of work carried out since 2007, that the rehabilitation work needed at some sites has been under-estimated, particularly at PJ-1 and KAW-35. Several additional weeks will be needed to complete these sites.

Furthermore, due to an error in the budget table presented in the KRG document entitled *Summary Report on Rehabilitation Work at the 18 "Major" Abandoned Mineral Exploration Sites in Nunavik Carried Out in the Summer of 2008 and Update on General Response Plan*, the work table had to be adjusted and some work will be delayed as much as a year. Additionally, Canadian Royalties has come forward with the intention of rehabilitating sites SW-27, WB9, SW-42 and KV-1 in 2010 or 2011. Table 8 shows the new schedule of rehabilitation work to be carried out on the 18 sites, including the ones already completed.

Table 8: Schedule for rehabilitation work for the 18 major abandoned exploration sites

Site	Summer 2008	Winter 2008-2009	Summer 2009	Winter 2009-2010	Summer 2010	Winter 2010-2011	Summer 2011	Winter 2011-2012	Summer 2012
KAW-35									
KAW-45									
PJ-1									
TQ-1									
TQ-4									
PJ-10									
PJ-17									
TW									
K-28									
K-61									
WB-3									
KV-1									
SAL-1									
SW-27									
SW-34									
SW-42									
WB-9									
WHA-1									

CR : Work carried out by
Canadian Royalties
: Site completed
: Clean-up work
: Winter transportation
: Summer Transportation

5.1 Summer Activities

Summer is the busiest and most productive clean-up season. It allows workers easier access to the material on the sites and a greater number of day light hours to operate. Fieldwork generally involves gathering material, cutting and crushing barrels, the transfer of waste to barrels of good condition, burning combustible material and the preparation of hazardous waste and other waste for transportation in either summer or winter. Table 9, originally presented in the GRP, provides a general description of summer fieldwork logistics. The proposed number of workers and workdays has been calculated taking into account the clean-up activities and the scope of the work at each site.

Table 9: Summer Fieldwork logistics

Site	Workdays	Workers	Worker community	Means of transportation	Number of return trips ¹	Accommodations
KAW-35	14	8	Kawawachik.	floatplane	30	temporary camp
KAW-45	COMPLETE					
PJ-1	14	6	Tasiujaq /Aupaluk	helicopter	30	temporary camp
TQ-1	7	8	Kuujuaq	helicopter	20	outfitter camp
TQ-4	7	8	Kuujuaq	helicopter	20	temporary camp
PJ-10	7	6	Aupaluk	helicopter	20	temporary camp
PJ-17	COMPLETE					
TW	COMPLETE					
K-28	COMPLETE					
K-61	COMPLETE					
WB-3	COMPLETE					
KV-1	2	6	Salluit	helicopter	8	none
SAL-1	COMPLETE					
SW-27	7	6	Salluit	helicopter	20	temporary camp or exploration camp
SW-34	14	6	Kangiqsujaq/Sa luit	helicopter	28	exploration camp (to be determined)
SW-42	7	6	Kangiqsujaq/Sa luit	helicopter	20	exploration camp (to be determined)
WB-9	7	6	Kangiqsujaq/Sa luit	helicopter	20	exploration camp (to be determined)
WHA-1	2	4	Umiujaq	helicopter	8	none

¹: Return trips include transportation of workers and supplies from village of residence (or work accommodations) to the site. It also includes transportation of material from the site to a temporary storage site.

5.2 Winter Activities

Winter fieldwork involves the transportation of hazardous material and waste by snowmobile or Twin Otter. This could include the transportation of heavy equipment at the site PJ-1, and the transportation of hazardous material and waste storage containers at the site SW-34. Table 10 provides a general description of winter field logistics. Local labour is proposed for snowmobile transportation activities and to ferry hazardous material and waste between the airport and a nearby temporary storage site prior to shipment south.

Generally speaking, sites located less than 150 km from the nearest village may be accessed by snowmobile. As with summer land access, snowmobile trail conditions must be taken into account when calculating distances. Four snowmobiles and four 14-ft sleds are proposed to transport barrels (crushed or containing residue or other waste). Each sled can carry approximately 2 m² of material.

Table 10: Winter fieldwork logistics

Site	Workdays (number of return trips)			Workers		Worker community
	Snow-mobile	Twin Otter	Other	Community	Other	
KAW-35	-	-	-	-		-
KAW-45	-	-	-	-		-
PJ-1	10 (10)		20 (10)	4	6	Aupaluk
TQ-1		5 (10)		4		Kuujuaq
TQ-4	3 (3)			4		Kuujuaq
PJ-10	10 (10)			4		Aupaluk
PJ-17	-			-		-
TW	-			-		-
K-28	-	-	-	-		-
K-61	-	-	-	-		-
WB-3	-			-		-
KV-1		1 (2)		2		Salluit
SAL-1		-		-		-
SW-27		1 (2)		4		Salluit
SW-34	4 (8)		4 (8)	4	2	Salluit
SW-42		1 (2)		4		Salluit
WB-9		2 (3)		4		Salluit
WHA-1	1 (1)			4		Umiujaq

5.3 Transportation and Storage of Hazardous Waste

Table 11 shows the means of transportation proposed for each site as well as the material to be removed from each. All recoverable hazardous material (petroleum hydrocarbon and other residue) will be shipped to Veolia Environmental Services or another appropriate recovery facility in the south of the province.

The transfer of residue to undamaged containers and labelling will be carried out during summer fieldwork.

Table 11: Category of hazardous or other material and its transportation to a disposal centre

Site	Means of transportation		Quantity of hazardous or other material									
	From site to nearest village	From village to disposal centre	Diesel (L)	Anti-freeze (L)	Oil (L)	Naphta (L)	Grease (L)	Lithium grease tubes	Propane (tank)	Battery	Paint (L)	Extinguisher
KAW-35	floatplane	train/truck	150	150			40					2
KAW-45	COMPLETE											
PJ-1	Snowmobile/helicopter	cargo (NEAS)					240	50	20	4	12	20
TQ-1	Twin Otter	cargo (NEAS)	16400									
TQ-4	Snowmobile/helicopter	cargo (NEAS)	150							1		
PJ-10	Snowmobile/helicopter	cargo (NEAS)	1400		280		40		5	1		
PJ-17	COMPLETE											
TW	COMPLETE											
K-28	COMPLETE											
K-61	COMPLETE											
WB-3	COMPLETE											
KV-1	Twin Otter/helicopter	cargo (NEAS)	50									
SAL-1	COMPLETE											
SW-27	Twin Otter/helicopter	cargo (NEAS)	1650		26		260		1			
SW-34	container/truck	cargo (Xstrata)	16400			410						1
SW-42	Twin Otter/helicopter	cargo (NEAS)	700				12					
WB-9	Twin Otter/helicopter	cargo (NEAS)	280						9	1	24	3
WHA-1	Snowmobile/helicopter	cargo (NEAS)	410									

5.4 Management of Combustible Non-Toxic Material

Combustible non-toxic material will be burned at each site. This material includes wood as well as buildings constructed from wood, aluminium and mineral wool insulation. Pursuant to section 22 of the *Regulation respecting the Quality of the Atmosphere*, a certificate of authorization is required to burn wood, shacks and buildings. Prior to burning any building, all hazardous material must be removed including emergency lights (lead and Ni-Cd battery cells), smoke detectors, fluorescent ballast and fire system accumulators (Ni-Cd battery cells). Non-combustible material should also be removed including asphalt shingles, heating stoves, refrigerators, stove-ovens, bed frames, etc. Material remaining after burning (tin, glass wool, iron and wire) is managed with the other waste at the site. It is also possible that petroleum hydrocarbons at the sites will be used to ignite combustible material. In such cases, a certificate of authorization will be required pursuant to section 23 of the *Regulation respecting the Quality of the Atmosphere* for the open-air burning of petroleum hydrocarbons.

Table 12: Combustible material to be burned or not

Site	Wood debris for burning	Estimated quantity (m³)	Number of buildings (trailer, wooden shack with insulation)		Status of certificates of authorization
			Burn	Keep standing	
KAW-35	x	60	4	1	One application for all the sites
KAW-45	-	-	-	-	
PJ-1	x	50	2	-	
TQ-1	Outfitting				
TQ-4	x	12	-	2	
PJ-10	x	20	-	-	
PJ-17	-	-	-	-	
TW	-	-	-	-	
K-28	-	-	-	-	
K-61	-	-	-	-	
WB-3	-	-	-	-	
KV-1	x	5	-	-	
SAL-1	-	-	-	-	
SW-27	x	20	-	-	
SW-34	x	15	-	-	
SW-42	x	10	-	-	
WB-9	x	100	10	-	
WHA-1	x	50	-	-	

5.5 Management of Non-Combustible Non-Toxic Material

At most of the sites, non-combustible non-toxic material represents the greatest quantity of debris (empty barrels, equipment parts, domestic appliances, wire meshing, etc.) and is the least likely to be harmful to the environment or to jeopardize the health of animals and humans. Notwithstanding, such material adversely affects the appearance of the landscape. For this reason, wherever possible all waste will be removed from the sites. At the sites KAW-35 and PJ-1, the removal of material and heavy equipment will require more planning and ultimately be costlier. The situation at these sites is described in more detail below.

As well, it may be necessary to leave certain material and heavy equipment behind, necessitating the creation of disposal areas for non-combustible non-toxic waste. Certificates of authorization are required to create waste disposal areas. At the site KAW-35, a waste disposal area has already been located taking into account MDDEP directives. Batteries and oil will be extracted from the equipment in question and removed from the sites or stored in specially designed areas.

The number of return-trips indicated in Table 13 includes the transportation of non-combustible non-toxic debris as well as hazardous material.

Table 13: Non-combustible non-toxic materials

Site	Workdays		Volume of waste (m ³)	Propane tanks (empty)	Heavy equipment ¹	Transport (empty barrels and other)			Location of waste disposal area
	Barrel crushing (if > than 60)	Barrel cutting without crushing				From site to nearest village	Number of return trips	From village to disposal centre	
KAW-35		-	100	-	2	floatplane	10	train/truck	55°23.24 N 66°12.48 W
KAW-45	COMPLETE								
PJ-1		-	100	20	19	snowmobile	20	cargo (NEAS)	To be det.
						other	20		
TQ-1		2	10	6	-	Twin Otter	10	cargo (NEAS)	
TQ-4	2		5	8	-	Snowmobile/helicopter	3	cargo (NEAS)	
PJ-10	1		25	10	-	Snowmobile/helicopter	10	cargo (NEAS)	
PJ-17	COMPLETE								
TW	COMPLETE								
K-28	COMPLETE								
K-61	COMPLETE								
WB-3	COMPLETE								
KV-1		1	5	-	-	Twin Otter/helicopter	2	cargo (NEAS)	
SAL-1	COMPLETE								
SW-27	1		15	-	-	Twin Otter/helicopter	2	cargo (NEAS)	
SW-34	11		40	42	-	container/truck	3	cargo (Xstrata)	
SW-42	1		10	-	-	Twin Otter/helicopter		cargo (NEAS)	
WB-9	1		20	-	-	Twin Otter/helicopter	3	cargo (NEAS)	
WHA-1		1	5	-	-	Snowmobile/helicopter	1	cargo (NEAS)	

¹: Heavy equipment includes muskegs, trailers, tractors, conveyors and other mineral exploration equipment.

5.5.1 Site PJ-1

In sectors 4 and 5 of the site PJ-1, there are 19 pieces of equipment (crane, tractor, conveyor, rock crusher, generator, motors, etc.), two muskegs and nine 10,000-L reservoirs. These pieces of equipment are too heavy to be removed from the site by helicopter or snowmobile and sled, but also too numerous to be left in the waste disposal area proposed for the site. Consequently, two mechanics, two welders and two operators have been contracted and called on to assist with the removal of the equipment from the site. The contract was awarded to Régis Plourde who is a foreman for the construction division of the Makivik Corporation and has the experience necessary to carry out this type of task in a remote region.

It was decided that the ideal period for performing this task would be November and December (2009), when the ground is frozen and covered with snow. Three weeks were allocated to carry out the work. The distance between Aupaluk and the site is 45 km and the crew opted to return each night to have access to the construction camp in the community.

An excavator and tractor owned by the community were driven from Aupaluk to the site PJ-1. The two vehicles were used to dislodge the pieces of heavy equipment abandoned at the site and to transport them temporarily to Aupaluk. The 10,000-L reservoirs were cut in half to carry various materials. Approximately 20 return trips were necessary to remove all the heavy equipment from the site.

Following a thorough evaluation of the equipment now in temporary storage in Aupaluk, reusable parts will be sold or redistributed within the region and any equipment which is no longer functional will be shipped to a recycling centre during the next shipping season.

5.5.2 Site SW-34

It is recommended that during the winter of 2010, that Xstrata Exploration staff transport three containers from Cross Lake to Esker Lake (SW-34) using a tractor equipped with tracks (D8). In the summer of 2010, barrel crushing work could be carried out, and metal debris as well as crushed and non-crushed (containing residue) barrels can be prepared for removal from the site. For information purposes, one container holds roughly 80 barrels, 800 crushed barrels or 98 propane tanks. In the winter of 2011, the containers containing the barrels and metal debris could be removed from the site with a tractor equipped with tracks. The containers and their contents will subsequently be managed with the waste at the Raglan mine.

5.6 Petroleum-Hydrocarbon Soil Contamination and Acid Mine Drainage

Most major abandoned mineral exploration sites contain soil contamination for the most part by petroleum-hydrocarbons or rock waste. Table 14 shows the amount of contaminated soil found on each of the sites.

An application for a certificate of authorization was submitted in the summer of 2007. The application contained the information from the site characterization completed during the 2001-2002 inventory (KRG, 2003). The application was rejected by the regional branch of the MDDEP because the characterization information was inadequate (Quebec, 2003) to ensure the selected treatment methods were the most appropriate. For example, there is no data concerning the volume of contaminated soil or the nature of the petroleum hydrocarbons.

Table 14: Contaminated soil located on the 18 sites

Site	Contamination area (m ²)
KAW-35	103
KAW-45	-
PJ-1	115
TQ-1	2
TQ-4	2
PJ-10	20
PJ-17	125
TW	2
K-28	15
K-61	75
WB-3	2,5
KV-1	2
SAL-1	-
SW-27	2,5
SW-34	90
SW-42	12
WB-9	25
WHA-1	6

Two firms (Genivar and Golder Associés) submitted service offers that have made it possible to identify the costs related to developing the information required by the MDDEP. The estimated cost to characterize the contaminated soil at the five sites with the greatest contaminated surface ranges between \$100,000 and \$200,000. This amount does not include the actual restoration work. The proposed work would characterize the contaminated soil at the five sites in accordance with the MDDEP criteria for obtaining the certificate of authorization necessary to carry out the decontamination work. The characterization work includes, among

other things, soil sampling to identify the types of petroleum-hydrocarbon contamination and the volume of the contaminated soil for each identified petroleum hydrocarbon. If a decision is made to not use the services of a consultant to characterize the soil, it will be necessary to establish a sampling protocol as soon as possible in cooperation with the regional branch of the MDDEP. This protocol should be established before the beginning of next summer's work.

Acid mine drainage has been identified at the site KAW-35. A water sample taken from the now-flooded mine workings revealed an acid pH of 3.27 (21.7°C). Further analysis carried out by the MDDEP on a second water sample also revealed higher than normal levels of copper, nickel and iron (Martin Duclos, personal communication). As well, although pH levels of mine tailings at the site PJ-1 do not seem to indicate acid mine drainage (neutral pH), analysis carried out by the MDDEP nonetheless revealed higher than acceptable concentrations of heavy metals (Martin Duclos, personal communication). Analysis should also be performed on effluents near the mine tailings at the site TW. Table 15 shows the concentrations of metals found in effluent at the sites KAW-35 and PJ-1.

Table 15: Concentration of heavy metals in effluent at the sites KAW-35 and PJ-1

Site	Metals	Concentration (mg/L)	Standard (mg/L) ¹	
			Acceptable concentration	Acceptable concentration of a grab sample
KAW-35	Copper	0.42	0.3	0.6
	Iron	8.1	3.0	6.0
	Nickel	1.6	0.5	1.0
PJ-1	Copper	0.53	0.3	0.6
	Iron	5.0	3.0	6.0
	Nickel	0.6	0.5	1.0

¹: Mining industry directive 019.

To mitigate acid mine drainage, contact between the tailings and both oxygen and precipitation must be eliminated. At the site KAW-35, two solutions are possible: 1) place the tailings in the existing test well, or 2) cover the tailings with a moisture barrier to eliminate contact with precipitation. The first solution could prove more costly given the absence of information about the well (orientation, dimensions, etc.). Moreover, the placement of tailings in the test well could cause already highly acidic water in the well to leak into the environment.

Methods for the mitigation of both contaminated soil and mine tailings present on any of the major sites are currently under study.

6 DESCRIPTION OF CLEAN-UP WORK TO TAKE PLACE IN 2010

This section describes the clean-up work to be carried out on seven abandoned mineral exploration sites in the summer and possibly winter of 2010.

6.1 Labrador Trough

6.1.1 Kawawachikamach Sector

KAW-35

There is still a large volume of material, mostly metals and a few wooden structures, remaining on this site. It is recommended to have a team conduct work on this site in the summer to allow for access to floatplanes in the area, either early or later in their season. The clean-up effort can be mostly focused on removing the material from the site and transporting it to a temporary storage site in Schefferville, where it can then be transported via train to Sept-Iles to an appropriate recycling facility.

The team can be divided in two groups, one on site that will load the planes and the other at the drop-off site to receive the material and to transport it to Schefferville.

Furthermore, combustible material should be burned on site with only the largest and sturdiest wooden structure to remain as a shelter for the workers and future travellers and hunters. Approximately 2 weeks of work and several return trips with a floatplane will be needed to transport all the material remaining on the site.

6.1.2 Tasiujaq Sector

PJ-1

Being the largest site to rehabilitate there still remains a large volume of material to be removed from the site. A team of workers should conduct work on the site during the summer of 2010 and concentrate on using helicopters to transport remaining manageable debris to a temporary storage site in Aupaluk. Several marine containers should be delivered to the community to ship the material south of the province.

Since there are still several large pieces of equipment and debris on site that cannot be transported by helicopter, a work term can be scheduled for the winter of 2010, when a winter road can be used again to transport this waste to Aupaluk across the tundra.

TQ-1

The abandoned mineral exploration site TQ-1 (57° 57.68' N, 69° 40.16' W) is located on the shore of Lake G rido, 75 km west of Kuujuaq. The site comprises one sector. The 2001-2002 inventory ranked this site sixth in importance for rehabilitation work.

During the 2001–2002 inventory, it was noted that the outfitter Safari Nordik appeared to be using the site under the name G rido Camp. The most recent inspection of the site in 2007 confirmed that Safari Nordik is currently using the site. Further confirmation was obtained from Nicolas Laurin of Safari Nordik in 2009.

The June 2007 inspection matched the description prepared during the 2001–2002 inventory. Notwithstanding, the site is well maintained and renovations have been carried out. Old propane tanks, some barrels and rock samples remain at the site. The presence of soil contamination under some old barrels located near the buildings was again observed.

Approximately one kilometre from the camp, inland from Lake G rido, roughly 50 barrels filled with diesel were identified next to a landing strip (Figure 29). The barrels were initially at Lake G rido, a kilometre from the camp (“intermediate” site validated in 2005 – KRG, 2006) and were transported to the landing strip by the community of Tasiujaq after 2002 (information received from Nunavik Rotors). The barrels have however been left at the landing strip, due to inadequate transportation solutions. Currently at Lake G rido, there are close to 50 other barrels, metal debris and rock samples. According to Nicolas Laurin of Safari Nordik, many barrels at Lake G rido still contain diesel. Although only an “intermediate” site, these barrels are located close enough to the site TQ-1 to be included in clean-up work (Figure 30).

This site might be easier accessed by floatplane, which can also accommodate the transportation of waste to Kuujuaq for shipment south by sealift in 2010 or 2011.



Figure 29: Near the site TQ-1. Barrels containing diesel next to the landing strip taken during the 2001-2002 inventory.



Figure 30: Intermediate site P-24F13-5. Barrels next to Lake Gerido, near the site TQ-1 taken during the 2001-2002 inventory.

TQ-4

The abandoned mineral exploration site TQ-4 (58° 15.23' N, 70° 07.20' W) is located 40 m from Lake Garigue south of Tasiujaq. The site comprises three sectors. The 2001-2002 inventory ranked this site fifteenth in importance for rehabilitation work.

The site was inspected in 2007. The inspection revealed that the site closely matches the description prepared during the 2001–2002 inventory.

The two buildings in sector 1 (Figure 31) are still present but reference to the description of the building interiors reveals that the site has been used since 2001. The 2001–2002 inventory also notes that the camp is used by Mario Carreau (Tasiujaq). A collapsed building, the wooden platform and a variety of debris (35 barrels, eight propane tanks, aluminium insulation sheets, etc.) near the two buildings are still present. Sector 2, which encompasses sector 3, matches the description from the 2001–2002 inventory. The 115 barrels are still located next to the two depressions.

No soil contamination was noted during the 2001–2002 inventory. Notwithstanding, the contents of one barrel in sector 1 appear to have since leaked, causing soil contamination.



Figure 31: Site TQ-4, sector 1 taken during the 2001-2002 inventory.

6.1.3 Aupaluk Sector

PJ-10

The abandoned mineral exploration site PJ-10 (59° 15.07' N, 70° 06.52' W) is located 50 m from Lake Ford, 30 km west-southwest of Aupaluk. The site comprises two sectors. The 2001-2002 inventory ranked this site ninth in importance for rehabilitation work.

The site was inspected in 2007 and revealed that the site matched the description prepared during the 2001–2002 inventory. Figures 32 and 33, taken in 2007 show the site.



Figure 32: Site PJ-10, sector 1 taken during the 2001-2002 inventory.



Figure 33: Site PJ-10, sector 2 taken during the 2001-2002 inventory.

6.2 Ungava Trough – Hudson Bay

6.2.1 Umiujaq Sector

WHA-1

The abandoned mineral exploration site WHA-1 (56° 24.08' N, 75° 39.30' W) is located on the shore of a lake, roughly 40 km southwest of Umiujaq. The site comprises a 120 m x 25 m sector. The 2001-2002 inventory ranked this site seventeenth in importance for rehabilitation work.

According to the 2001–2002 inventory, the site comprises a wooden building in poor condition, nine wooden bases, four 205-L barrels including one filled with diesel and the remaining three containing together roughly 30 L of diesel, 19 40-L barrels including four containing together 50 L of diesel residue, and less than 3 m³ of metal debris. A 6 m² area inside the building is contaminated with petroleum hydrocarbons. Figures 34 and 35 are photographs of the site taken during the 2001-2002 inventory.



Figure 34: Collapsed building at site WHA-1.



Figure 35: Barrels at site WHA-1.

7 DRAFT BUDGET FOR 2010

Table 16 presents the estimated budget for carrying out rehabilitation work on 7 of the 18 “major” abandoned mineral exploration sites in Nunavik during 2010.

Table 16: Estimated budget for rehabilitation work to take place in 2010

Income	
ARK surplus 2008-2009	\$137,522
MRNF income	\$332,189
FRAN income	\$332,189
Total	\$801,900

In kind Contribution									
SITE	PJ-1	KAW-35	SW-34	TW	TQ-1	TQ-4	PJ-10	WHA-1	Total
Xstrata Nickel			\$15,000						\$15,000
Canadian Royalties									\$0
Makivik (NEAS)	\$25,000			\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$50,000
Goldbrook Venture			\$15,000						\$15,000
Total	\$25,000	\$0	\$30,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$80,000

Expenses									
SITE	PJ-1	KAW-35	SW-34	TW	TQ-1	TQ-4	PJ-10	WHA-1	Total
Coordinator salary	\$12,000	\$8,000	\$8,000		\$7,000	\$7,000	\$6,000	\$6,000	\$54,000
Technician salary	\$4,000	\$4,000	\$4,000		\$3,000	\$3,000	\$3,000	\$3,000	\$24,000
Workers salaries	\$20,000	\$15,000	\$10,000		\$7,000	\$7,000	\$5,000	\$5,000	\$69,000
Professional/Technical salaries	\$70,000	\$0	\$0		\$0	\$0	\$0	\$0	\$70,000
Transportation of waste	\$200,000	\$20,000		in-kind					\$220,000
Transportation of material	\$100,000	\$20,000	\$25,000		\$15,000	\$15,000	\$15,000	\$15,000	\$205,000
Disposal of waste	\$25,000				\$15,000	\$15,000		\$15,000	
Plane tickets	\$5,000	\$5,000	\$3,000		\$3,000	\$3,000	\$3,000	\$3,000	\$25,000
Travel Expenses	\$5,000	\$2,500	\$2,500		\$2,500	\$2,500	\$2,500	\$2,500	\$20,000
Material/Equipment	\$15,000	\$5,000	\$3,000		\$3,000	\$3,000	\$3,000	\$3,000	\$35,000
Communication and translation	\$1,000	\$1,000	\$1,000		\$1,000	\$1,000	\$1,000	\$1,000	\$7,000
Sub-total	\$457,000	\$80,500	\$56,500	\$0	\$56,500	\$56,500	\$38,500	\$53,500	\$729,000
Administration (10%)	\$45,700	\$8,050	\$5,650	\$0	\$5,650	\$5,650	\$3,850	\$5,350	\$72,900
TOTAL	\$502,700	\$88,550	\$62,150	\$0	\$62,150	\$62,150	\$42,350	\$58,850	\$801,900
<i>Total with in-kind contribution</i>	<i>\$527,700</i>	<i>\$88,550</i>	<i>\$92,150</i>	<i>\$5,000</i>	<i>\$67,150</i>	<i>\$67,150</i>	<i>\$47,350</i>	<i>\$63,850</i>	<i>\$958,900</i>

8 DESCRIPTION OF CLEAN-UP WORK TO TAKE PLACE BY MINING COMPANIES

The following section describes work to be carried out in 2010 by active mining companies in the region who have announced their intentions to complete this work by their own financial capacities. However, if circumstances prevent them from doing so, the work will be carried out by KRG in 2011.

8.1 Ungava Trough – Hudson Bay

8.1.1 Salluit Sector

SW-34

This site is one of the largest remaining and will require a lot of clean-up work in 2010, which will basically consist of transporting material to a temporary storage site and crushing the hundreds of barrels that remain on site.

It is recommended that 2 helicopters be used to transport the material to the Xstrata road since it is quite far from the site. An alternative would be to transport containers to the site during the winter, fill them in the summer and have them transported out during the following winter. A trail leading from the site connects with the existing Xstrata roads network and may be useable at certain times of the year. A small airstrip located at East Lake is also close to the site and may provide another alternative for transporting waste.

A barrel crusher on site to crush the remaining barrels would also be advisable as it would reduce volume and therefore the number of containers needed. Again, collaboration with both Goldbrook Venture and Xstrata Nickel could prove helpful to the rehabilitation efforts.

KV-1

The abandoned mineral exploration site KV-1 (61° 25.64' N, 76° 45.46' W) is located on the shore of a lake, roughly 100 km southwest of Salluit. The site comprises two sectors. The 2001-2002 inventory ranked this site fourteenth in importance for rehabilitation work.

The site was inspected on July 5, 2007. The inspection revealed that the site matches the description prepared during the 2001–2002 inventory. Roughly 23 barrels are scattered around the site and on the opposite shore of the lake and 15 compacted barrels and two waste disposal areas are still present (Figure 36).

The site is located near site SW-27 and should be cleaned-up in conjunction to make the best of a work team and helicopter use. Work will most likely consist of gathering barrels and other debris for transportation, burning combustible materials on site and inspecting the waste disposal site.



Figure 36: A photograph of KV-1 taken during the 2001-2002 inventory.

SW-27

The abandoned mineral exploration site SW-27 (61° 28.76' N, 76° 22.93' W) is located roughly 90 km south-southwest of Salluit, far from any body of water. The site covers 0.2 km² and comprises four sectors. The 2001-2002 inventory ranked this site twelfth in importance for rehabilitation work.

The site was inspected on July 5, 2007. Of all the abandoned mineral exploration sites still requiring clean-up, site SW-27 contains the greatest quantities of residue: roughly 1650 L of diesel, 260 L of grease and 26 L of oil. Although covering only 2.5 m², petroleum-hydrocarbon soil contamination is still very evident. Open or damaged barrels of grease observed during the 2001–2002 inventory are still present (Figure 37).

This site is located on Canadian Royalties property and a possible collaboration with this company could assist in the clean-up efforts.

SW-42

The abandoned mineral exploration site SW-42 (61° 23.92' N, 74° 34.40' W) is located next to Lake Beuparlant, roughly 100 km south-southeast of Salluit. The site comprises one sector. The 2001-2002 inventory ranked this site thirteenth in importance for rehabilitation work.

The site was inspected on July 4, 2007. A wood roof and boards, metal debris, aluminium pipes, home-made stove, and exploration-shaft wood cover were all observed. The site also includes a pile of between 80 and 90 barrels and other barrels scattered along the shore of the lake. Finally, a pile of 1- to 20-L metal containers is located only a few metres from the lake. Figure 38 presents a photograph of the site taken during the 2001-2002 inventory.

This site is located on the property of Resolve Ventures and near the property of Golden Valley Mines Inc. These companies should be contacted to gauge their level of collaboration for the 2010 season.



Figure 37: A photograph taken of site SW-27 during the 2001-2002 inventory.



Figure 38: A photograph taken of site SW-42 during the 2001-2002 inventory.

WB-9

The abandoned mineral exploration site WB-9 (61° 27.35' N, 74° 33.22' W) is located next to Lake Kenty, roughly 100 km south-southeast of Salluit. The site comprises one sector. During the 2001–2002 inventory, the site was ranked fifth in order of importance among the 18 sites requiring “major” clean-up.

This site is both an abandoned mineral exploration and outfitter camp. In 2007, property owned by Golden Valley Mines Inc, was identified on the opposite shore of Lake Kenty. Figure 39 shows the site WB-9 in the foreground and the new camp in the background.

The site was inspected on July 4, 2007. The site comprises ten buildings and three small sheds, all of which have deteriorated since the initial inventory. The site contains a large quantity of non-hazardous debris, such as bed frames and damaged mattresses, a stove-oven, a washing machine, rock samples, etc. No heavy equipment was identified at the site. In total, 20 barrels were found scattered near the buildings. The barrels were not systematically verified, but might contain petroleum-hydrocarbon residue. A small amount of soil contamination was observed. As well, in a 1-km radius around the camp, 60 barrels divided in three groups were observed, but no verification was carried out to determine if they contained any residue.

This site is located between the properties of Golden Valley Mines Inc and Goldbrook Ventures and collaboration will be helpful when cleaning this site. All of the wooden structures will need to be emptied, stripped of metal and non-hazardous waste and burned on site. The barrels and other debris will have to be transported by helicopter to a temporary storage facility.



Figure 39: A photograph take on site WB-9 during the 2001-2002 inventory.

8 HUMAN RESOURCES

Except for the environmental consultants required for the treatment of contaminated soil and acid mine drainage, human resources for the project fall into two categories: 1) KRG employees, which is to say the project co-ordinator and environmental technicians, and 2) local workers.

The project co-ordinator works full-time on the project while the environmental technicians only work full-time during the summer season. Experience acquired in the previous work terms suggests that it is absolutely necessary to have one and in some case two technicians on site to complete the clean-up according to the schedule and to allow for more coherent logistical planning by the coordinator.

Local workers are hired to work on the project from the communities located closest to each site. This not only creates jobs, but it also contributes to increasing local know-how regarding contaminated soil restoration and environmental project management. The Northern Villages are central to providing local workers for the rehabilitation work, including the payment of the workers' wages. The amounts paid for these workers are subsequently invoiced to the KRG which reimburses all related costs. This cooperation is extremely effective and permits the hiring of individuals who are recognized in their communities. In some cases however, few applicants indicated an interest in the work. In other cases, workers did not show up at the start of work, despite having accepted to do the job. To resolve recruitment problems, a permanent itinerant team of workers could be created to work at several sites consecutively. This type of arrangement would extend the length of the job for the team members and would allow them to develop experience over the course of a summer. According to the number of workers needed at each site, it might be possible to hire extra workers from nearby villages as required. This approach would improve the transfer of know-how regarding, in particular, the restoration of contaminated sites. This kind of experience is also highly sought-after by mineral exploration companies for the clean-up of their sites and could therefore lead to future work.

Summer clean-up work at each site requires an environmental technician and between three and six workers. Winter field work, including snowmobile transportation and Twin Otter unloading generally requires four workers and a supervisor.

Worker safety is also an important issue for those involved in rehabilitating the major abandoned mineral exploration sites in Nunavik. All of the sites to be rehabilitated are in isolated locations that cannot easily be reached from nearby villages. Workers are most often transported by helicopter or floatplane. Since the transporter does not remain at the site, emergency planning is important. It is essential that each work team has an emergency plan and adequate communication systems to contact help, if necessary. The combined use of satellite phones and "spot" technology is highly recommended. Furthermore, an HF radio that allows for transmission between pilot and field team is recommended as it will permit increased communications and safety when transporting equipment and during landing and take-off.

9 COMMUNICATIONS

A communication was prepared by KRG (Appendix 3) to provide an update of the rehabilitation work carried out on each site in 2009 and a list of those sites that will be completed in the future. The press release was made public on the KRG website and sent to the organizations and communities directly involved in the project.

A film crew was present for the October fieldwork undertaken on PJ-1. The project coordinator and Michael Barrett, KRG representative for the project, were interviewed regarding their opinions of current mining operations in the region with respect to environmental impacts.

The project coordinator attended the Québec Mining Symposium in Québec in November to co-present an overview of the Abandoned Mineral Exploration Rehabilitation Project and to summarize both the work done in 2009 and upcoming work.

In the winter of 2012, visits to each of the communities that participated in the clean-up work will be organized in order to present the project, specifically the results of the rehabilitation work completed at each of the sites. A final report will be transmitted to the Inuit, Naskapi and Innu communities, and a follow-up meeting is planned with project partners.

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Nancy Dea
Project Coordinator
February 16, 2010

APPENDIX A

MAPS OF THE 18 “MAJOR” EXPLORATION SITES

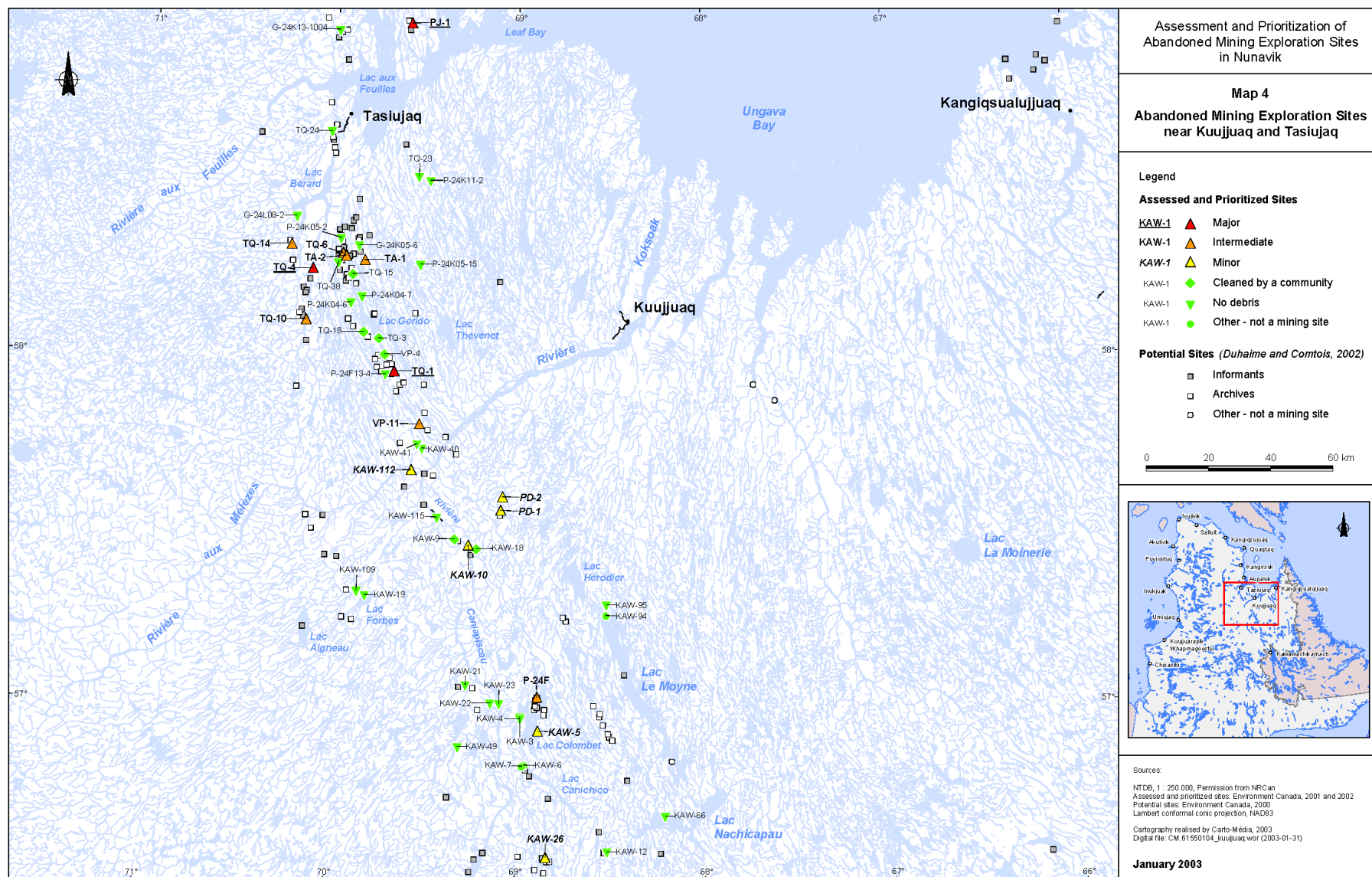


Figure 41: Labrador Trough. “Major” Abandoned Mineral Exploration Sites TQ-1, TQ-4 and PJ-1.

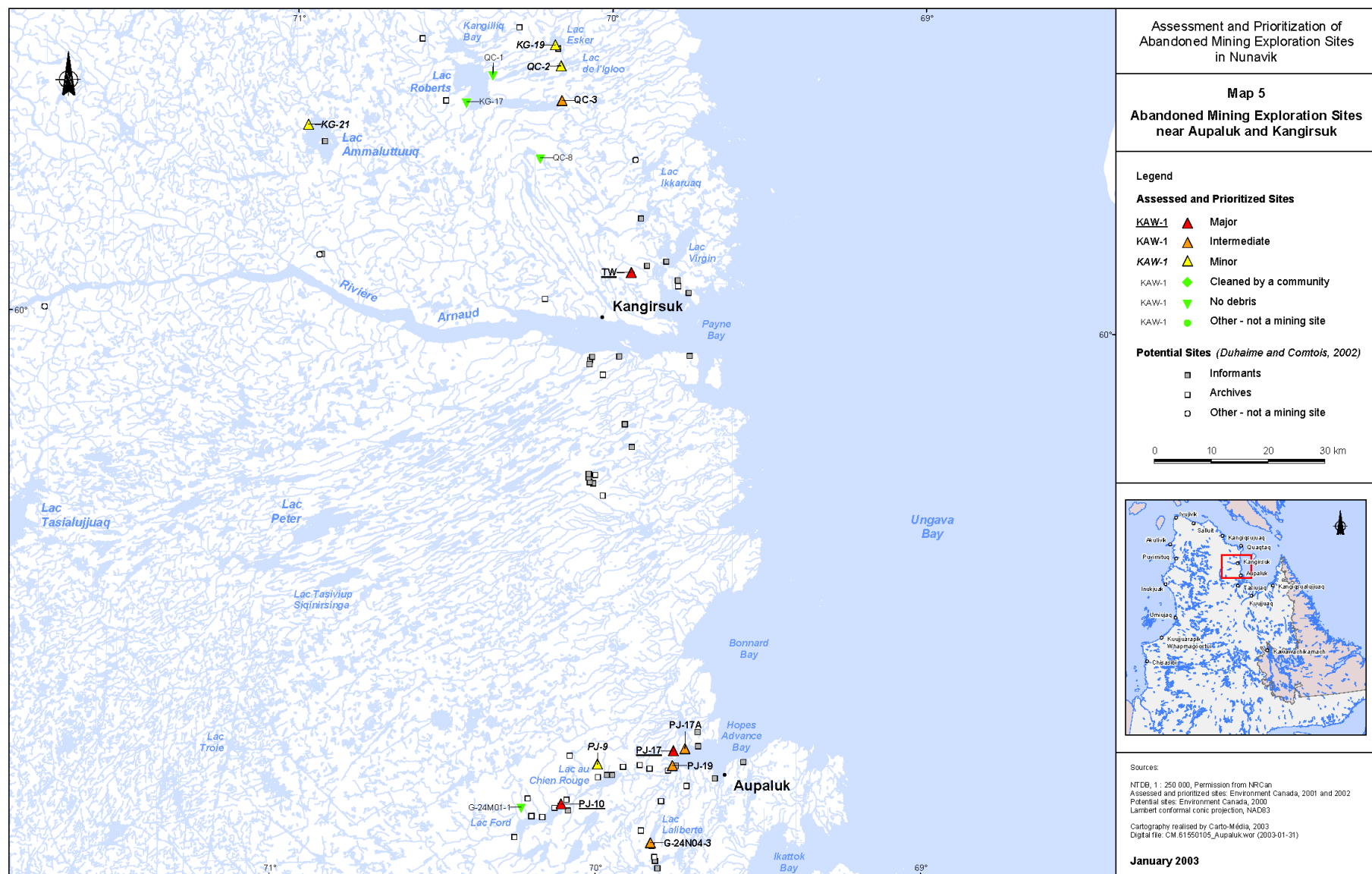


Figure 42: Labrador Trough. “Major” Abandoned Mineral Exploration Sites PJ-10, PJ-17 and TW.

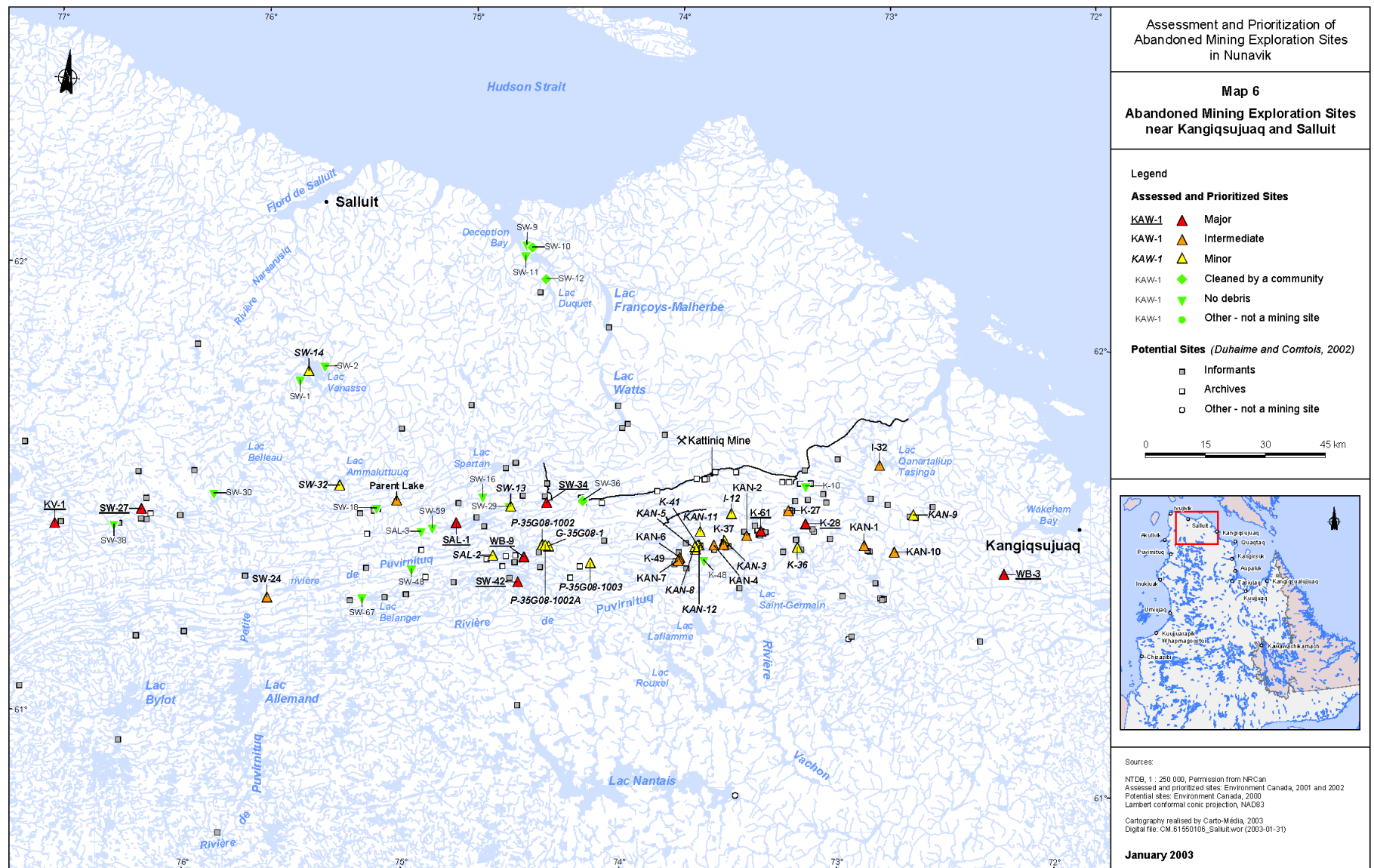


Figure 43: Ungava Trough. “Major” Abandoned Mineral Exploration Sites K-28, K-61, KV-1, SAL-1, SW-27, SW-34, SW-42 WB-3 and WB-9.

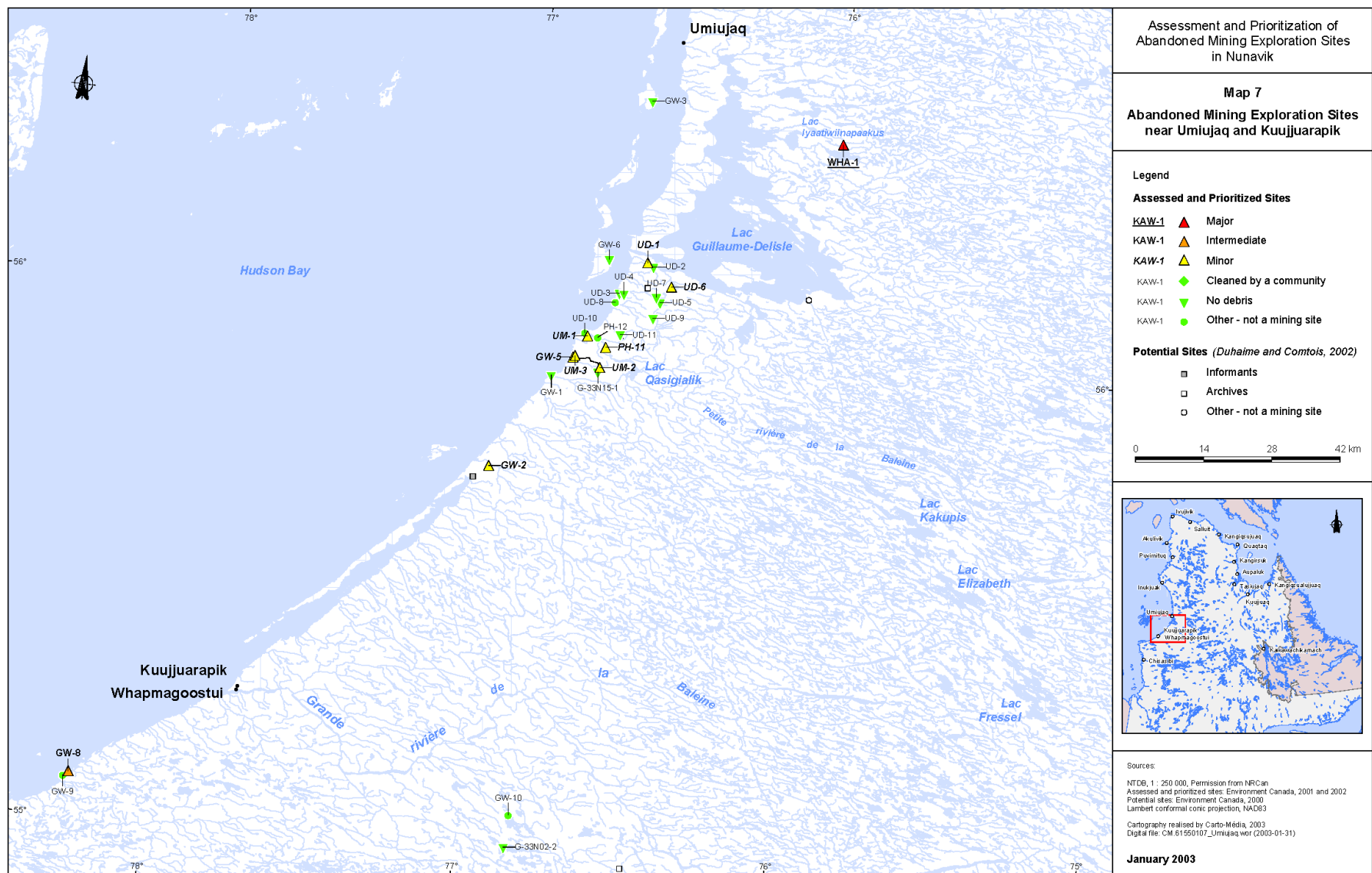


Figure 44: Hudson Bay. “Major” Abandoned Mineral Exploration Site WHA-1.

APPENDIX 2

SUMMARY OF REHABILITATION WORK CARRIED OUT BY CANADIAN ROYALTIES



Projet Nunavik Nickel

Nunavik Nickel Project

COMPILATION REPORT ON REMEDIATION WORK CARRIED OUT ON ABANDONED
MINING EXPLORATION SITES LOCATED ON CANADIAN ROYALTIES' PROPERTY, AND
THE MANAGEMENT OF CONTAMINATED SOILS FROM BOMBARDIER BEACH

2008-2009 Seasons



Puvirnituk River

November 2009

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LIST OF ACRONYMS

KRG	Kativik Regional Government
CRI	Canadian Royalties Inc.
FRAN	Fond Restor-Action Nunavik
RHM	Residual Hazardous Material
NEAS	Nunavut Eastern Arctic Shipping Inc

1. INTRODUCTION

In 2001 and 2002, the Kativik Regional Government (KRG) performed an inventory of abandoned mineral exploration sites on the Nunavik territory. During this process 193 potential sites were visited, of which 90 were identified as abandoned mineral exploration sites. There are still 300 potential sites that remain to be inventoried. These sites are a threat to the environment and to human health, and it was imperative that immediate action be initiated for the remediation of these sites.

During the last 7 years, Canadian Royalties Inc. (CRI) has voluntarily proceeded to clean-up 31 abandoned mineral exploration sites in the course of its exploration activities and during the development of the Nunavik Nickel Project. During the remediation activities, thousands of barrels (mainly fuel barrels), various scrap materials as well as residual hazardous materials (RHM) were collected and transported to the Expo and Berbegamo exploration sites in use by Canadian Royalties.

CRI is a founding member of the "Fonds Restor-Action Nunavik" (FRAN) that aims to rehabilitate old abandoned mining exploration sites in northern Quebec. CRI carried out extensive operations in 2009 to finish the clean-up of the old Expo (K-61) and Mesamax (K-28) sites and to recover the accumulated scrap collected from the 29 other abandoned sites.

More specifically, during the 2008 and 2009 summer seasons, CRI decided to proceed with the disposition of various residual materials accumulated during the remediation activities, and to dismantle the old Expo camp and arrange for the treatment of contaminated soils in southern Quebec.

CRI prepared a work program, including logistics, and procedures outlining the most effective approach for the handling and disposal of various residual materials. To ensure compliance with applicable regulations the manual covers all activities performed in the 2008-2009 program.

2. 2008-2009 REMEDIATION WORK

2.1 Chronology of activities

The clean-up program commenced during the middle of August, 2008 and coincided with the opening of the new Expo camp which served to house the clean-up crew. The clean-up operations lasted 6 weeks in 2008 and 8 weeks in 2009.

Table 1: Chronology of activities associated with the 2008-2009 clean-up:

Items	Start	End
Planning & Purchase of Response Material	July 1 st , 2008	July 31, 2008
Site Mobilization	August 14, 2008	
Worker Training	August 15, 2008	Aug. 16, 2008
Start of Clean-up Operations	August 17, 2008	
Shipping & Unloading	September 29, 2008	
Demobilization	October 6, 2008	
Mobilization - Clean-up Crew	July 7, 2009	
Worker Training	July 8, 2009	July 10, 2009
Start of Recovery Operations	July 11, 2009	
Demobilization - Clean-up Crew	August 25, 2009	
Shipping of Scrap Material to Points South	September 2009	
Recovery, Treatment and Disposal	October 2009	

2.2 Description of activities

The clean-up activities carried out on abandoned sites were similar from site to site and were directly related to the exploration activities performed. Generally, the work revolved around the collection of: abandoned bags of calcium chloride, scrap metal, abandoned vehicles, batteries, empty fuel barrels, tires, contaminated soils, various containers (acid, paint, grease, oil, etc.).

Most of the clean-up activities were carried out on 2 sites, classified as "major" by the FRAN: the **Old Expo Camp** (K-61) and **Mesamax** (K-28), and the **Berbegamo Camp** where scrap materials from abandoned sites were piled up.

K-28 - Mesamax

The abandoned mineral exploration site K-28 (61° 34.65' N, 73° 14.75' W) is located 67km west of Kangiqsujuaq, far away from any bodies of water. There were three areas on the site that were affected by mineral exploration activities. In 2005 and 2006, Canadian Royalties provided an updated list of its active exploration camps to the Kativik Regional Government; among these was an old CRI drill site known as Mesamax (K-28).

In 2006, CRI carried out a partial clean-up of the site. Wooden scrap materials were burned, scattered empty barrels were piled up in one heap, while full barrels and calcium chloride bags were removed from the site. Picture 13 shows the site area as it was after Phase I of the 2007 clean-up activities. CRI also gathered the barrels from area 1 and 2 along the road leading to the Berbegamo camp. The wood tripod in area 3 remained in place as a historical record and, except for a heap of scrap metal at the base of the tripod, all the drilling material used in 2001 has been removed from the site.

CRI continued its clean-up activities the following year and removed by helicopter all the barrels, propane bottles and scrap metal.

In 2009, a final clean-up operation recovered the remainder of debris encountered on the site as well as 5m² of oil contaminated soils (Photo 14).

K-61 - Old Expo Camp

The abandoned mining exploration site K-61 (61° 33.25' N, 73° 27.25' W) is located 80km west of Kangiqsujuaq, and is more than 500 metres away from the closest body of water. The site has three areas affected by mineral exploration activities. Site K-61 is known as "Old Expo Camp" which used to belong to Canadian Royalties.

Since the completion of the inventory by the KRG in 2001-2002, the old buildings have been demolished, or renovated in 2005 (Picture 17). From 2005 to 2007, CRI used site K-61 to gather scrap and debris from 29 minor and intermediate sites located on its property (Picture 7). For example, the muskeg found on minor site KAN-11 (61° 32.62' N, 73° 37.27' W) was moved to site K-61 (Pictures 5 and 6).

In 2008, after opening the new Expo camp, CRI started to dismantle the old exploration camp and clean-up the site. More than 50% of the remediation work was completed during this period (Pictures 8 and 16).

In 2009, the last phase of the clean-up and remediation activities, was completed. All the scrap and debris were recovered, including the contaminated soils and the debris from the 29 sites gathered on site K-61 (Pictures 11, 12 and 19).

Other sites and remediation work

Note that the clean-up of the 29 intermediate and minor sites was made possible thanks to the implication of the exploration personnel and the decision to carry out the clean-up operations simultaneously with the exploration activities. As much as possible, every helicopter flight that was bringing supplies to a diamond drill site had to haul back scrap and debris collected from abandoned mining exploration sites located nearby.

The new camp at Berbegamo was used also as a gathering site for all debris collected between 2006 and 2008 from old exploration mining sites that were abandoned. The remediation work carried out in 2009 also included the conditioning and recovery of debris on the Berbegamo site itself.

Another objective of the 2009 campaign was the recovery, management and shipping of contaminated soils, especially those from Bombardier Beach. The accidental spill of 2008 generated more than 220 cubic metres of contaminated soil that had to be shipped south to be treated.

Finally, the last objective of the 2009 campaign was to minimize the environmental hazards associated with the Nunavik Nickel Project. The operations completed include: clean-up activities, recovery of residual hazardous materials (RHM) and care and maintenance of infrastructure.

2.3 Work Team

Two teams comprised of 4 labourers, 2 operators and 1 supervisor were trained and equipped to carry out the clean-up activities. Occasionally, the help of surface personnel was required to handle debris, barrels, containers, etc.

In order to increase the number of Inuit people working on the site, it was decided that more than 50% of the workers would come from neighbouring Inuit communities. This objective was easily reached with the collaboration of the Landholding Corporation in Kangiqsujuaq.

A specialized carrier (Tessier Ltd) and surface personnel were called upon to help with the transportation and shipping of residual hazardous materials (RHM). Nunavut Eastern Arctic Shipping Inc. (NEAS) provided sea transportation of the materials.

2.4 Residual Materials & Health and Safety

Particular attention was paid to the recovery of residual materials as well as the health and safety of all the workers involved. Because some of the materials present a serious threat to the environment and to human health, several safety measures were adopted during the recovery and handling of RHM:

- Personal protective equipment was mandatory.
- Work teams were careful to avoid any leakage or spill from the recovered materials;
- Scrap metals with sharp edges were handled carefully (with PPE) in order to prevent scratches and cuts;
- Some of the debris was heavy. Work teams took special precautions and used proper equipment to avoid injuries (2 men to handle debris, use of straps, etc.);
- Special attention was paid when opening barrels (odour, vapour release, etc.)
- Scrap, debris and obsolete equipment were systematically inspected in order to recover batteries, lubricants, antifreeze, etc.
- Daily meetings were held regarding the prevention of accidents, and health and safety issues associated with the clean-up program.

2.5 Equipment

To carry out the clean-up and remediation activities of 2008 and 2009, the following equipment was used for the recovery of debris and handling of materials: one loader, one muskeg, one six-wheel drive ATV, one trenching machine, one 4x4 vehicle and 2 garbage compactors.

A certified semi-portable oil collection tank was used at the Expo site. It greatly reduced the quantities of liquid waste shipped south and also made it possible to recycle some of the waste as fuel for the oil furnaces used on-site.

Thirty-two (32) containers of recyclable debris and forty-five (45) containers of contaminated soils were used to transport debris and residual hazardous materials (RHM) to the south.

2.6 Field Logistics

Since Berbagamo was the only camp in operation in 2009, it was the first site to be cleaned-up and freed of debris. Afterwards, the clean-up operations were transferred to the Expo site in order to complete the remediation of the old exploration camp (K-61).

3. DISMANTLING AND CLEAN-UP

3.1 Field Operations

CRI prepared a manual of procedures outlining the 2008-2009 Clean-up Program. These procedures were implemented to ensure the safety of the workers and to provide a framework for the clean-up operations, in full respect of the environment and in compliance with the applicable regulations.

Here are a few of the directives contained in the manual to illustrate the implication of CRI in the clean-up program:

"The area reserved for the recovery of residual materials shall be organized in such a manner as to reduce any risks of contaminating the environment through potential leaks or spills. This implies that:

- The work area is well marked and easily identified. Furthermore, the area must be located away from traffic in order to minimize the risks of a collision;*
- The work area must occupy a flat surface in order to provide stability for the equipment in use;*
- The work area must be divided into work stations (for example: temporary storage "treatment pending", unloading of containers into waste tanks, drainage of containers, crushing of containers);*
- Inside the work area, all residual materials must be stored in bins or on spill containment platforms until they are treated;*
- Contaminated residual materials must be handled in a bin or on a containment platform (for example : unloading of contaminants, drainage and compaction of containers);*
- The compactors to crush barrels and spray cans must be installed in a bin or on a containment platform large enough to permit the safe handling of containers. Enough free space must be available around the compactor to permit the handling of containers directly over the bin or platform;*
- After containers and contaminants have been unloaded or drained, they must be disposed of according to the method stipulated in **Section 3** of the Manual;*

- An inventory must be kept and regularly updated - see Manual

For more details, refer to: 2008-2009 Clean-up Program - Procedure Manual - Management of Residual Materials, July 2008.

3.2 CRI Achievements since 2002

CRI has voluntarily undertaken clean-up and remediation operations on old abandoned mining exploration sites since 2002. To date more than 31 old abandoned sites have been rehabilitated or cleaned according to their type and category. See Table 2.

Table 2: List of sites that have been cleaned or rehabilitated by CRI - 2002-2009

Site	Category	Work completed by CRI	Work to be completed by CRI	Completed
K-61 Expo	Major	Camp rehabilitated by CRI in 2005	Recovery of scrap, debris, barrels RHM, and contaminated soils	2009
K-28 Mesamax	Major	Debris piled up, recovery of RHM	Debris moved to Berbegamo	2009
I-14 Mesamax	Major	Debris piled up, recovery of RHM	Debris moved to Berbegamo	2008
KAN-4	Intermediate	Debris piled up	Recovery of barrels Winter 2007	2007
KAN-2	Intermediate	Debris piled up	Recovery of barrels Summer 2007.	2007
KAN 10	Intermediate	Debris piled up, recovery of RHM	Work completed on this site	2007
K-37	Intermediate	Debris piled up	Debris moved to Expo	2008
K-27	Intermediate	Debris piled up	Debris moved to Expo	2008
K-49	Intermediate	Debris + airplane	Work completed	2006/2007
KAN-5	Minor	Debris moved to Mequillon	Debris moved to Expo	2007
K-36	Minor	Debris piled up	Clean-up 2006	2007
KAN-3	Minor	Debris piled up	Recovery of barrels Winter 2007	2007
KAN-11	Minor	Muskeg	Recovery of barrels Winter 2007	2007
KAN-8	Minor	Debris moved to Mequillon	Debris moved to Expo	2007
KAN-12	Minor	Debris moved to Mequillon	Debris moved to Expo	2007
K-41	Minor	Debris moved to Mequillon	Debris moved to Expo	2007
K-42	Minor	Debris moved to Mequillon	Debris moved to Expo	2007
K-45	Minor	Debris moved to	Debris moved to Expo	2007

		Mequillon		
I-6	Minor	Debris moved to Expo	Work completed at this site	2005
I-8	Minor	Debris moved to Mequillon	Work completed at this site	2006
I-10	Minor	Debris moved to Mequillon	Work completed at this site	2006
I-13	Minor	Debris moved to Berbegamo	Work completed at this site	2006
I-33		Debris moved to Berbegamo	Work completed at this site	2006
Kan-2	Intermediate	Debris moved to Expo	Work completed at this site	2006
Kan-3	Minor	Debris moved to Mequillon	Work completed at this site	2006
K-20	Minor	Debris moved to Berbegamo	Work completed at this site	2006
K-31	Minor	Debris moved to Expo	Work completed at this site	2006
K-34	Minor	Debris moved to Expo	Work completed at this site	2005
K-35	Minor	Debris moved to Expo	Work completed at this site	2005
SW-51	Minor	Debris moved to Expo	Work completed at this site	2005
WB-4	Minor	Debris moved to Berbegamo	Work completed at this site	2007

Sources : CRI Exploration Group

3.3 Recovery of debris - Summary 2008-2009

Over the last seven (7) years, all scrap and debris recovered during the clean-up and remediation operations on the 31 abandoned mining exploration sites were transported and piled up at the Expo or Berbegamo sites. The first scrap shipment sent south was in 2008. Hazardous materials were stored at the new MDDEP-certified facilities of the Nunavik Nickel Project.

Activities completed under the 2008 Program:

- Recovery of debris at Expo site (K-61)
 - Closing and dismantling of Old Expo Camp,
 - Recovery of hazardous materials and storage at the newly certified Expo facilities,
 - Shipping of 3,600 old barrels to the south for recycling,
 - Recovery of contaminated soils and storage at the new certified Expo facilities,
 - Closing and cleaning of 3 fuel caches used for the Gerido project

Activities completed under the 2009 Program:

- Cleaning and remediation of Expo (K-61) and Mesamax (K-28) sites,
- Cleaning and recovery of debris collected at twenty-nine (29) other abandoned exploration sites (now entirely cleaned) and stored at the Expo and Berbegamo sites,
- Cleaning and recovery of the debris remaining after construction work undertaken at the Expo site,
- Conditioning of contaminated soils before their shipment to the south,
- Conditioning of RHM found on the old exploration sites,

- Shipping of RHM, soils and debris to the south:
 - 13,000 old barrels for recycling,
 - 40 m³ of used tires for recycling,
 - 13,000 litres of old oil to be used for energy purposes,
 - 90 m³ of scrap steel for recycling,
 - 240 m³ of oil contaminated soils for decontamination,
 - 35 m³ of RHM for treatment

The small quantities of RHM (batteries, antifreeze, solvents, etc) found on old abandoned sites were stored at the new certified Expo facilities site.

Finally, residual materials found at old abandoned sites such as propane, diesel and calcium were either recycled or used on-site.

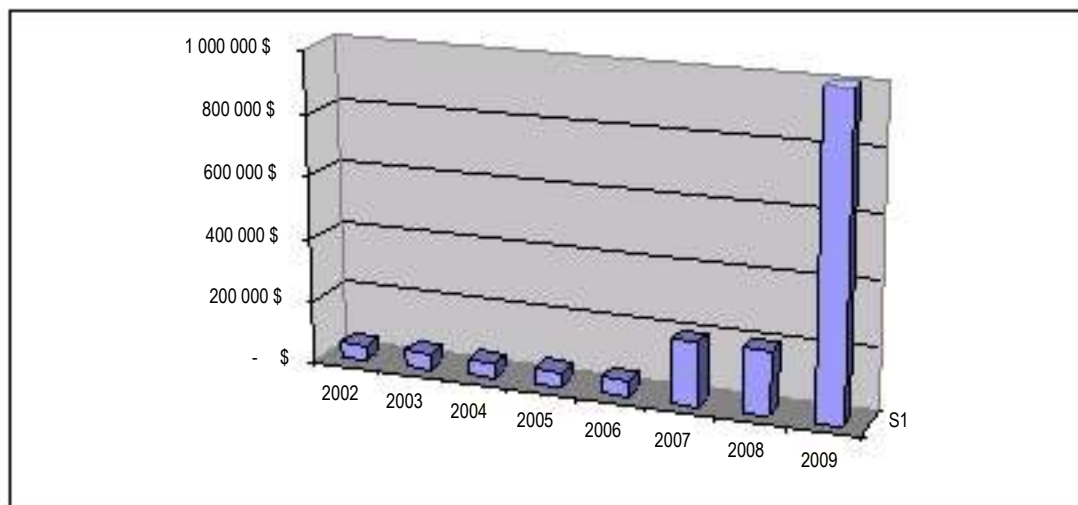
4. IMPACT ON BUDGET

Clean-up operations represented an important investment for CRI, particularly the collection of debris at sites that were only accessible by helicopter. In 2007 only, more than \$200,000 was spent to recover debris and scrap at remote sites and its transport to Expo.

The costs involved for the last 7 years were mostly for personnel, logistics and equipment.. Additional investments in labour, equipment and material were required in 2009 for the recovery and management of scrap and debris, and its transportation to the south.

The 2009 campaign represents an investment of \$1,000,000 and a 7-year effort for the recovery, conditioning, sea transportation, disposal and/or recycling of scrap, and the treatment of contaminated soils.

Table 3: Clean-up Operations Budget (2002 - 2009)



Source: CRI Exploration

5. CONCLUSION

The clean-up of old abandoned mining exploration sites voluntarily undertaken by CRI since 2002 resulted in the remediation of more than 31 old abandoned sites. This enormous achievement by a small exploration company shows that it is possible to innovate in order to protect the environment.

The utilization of labour and equipment reserved for drilling operations played a big role in this achievement, mainly for the following reasons:

- Motivated and committed personnel ,
- Easy access to abandoned sites,
- Availability of helicopters on their return flights,
- Basic training in clean-up work,
- Minimal equipment required,
- Minimal investment required.

Besides being one of the founding members of the FRAN and an active supporter of this cause, Canadian Royalties Inc. has also identified the necessary elements to complete an environmentally successful exploration program in remote northern areas:

- Minimise the environmental footprint at exploration sites and camps,
- Systematically bring back all scrap and debris on return flights,
- Undertake progressive remediation actions at active exploration sites,
- Diligent management of RHM.
- Use opportunities offered by facilities and equipment already in place to rehabilitate or clean up old exploration sites found on company property.

A special thank-you to Mr. Glenn Mullan, Chairman of the Board of Directors at CRI, for his personal implication and proactive vision regarding the remediation of mining sites.

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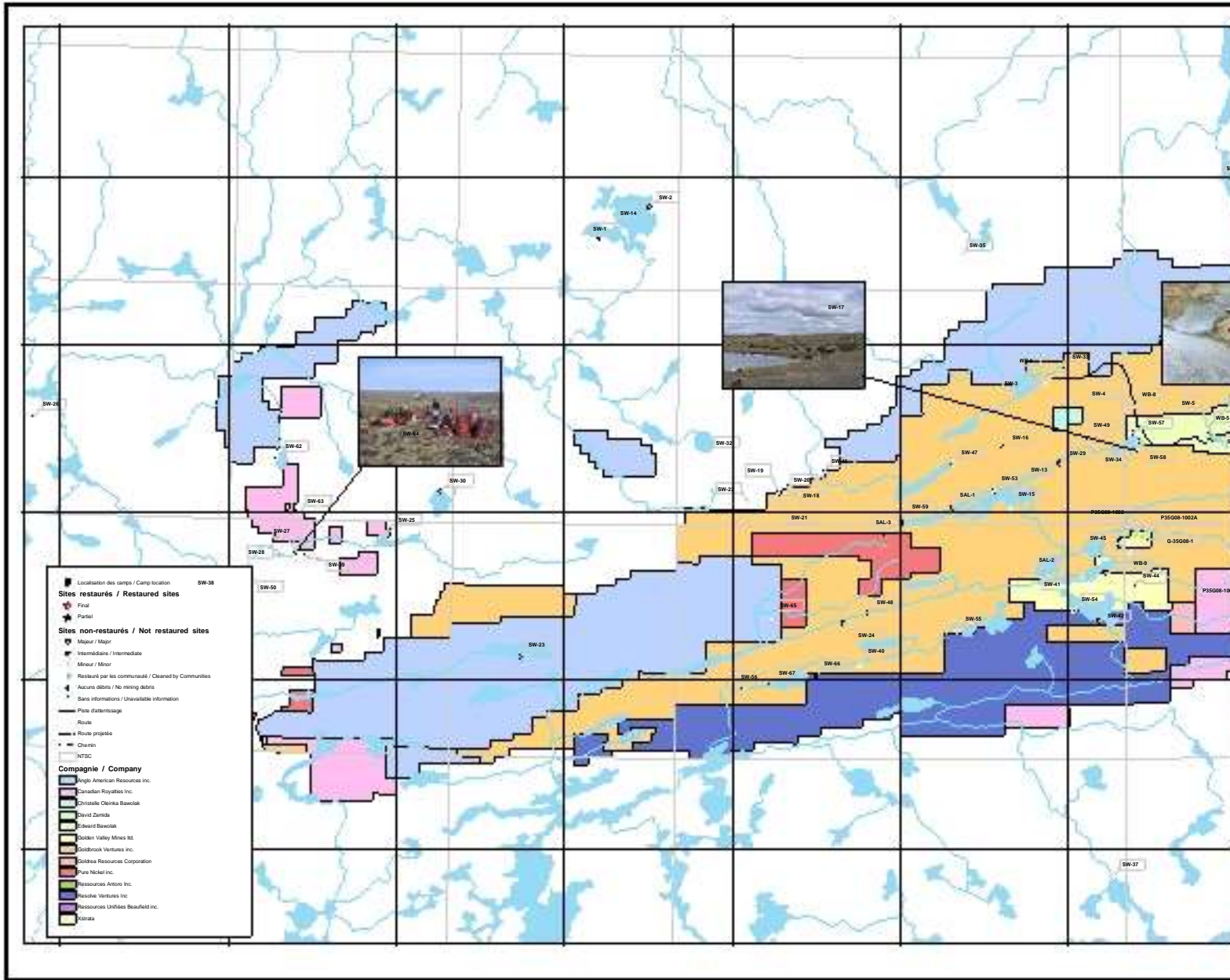
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ANNEX A

**LOCATION MAP OF
ABANDONED MINING EXPLORATION SITES**



ANNEX B

**PHOTOGRAPHS OF OPERATIONS
2008- 2009 CLEAN-UP PROGRAM**



Picture 1 - Recovery of residual fluids



Picture 2 - Crushing of barrels for transportation - K-61



Picture 3 - Loading of barrels inside containers before shipping to the south & recycling



Picture 4 - Loading of residual materials before shipping south



Picture 5 - Work in progress at K-61 - September 2008



Picture 6 - Work in progress at K-61 - August 2009



Picture 7 - Old Dump at K-61 - Storage of scrap and debris - 2007



Picture 8 - Old Dump at K-61 - Cleaning Operations September 2008



Picture 9 - Recovery of steel & barrel crushing station



Picture 10 - Recovery of old water supply pipes



Picture 11- Old Dump at K-61 - Clean-up completed- September 2009



Picture 12 - Old Dump at K-61 - Clean-up completed - September 2009



Picture 13 - Mesamax K-28 - During clean-up operations - July 2009



Picture 14 - Mesamax K-28 - After clean-up - August 2009

ANNEX C

PHOTOGRAPHS OF CLEAN-UP AND REMEDIATION OPERATIONS - BEFORE AND AFTER

Pictures showing progress of clean-up operations - 2008 - 2009 Clean-up Program



Picture 15 - Old Expo Camp - July 2008.



Picture 16 - Old Expo Camp- September 2008.

Pictures showing progress of clean-up operations - 2008 - 2009 Clean-up Program

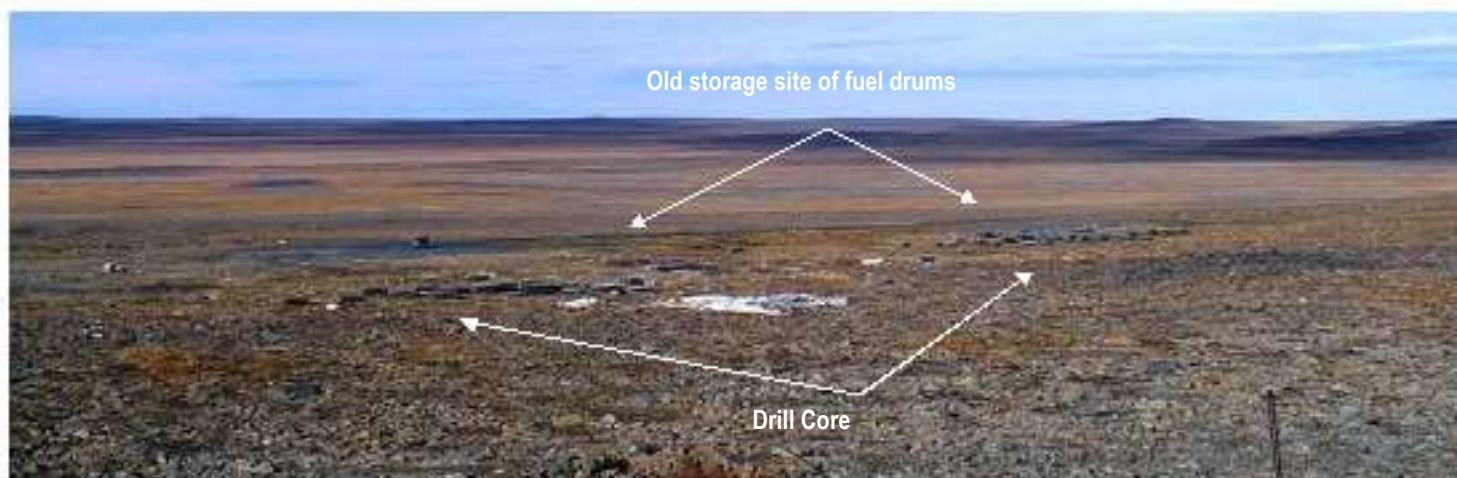


Picture 17 - Old Expo Camp - July 2008.



Picture 18 - Old Expo Camp - Progress of Operations at the end of July 2009

Pictures showing progress of clean-up operations - 2008 - 2009 Clean-up Program



Picture 19 - Old Expo Camp - Progress of Operations - August 2009



Picture 20 - Old Expo Camp - Work completed - End of August 2009

Pictures showing progress of clean-up operations - 2008 - 2009 Clean-up Program



Picture 21 - Crushing Site - Expo July 9, 2009



Picture 22 - Crushing Site- Expo, September 9, 2009 after site cleaning

APPENDIX 3

COMMUNITY BULLETIN FROM KRG

COMMUNITY INFORMATION

In 2003 the KRG and the Makivik Corporation published a report entitled *Assessment and prioritization of abandoned mining exploration sites in Nunavik* with the goal of addressing an important environmental issue, namely abandoned mining exploration sites in the region and their impact on the environment. With the help of several organizations and local informants, 275 sites were identified. These were later categorized as major, intermediate and minor.

In 2007, with funding from KRG, Makivik Corporation, MRNF (Ministère de ressources naturel et faune) and Fonds Restor-Action (FRAN), KRG began a 6 year campaign to clean up the 18 major sites identified in the initial inventory. Since then 7 of these sites have been completed:

- The site known as PJ-17 (Merganser Point), near the community of Aupaluk was completed this year with the help of local participants and Cruise North, who, during the past 4 years, has provided numerous volunteers the opportunity to be environmental stewards in their own region;
- Site WB-3 (Qulusuttalik Lake) near the community of Kangiqsujaq was also completed this year with the help of local workers;
- Site TW (Twin Lake) near Kangirsuk took 3 years of hard work and dedication by the KRG team and local participants to realize its completion;
- This year SAL-1 (Nulivik Lake), south of Salluit, was completed with the help of the mining company Goldbrook and their team at Camp Belanger as well as workers from both Salluit and Kangiqsujaq;
- The clean-up of sites K-28 and K-61 (Expo Camp), located west of Kangiqsujaq, were accomplished independently by Canadian Royalties over a period of 4 years. This company has also cleaned many minor sites that were identified to be located on or near their property;
- Site KAW-45 (Musset Lake), North of Kawawachikamach, was completed in 2006 with the participation of the Naskapi, Innu and Montagnais Nations.

In July, October and November work was realized on PJ-1, which is located between the communities of Tasiujaq and Aupaluk. Debris and waste was collected during the summer and approximately 9000 pounds was removed in October and transported south. Heavy machinery is currently being transported from the site to Aupaluk for temporary storage. An update regarding work completed on this site will be available in mid-January 2010.

In October 2009 work was realized on the site KAW-35, near Retty Lake north of Kawawachikamach. 20, 000 pounds of metal was removed and transported to Sept-Iles by train.

The clean-up will continue with the objective of completing all 18 sites by 2012. The remaining sites include:

- SW-27, 90 kilometers south-southwest of Salluit;
- SW-42 (Beauparlant Lake), 100 kilometers south-southeast of Salluit;
- SW-34, along the shores of Esker Lake;
- WB-9, the Falconbridge campsite on Kenty Lake, 100 kilometers south-southeast of Salluit;
- TQ-1, now known as Gerido camp owned by Safari Nordik;
- TQ-4 (Garigue Lake), south of Tasiujaq;
- PJ-10 (Ford Lake), 30 kilometers west-southwest of Aupaluk;
- KV-1, located 100 kilometers southwest of Salluit on an unknown lakeshore;

- WHA-1 located east of Umiujaq in the Richmond Gulf area.

The KRG is providing this update because we share these accomplishments with Nunavik communities, Makivik Corporation, MRNF and FRAN and appreciate their collaboration. If you have any questions of information regarding these sites, please do not hesitate to contact the KRG.

A handwritten signature in black ink, appearing to read 'N. Dea', with a stylized, cursive script.

Nancy Dea
Project Manager, Abandoned Mining Site Rehabilitation Project
KRG



**Ressources naturelles
et Faune**

Québec



LP^{co}Λ^{co}

Société Makivik

Makivik Corporation

Fonds Restor-Action Nunavik