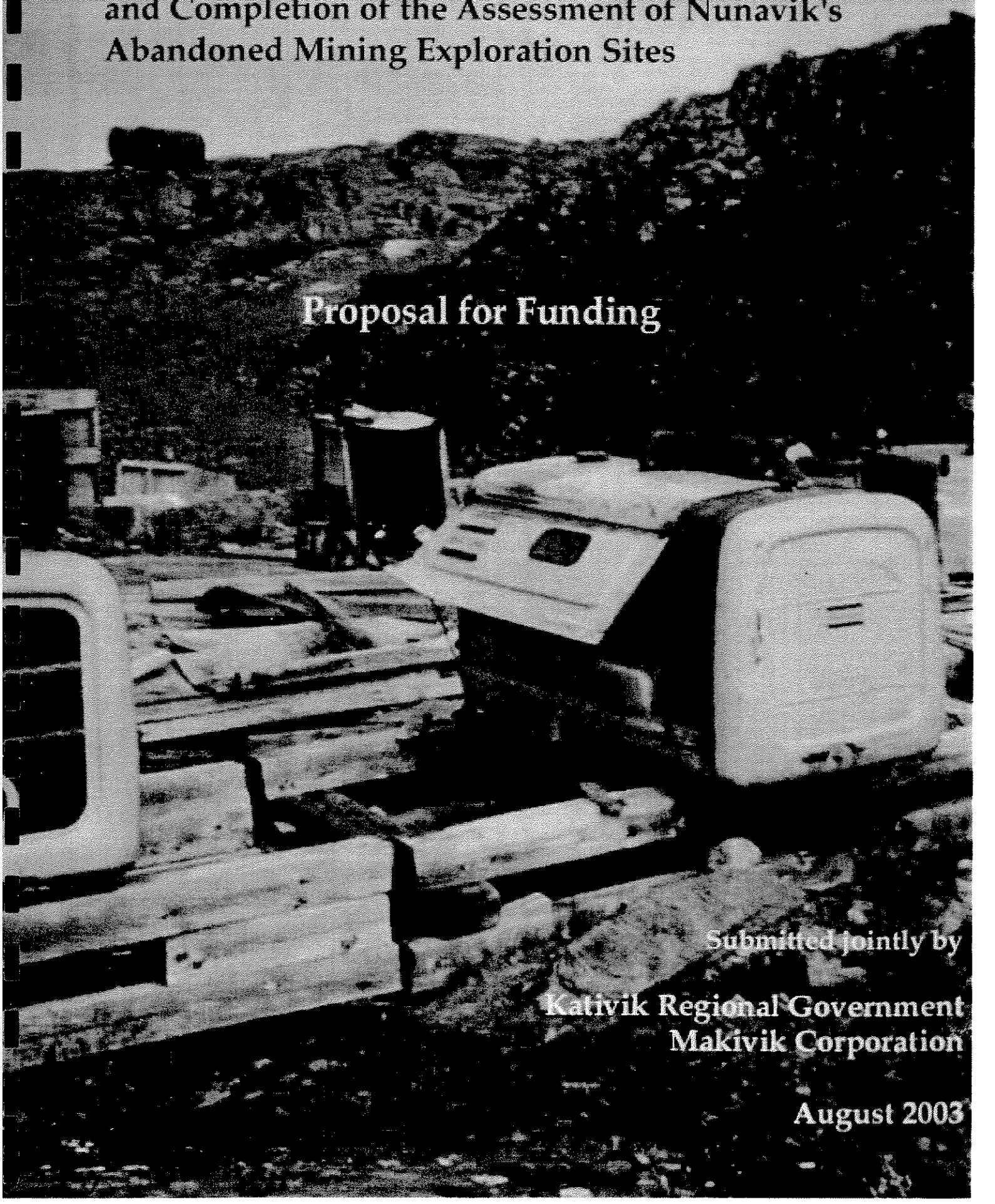
Remedial Measures and Completion of the Assessment of Nunavik's Abandoned Mining Exploration Sites



Proposal for Funding

Submitted jointly by

Kativik Regional Government
Makivik Corporation

August 2003

This proposal is submitted by :

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Inuit Communities of Nunavik

Naskapi Nation of Kawawachikamach

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LIST OF ACRONYMS:

CCME	Canadian Council of Ministers of the Environment
CSR	Corporate Social Responsibility
DIAND	Department of Indian Affaires and Northern Development
GÉTIC	Groupe d'études inuit et circumpolaires de l'Université Laval
IIED	International Institute for Environment and Development
JBNQA	James Bay and Northern Québec Agreement
KRG	Kativik Regional Government
MENV	Minister of the Environment
MRNQ	Ministère des Ressources naturelles du Québec
NEQA	Northeastern Quebec Agreement
NNK	Naskapi Nation of Kawawachikamach
WBCSD	World Business Council for Sustainable Development

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Executive Summary

This report is a continuation of joint projects involving the Kativik Regional Government, Makivik Corporation, the Naskapi Nation of Kawawachikamach, and the Groupe d'études inuit et circumpolaires de l'Université Laval (GETIC) to identify and assess the abandoned mining exploration sites in Nunavik. Primary results indicated some 595 potential abandoned mining exploration sites north of the 55th parallel (Duhaime and Comtois, 2002). Assessment of 193 of these sites indicates that 90 contain some residual material considered dangerous to the environment and to the health of local inhabitants (Kativik Regional Government, Makivik, 2003). Of these 90 sites, 18 were deemed "Major", 27 "Intermediate", and 45 "Minor".

The goal of this proposal is to carry out, over a five year period, in partnership with the mining industry, mining associations, government departments and agencies the remedial measures of the major sites, undertake the necessary transfer of expertise for further clean-up of intermediate and minor sites, and assess the remaining potential exploration sites in Nunavik that have yet to be examined.

The remedial measures of the 18 major sites are to be carried out in the following manner: 1) during summer months, carry out soil remediation, collection of inert metal materials and in some cases nearby dump-sites disposal, compaction of drums, and on-site burning of combustibles. 2) during winter, transportation of remaining materials in certain cases to municipal dumps and for contaminants to southern recycling and waste disposal sites. In both of these phases, an emphasis on the safety, training, transfer of skills and hiring of local community members will be a priority.

The manner proposed for the assessment and prioritization of the remaining non-validated sites involves an initial aerial survey of all sites, with a return visit by helicopter to the most significant sites. It is our belief that this approach will allow for the most cost-effective evaluation of the sites, with the contents of the largest sites being inventoried.

Included in this proposal is a detailed projected budget of $ 4,143,753.30 for the remedial measures of the 18 known and inventoried major sites and the assessment of the remaining non-inventoried sites. As budget permits, intermediate and minor sites will be treated on a case by case basis.

1. INTRODUCTION

In keeping with the World Commission on Environment and Development's definition of Sustainability, we aim to conduct our activities responsibly with respect to protecting the environment and to integrate the cultural values of Inuit, First Nations and Northern Peoples. This project is designed, planned and will be carried out in accordance with standards that integrates the Native Peoples in the decision making process, ensures the quality of life and protect and enhance the environment of Nunavik.

Within these guidelines, a comprehensive remedial measures of all abandoned mining exploration sites in Nunavik in partnership with the mining industry, mining associations, governmental and non-governmental organisations are required in order to protect sensitive Arctic and Sub-Arctic ecosystems and the health of its population. The overall goal of this proposal is therefore to set up a programme with a funding mechanism for the remedial measures of all sites in Nunavik. In the immediate, this proposal is a request for funding to complete the assessment and characterization of abandoned sites, and to remediate the 90 abandoned mining exploration sites, with emphasis and priority being placed on the 18 major abandoned sites that pose the highest threat to the environment. These sites have been described in the report "Assessment and Characterization of Abandoned Mining Exploration Sites in Nunavik". Makivik Corporation and Kativik Regional Government (2003). For convenience, this description has been retranscribed in Appendix 1.

The main objectives of this project are:

- To carry out a safe and effective remedial measures of past mining exploration sites
- To reduce threats to a fragile arctic ecosystem, particularly where it impacts the food chain and human health
- To treat contaminated areas with the help of experts in order to restore their bio-diversity and life
- To remove as much debris and hazardous materials from the land as environmentally and logistically feasible. Any debris left over from mining exploration (contaminated or not) counters Inuit and Naskapi "respect for the land"
- To transfer a know-how and to involve the communities in the coordination, the prioritization, and carrying out this mandate
- To set the stage for further clean-up of intermediate and minor sites, and assess the 402 potential exploration sites in Nunavik that have yet to be examined

- To accomplish the above, as much as possible, in partnership with the industry and governments

- To gain improved knowledge regarding the impacts of development activities in the north, as related to mining exploration.

2. CONTEXT

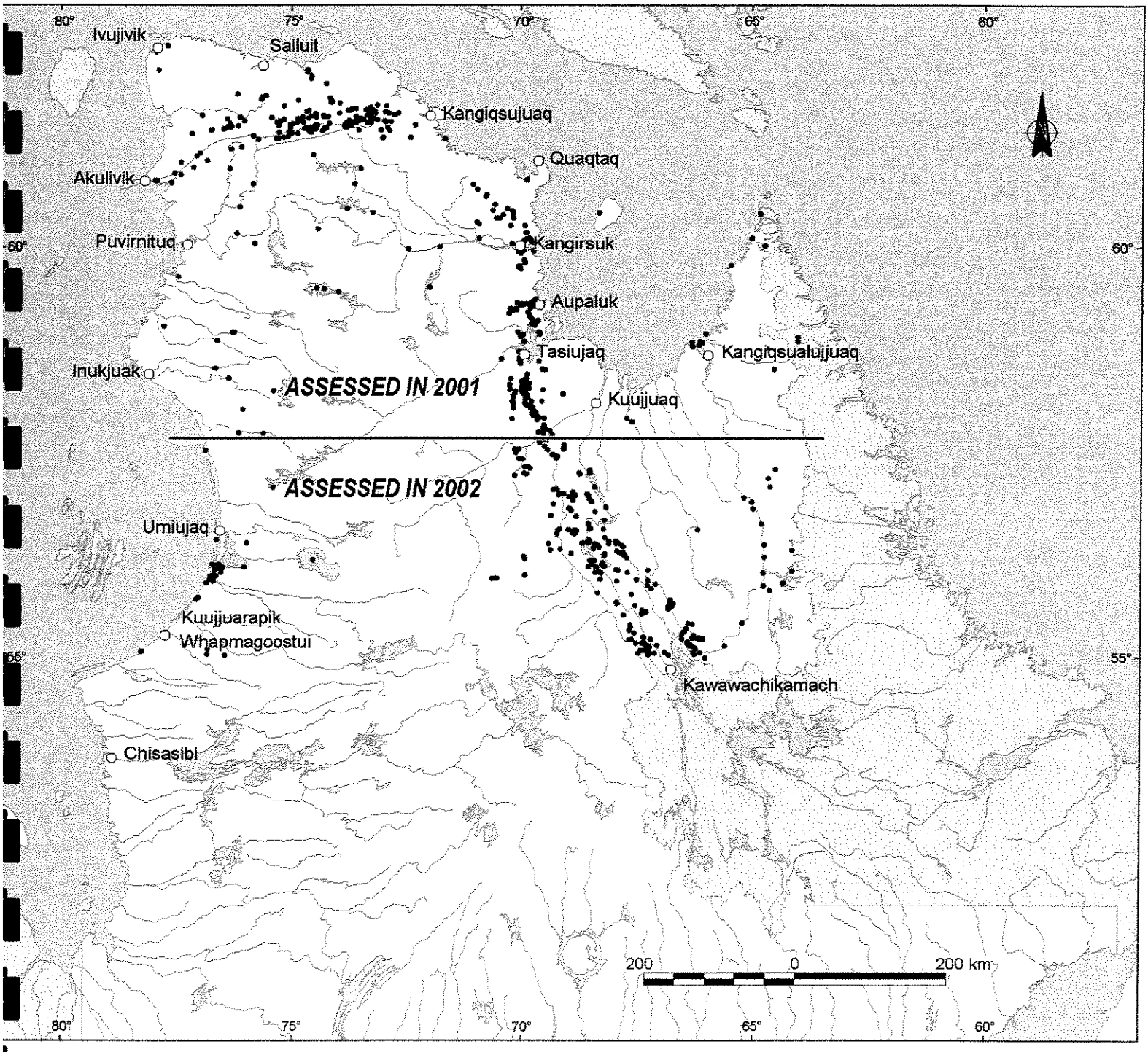
2.1 NUNAVIK

The region of concern is Nunavik (Map 1) which encompasses all of the territory north of the 55th parallel in Quebec. Most of the sites targeted are in the Ungava Trough, near Kangiqsujuaq and Salluit, and in the northernmost part of the Labrador Trough in the surroundings of Kuujjuaq, Tasiujaq, Aupaluk and Kangirsuk. Other sites are situated in the iron belt in the southern part of the Labrador Trough north of Kawawachikamach, and in the Hudson Bay area near the villages of Umiujaq and Kuujjuaraapik.

2.2 HISTORY AND BACKGROUND

From the 1940's to 1980's, extensive mining exploration campaigns were carried out in Northern Québec above the 55th parallel, especially in the Labrador and Ungava Troughs. Exploration was initiated in the Labrador Trough and oriented in a south-east–north-western direction, from Schefferville, near Labrador, to Kangirsuk, a village located on the western coast of Ungava Bay. In the 1950's, mining exploration activities were extended to the Ungava Trough, oriented east-west from Kangiqsujuaq, along Ungava Bay, to Hudson Bay. This prospecting led to the opening of the Asbestos Hills and Raglan mines. A third smaller region, located along the Hudson Bay coast between Umiujaq and Kuujjuaraapik-Whapmagoostui was also explored for its mining potential, but for a more limited period of time.

Before 1976, some companies cleaned up the sites when they left, while others abandoned them as is, leaving buildings, motors, core trays, drilling and heavy equipment (generators, compressors, bulldozers, etc.), petroleum tanks and barrels (some of which still contain residue), batteries, transformers, chemical products, salts and acids. Today it is clear that the vicinities of these sites have become polluted, consequently having dangerous impacts upon wildlife, water and ultimately the diet of the Nunavik people.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Quaqtaq
Akulivik
Puvirnituq
Kangirsuk
Aupaluk
Tasiujaq
Kangiqsualujjuaq
Inukjuak
ASSESSED IN 2001
Kuujjuaq
ASSESSED IN 2002
Umiujaq
Kuujjuarapik
Whapmagoostui
Kawawachikamach
Chisasibi
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On November 11, 1975, the signature of the *James Bay and Northern Québec Agreement* (JBNQA) (Québec, 1997), followed by the signature of the *Northeastern Quebec Agreement* (NEQA) on January 31, 1978 (Canada, 1983), provided environmental regulations regarding development projects including mining activities. Consequently, after 1976, mining companies were subject to more strict rules, obliging them to declare their activities to the Ministère des Ressources naturelles du Québec (MRNQ) and to remediate sites upon abandoning camps.

On March 9, 1995, the *Loi sur les mines* was adopted by the Québec government. It affects mining exploration and exploitation activities. The provisions concerning the remedial measures of the sites include Articles 232.1 through 232.11. The latter specifies that the Minister may decide to go beyond the norms stipulated by the preceding articles and, therefore, "enjoin" the companies to clean up sites retroactively, with no time limit. However, as companies did not report their activities to MRNQ before 1976, it is impossible to identify those responsible for most exploration campaigns conducted in Nunavik before then (Duhaime and Comtois, 2002).

In the early 1990s, Inuit communities began to notice possible environmental contamination. In 1997, more than 100 litres of highly toxic concentrated acid, generally used for chemical exploration, were discovered improperly stored in an area accessible to the local population 10 km south of the Katinniq mine. In 2000, abandoned dynamite was found close to Tasiujaq (Duhaime and Comtois, 2002).

The presence of these materials left on the land is a great concern to the Inuit and Naskapi peoples. The fragility of arctic ecosystems, the threat posed by melting permafrost (destabilizing mining structures and tailings storage), and the immediate and long lasting effects to the food chain all pose direct threats to public and environmental health.

By 1997, KRG and Makivik initiated community-oriented identification and remediation of some sites perceived as dangerous by the communities. However, given the large number of sites, the amount of debris and the threat some sites pose to the environment, it became clear that a more organized and systematic approach would be necessary. To this end, a four-phase programme was designed. The first phase consisted of a pilot project to test various methods to best inventory the abandoned mining exploration sites. The second phase was an inventory of abandoned mining exploration sites in the region North of the 55thparallel. The third phase was to evaluate these sites in order to determine the size and the hazards that each site posed to the ecosystem and to the users of the land. The fourth and final stage, which is the purpose of this proposal, is to carry out the remedial measures of the identified sites and to complete the evaluation undertaken in Phase 3.

2.2.1 Phase 1: Pilot Project

In 1999, a pilot project conducted jointly by KRG, Makivik, and GÉTIC was carried out. It took place in a 50 square kilometre area located 70 km west of Kangiqsujuaq, and tested three methods to inventory abandoned mining exploration sites. The three methods tested involved: 1) interviews with local key informants and archival data; 2) aerial surveys; and 3) satellite imagery. The project concluded that aerial surveys and interviews are the most reliable ways to map the sites, and that archival data help to complete the inventory. It specifies, however, that in order to further characterise sites, a field survey by helicopter would be required. In the area surveyed, 47 abandoned mining exploration sites were located on topographic maps (Duhaime and Comtois, 2000).

2.2.2 Phase 2: Inventory

In the summer of 2000, the combined results of the interviews conducted in 14 Inuit and Naskapi communities, along with a consultation of existing MRNQ documentation, revealed the possible existence of 595 abandoned mining exploration sites in Nunavik, most of them located in the Labrador and Ungava Troughs. Results of this study are reported in the "Inventaire des sites abandonnés d'exploration minière au Nunavik" (Duhaime and Comtois, 2000).

2.2.3 Phase 3: Assessment

Beginning in 2001, a two years project to assess and characterize the abandoned mining sites was initiated. Efforts began in the Ungava Trough in the area surrounding Kangiqsujuaq and Salluit, and in the northernmost part of the Labrador Trough in vicinities of Kuujjuaq, Tasiujaq, Aupaluk and Kangirsuk. In 2002, site characterization took place in the southernmost part of the Labrador Trough north of Kawawachikamach, and in the Hudson Bay area, namely Umiujaq and Kuujjuaraapik.

During Phase 3 (2001-2002), information on 193 of 595 potential abandoned mining exploration sites was gathered. These sites were classified according to their content, contamination, and the risk they pose to the environment. Classification was based on a list of criteria adapted from the *National Classification System for Contaminated Sites* including the assessment of the quantity of material and equipment present at the sites, and the soil and surface water contamination (CCME, 1992).

Of the 193 assessed sites, 90 were confirmed as abandoned mining exploration sites. Of the 90, 18 sites were classified as "major", 27 as "intermediate" and 45 as "minor". Appendix 2 presents the mining sites in relation to their proximity to the closest village and to their importance.

85 sites contained no residual material. Nine of these 85 sites had contained residual material prior to removal by community projects in mid 1990s. 18 other sites were attributed to other uses, mainly outfitting activities.

Based on the ratio of 90 sites containing abandoned residual mining material out of the sample of 193 visited, it is projected that there is a total of 277 out of the 595 potential mining exploration sites in Nunavik: 25 major, 95 intermediate, and 157 minor. Therefore, in addition to the 18 major, 27 intermediate and 45 minor sites inventoried, we might expect to find another 7 major, 68 intermediate and 112 minor sites. Their distribution would be almost equal between the Labrador Trough and the Ungava Trough-Hudson Bay region.

The major sites characterized in 2001-2002 contain abandoned buildings, heavy equipment, barrels of petroleum hydrocarbons (some of which contain residue), contaminated soil, and sometimes, batteries and transformers. In five major sites (K-28, K-61, KAW-35, TQ-1 and WB-9), there was evidence of recent mining exploration activities. Four of these sites, residue and debris from recent mining activities had not been removed nor had remedial measures been undertaken.

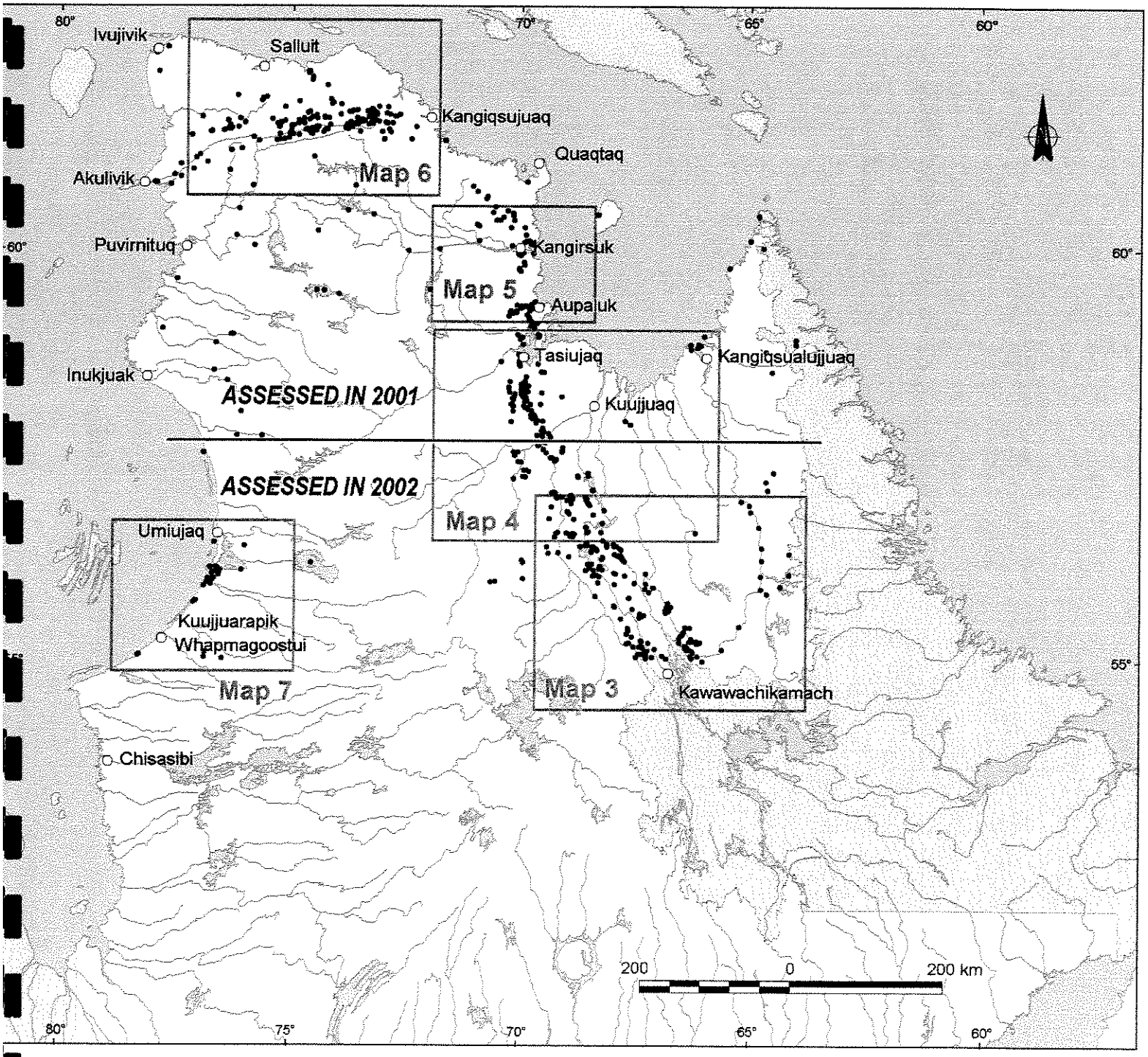
The results of the Phase 3 "Assessment" are summarized in the report "Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik: Final Report on a Two-Years Project 2001-2002" (KRG, Makivik, 2003) and to locate the sites, maps from that report are here reproduced (Maps 2, 3, 4, 5, 6, 7).

2.2.4 Phase 4: Remedial Measures And Completion of Assessment

Of the 90 abandoned mining sites assessed in the 2003 report, only one or two are currently being remediated. Further, basic scientific information and current research in the North are insufficient to fully predict the impacts of abandoned mining exploration sites to Nordic environments or to develop comprehensive technical solutions needed to address them (Office of the Auditor General, 2002). Thus, the potential for abandoned mining exploration sites to pollute underlying groundwater is present, and the safety of both public health and the surrounding ecosystem is at risk for the major sites. For these reasons, it is imperative to take action to clean up these sites and, as previously mentioned, the purpose of this proposal is to set up a program for remedial measures of these sites and to complete the evaluation undertaken in Phase 3.

3. CORPORATE AND GOVERNMENT RESPONSIBILITIES

Sustainable development is a concept adhere to by governments and the mining industry. Many governmental departments have in the recent years written their own strategy to achieve sustainable development within their sphere of responsibilities and the industry is contributing to sustainable development by presenting *Breaking New Ground, the first in-depth review of the mining and minerals sector from the perspective of sustainable development (* IIED, foreword*)*.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Inukjuak
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Kuujjuaq
ASSESSED IN 2002
Map 4
Umiujaq
Kuujjuarapik
Whapmagoostui
Map 7
Map 3
Kawawachikamach
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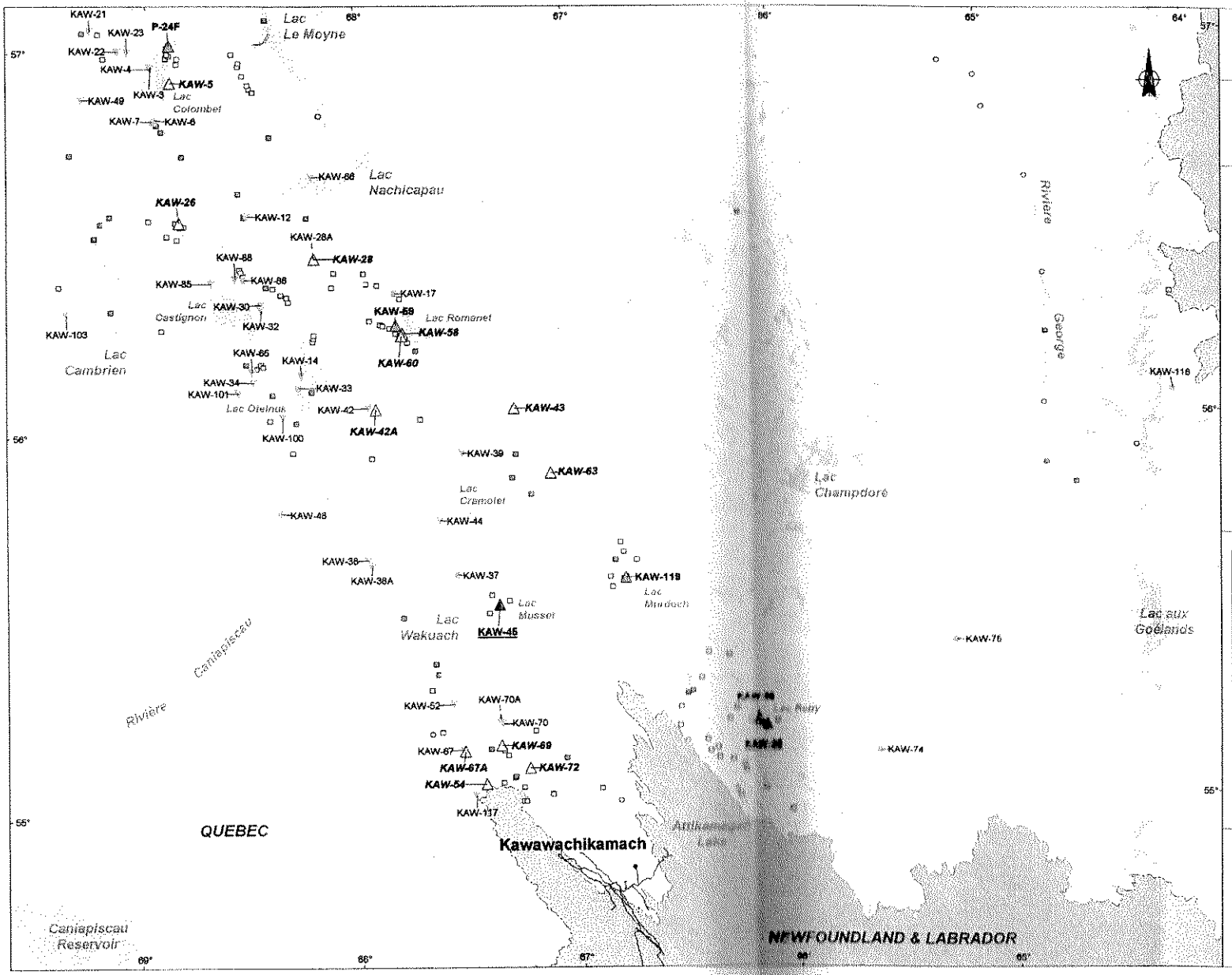


Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik

Map 3

Abandoned Mining Exploration Sites near Kawawachikamach

Legend

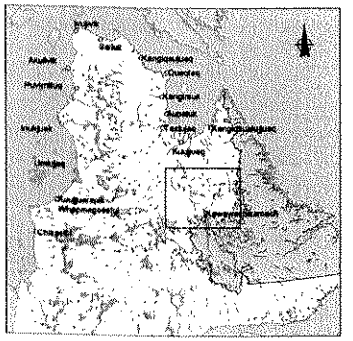
Assessed and Prioritized Sites

- KAW-1 ▲ Major
- KAW-1 ◬ Intermediate
- *KAW-1* △ Minor
- KAW-1 ◈ Cleaned by a community
- KAW-1 ▽ No debris
- KAW-1 ⊗ Other - not a mining site

Potential Sites *(Duhaime and Comtois, 2002)*

- ⊠ Informants
- ⊡ Archives
- ○ Other - not a mining site

0 20 40 60 km



Sources:

NTDB, 1 : 250 000, Permission from NRCan
Assessed and prioritized sites: Environment Canada, 2001 and 2002
Potential sites: Environment Canada, 2000
Lambert conformal conic projection, NAD83

Cartography realised by Carto-Média, 2003
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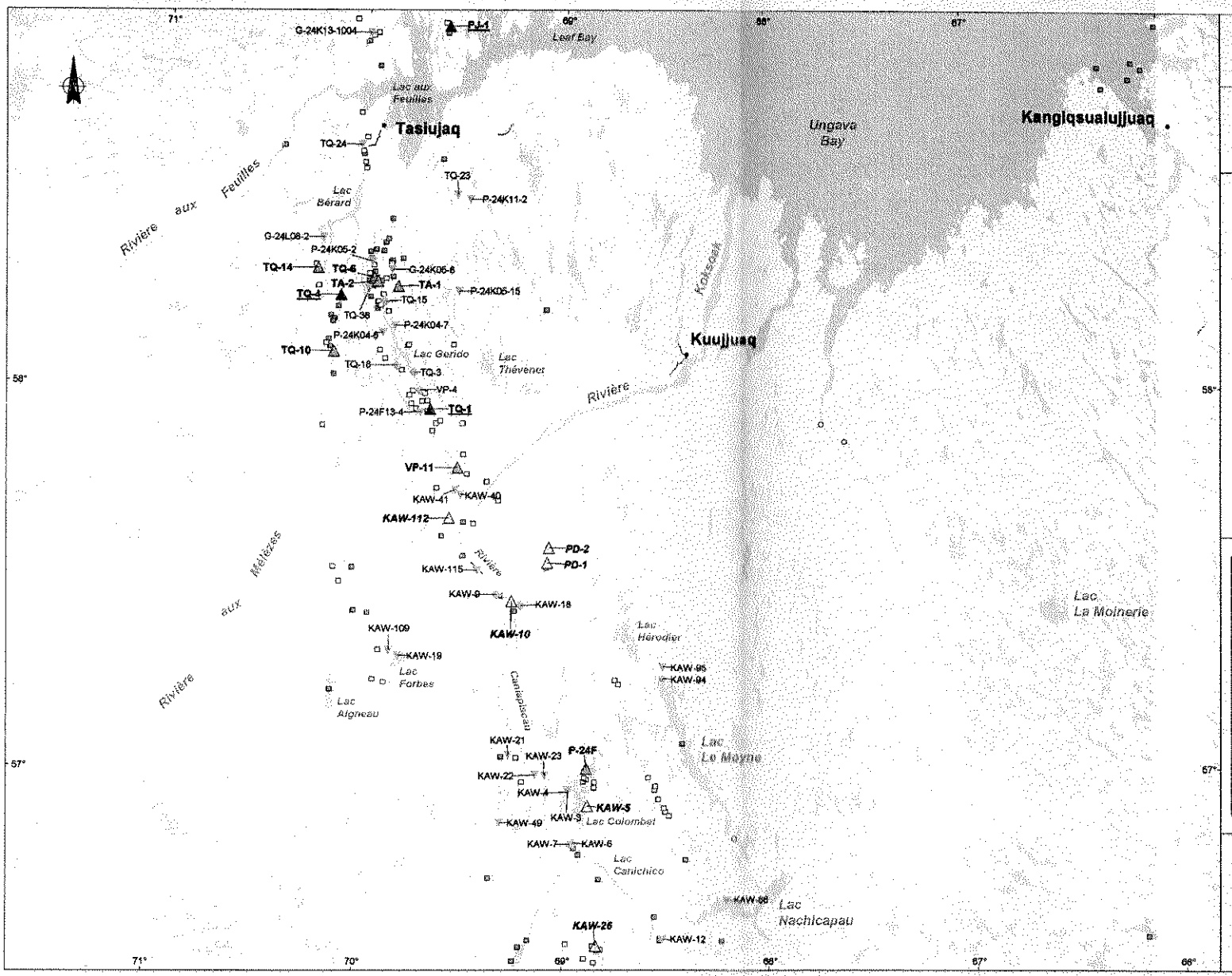
January 2003



Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik

Map 4

Abandoned Mining Exploration Sites near Kuujjuaq and Tasiujaq

Legend

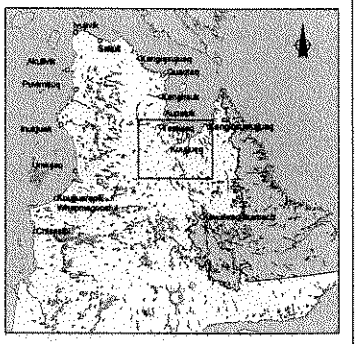
Assessed and Prioritized Sites

- KAW-1 ▲ Major
- KAW-1 ◬ Intermediate
- *KAW-1* △ Minor
- KAW-1 ◈ Cleaned by a community
- KAW-1 ▽ No debris
- KAW-1 ⊗ Other - not a mining site

Potential Sites *(Duhaime and Comtois, 2002)*

- ⊗ Informants
- □ Archives
- ○ Other - not a mining site

0 20 40 60 km



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Potential sites: Environment Canada, 2000
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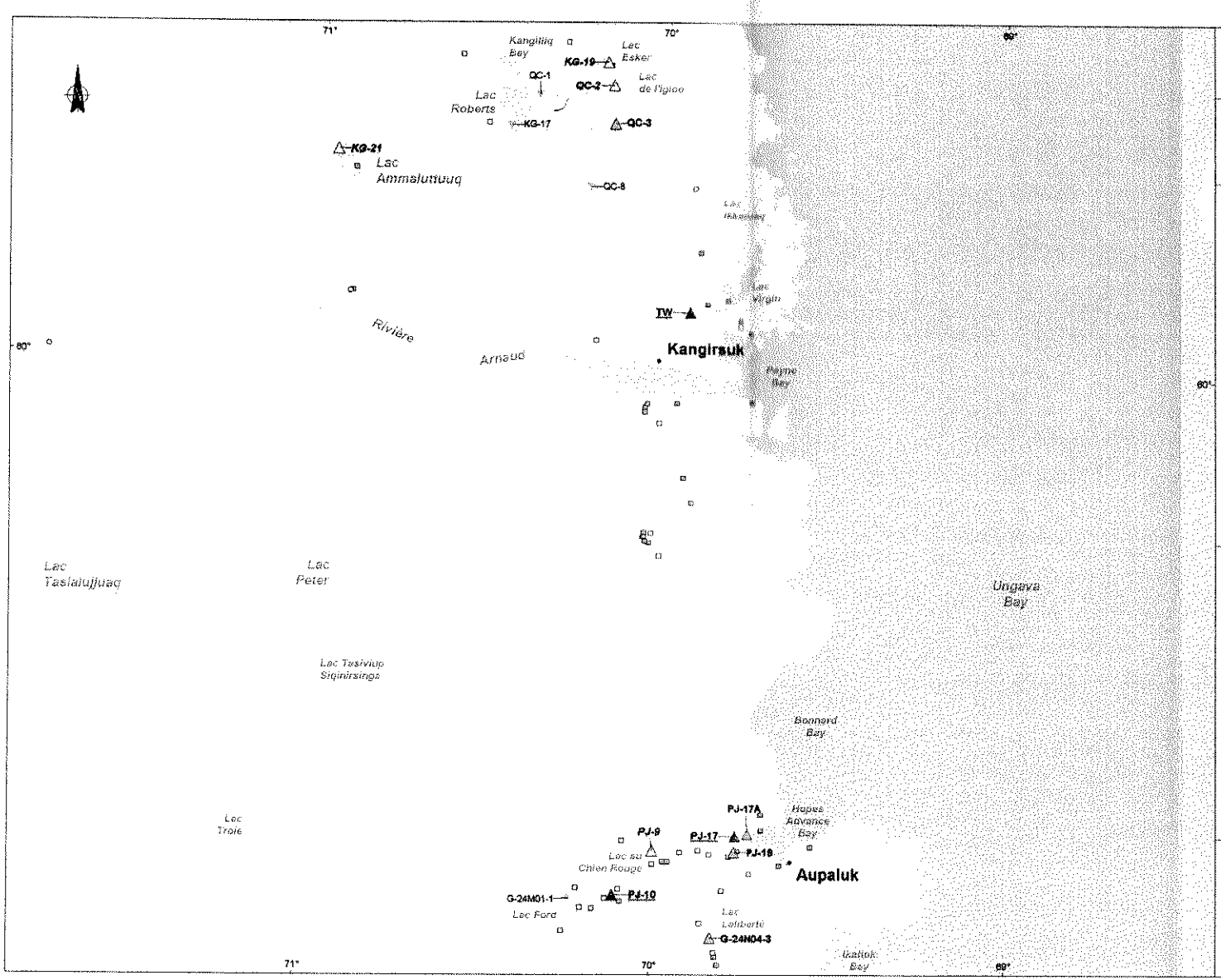


Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik

Map 5

Abandoned Mining Exploration Sites near Aupaluk and Kangirsuk

Legend

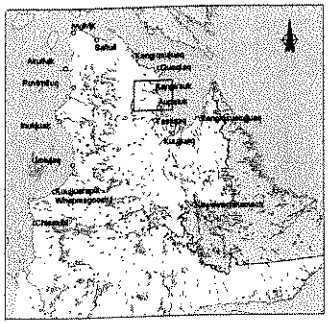
Assessed and Prioritized Sites

- KAW-1 ▲ Major
- KAW-1 ◬ Intermediate
- KAW-1 △ Minor
- KAW-1 Cleaned by a community
- KAW-1 No debris
- KAW-1 Other - not a mining site

Potential Sites *(Duhaime and Comtois, 2002)*

- Informants
- Archives
- Other - not a mining site

0 10 20 30 km



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Potential sites: Environment Canada, 2000
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Cartography realised by Carto-Media, 2003
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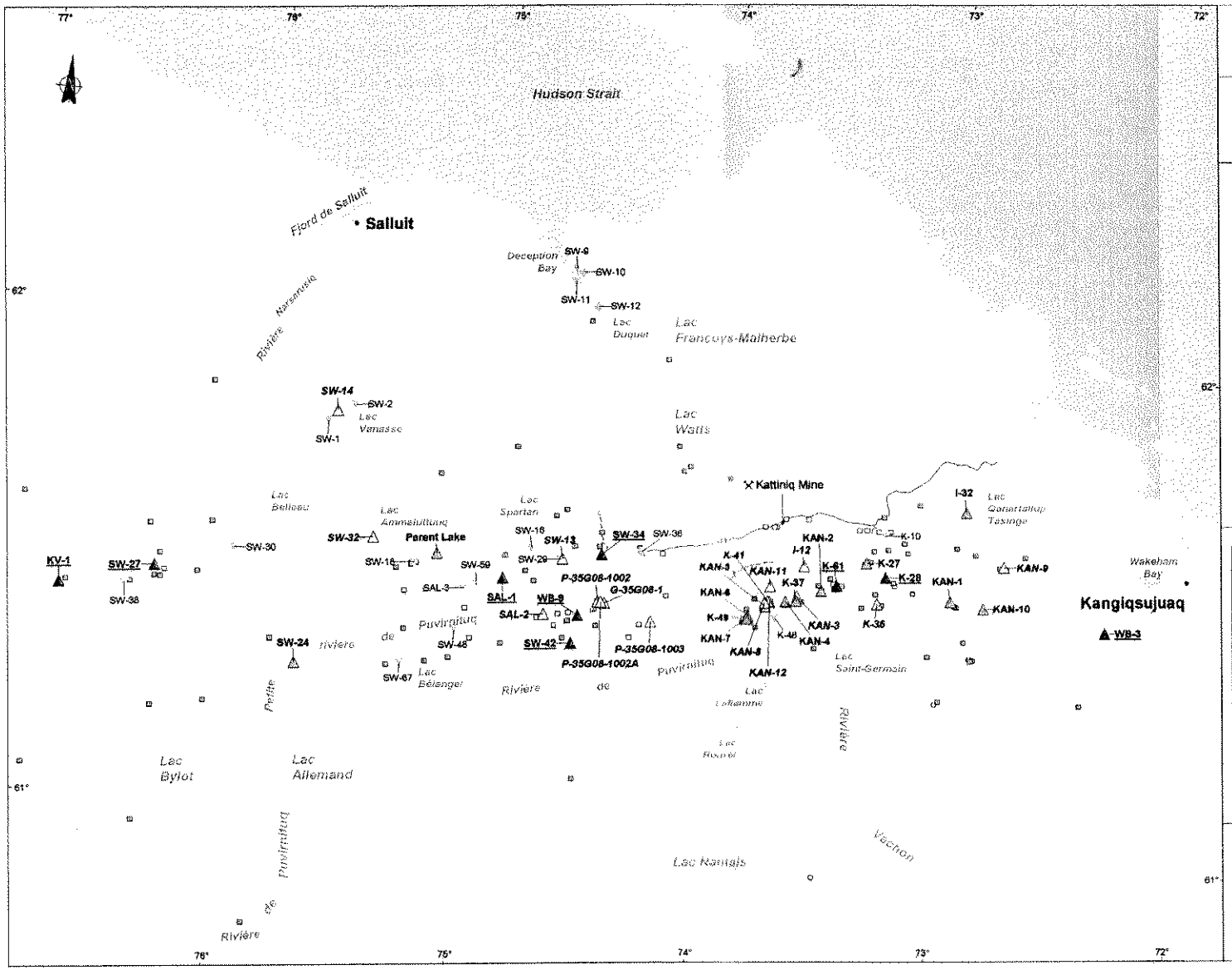


Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik

Map 6

Abandoned Mining Exploration Sites near Kangiqsujuaq and Salluit

Legend

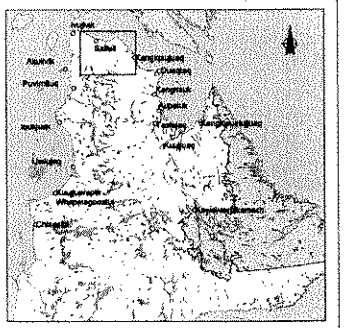
Assessed and Prioritized Sites

- KAW-1 ▲ Major
- KAW-1 △ Intermediate
- *KAW-1* △ Minor
- KAW-1 Cleaned by a community
- KAW-1 No debris
- KAW-1 Other - not a mining site

Potential Sites *(Duhaime and Comtois, 2002)*

- Informants
- Archives
- Other - not a mining site

0 15 30 45 km



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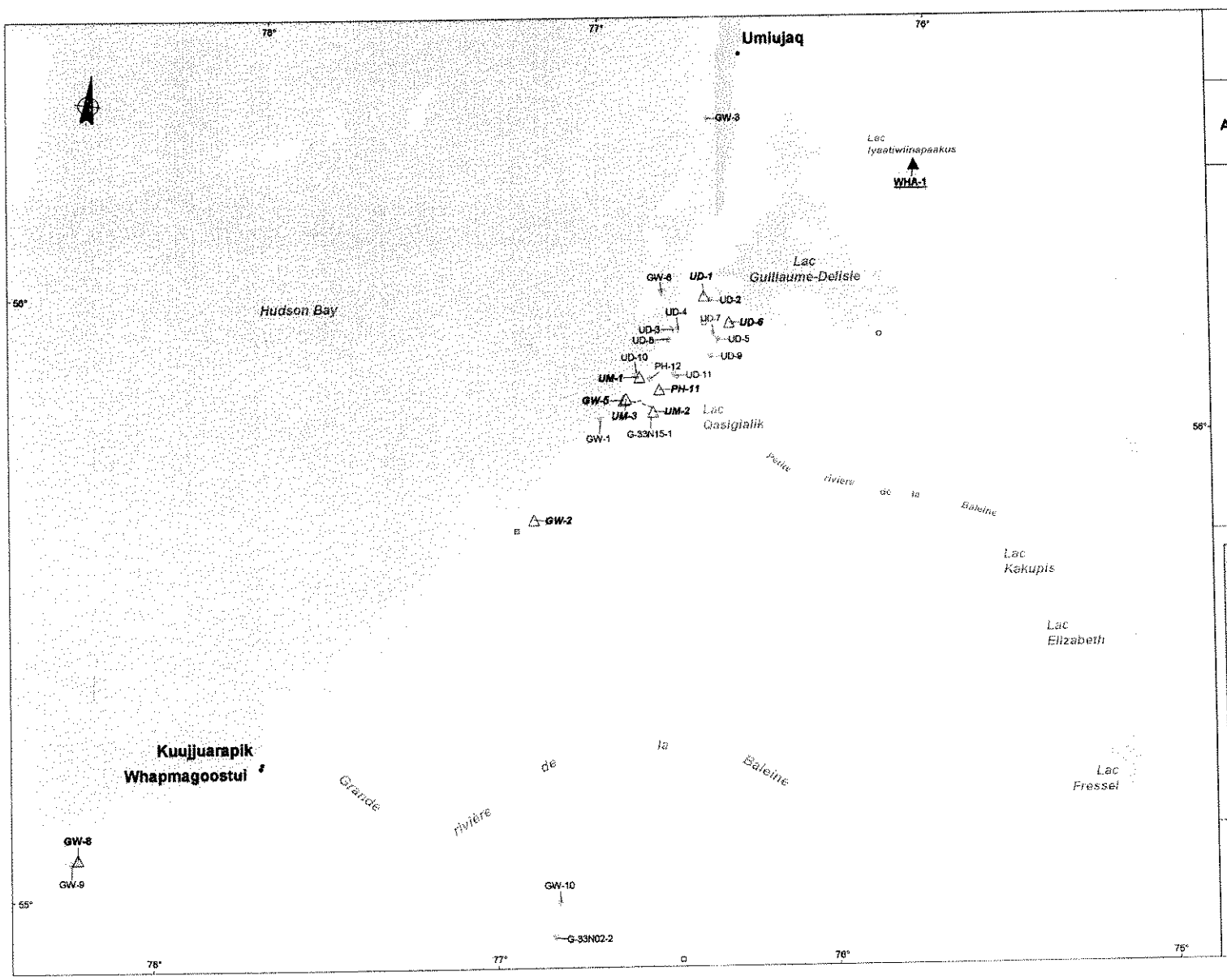


Assessment and Prioritization of Abandoned Mining Exploration Sites in Nunavik

Map 7

Abandoned Mining Exploration Sites near Umiujaq and Kuujjuarapik

Legend

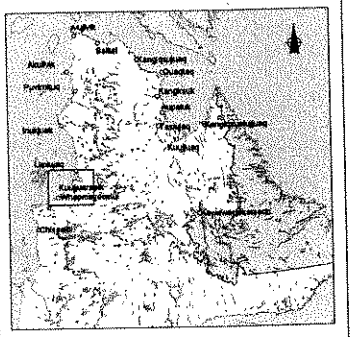
Assessed and Prioritized Sites

- KAW-1 ▲ Major
- KAW-1 △ Intermediate
- *KAW-1* △ Minor
- KAW-1 Cleaned by a community
- KAW-1 No debris
- KAW-1 Other - not a mining site

Potential Sites *(Duhaime and Comtois, 2002)*

- Informants
- Archives
- Other - not a mining site

0 14 28 42 km



Sources:

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Potential sites: Environment Canada, 2000
Lambert conformal conic projection, NAD83

Cartography realised by Carto-Media, 2003
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It is not our intention to define specific legal responsibilities in regards to the remedial measures of the abandoned mining exploration sites in Nunavik. However, the federal and provincial governments have responsibilities towards the natural resources, the environment and the Native Peoples, and both have established policies regarding mining, site remedial measures and closure. Moreover, the Department of Indian and Northern Affairs Canada, has set up multi-million dollar programs for clean-up of abandoned sites in Nunavut and in the North-West-Territories. For its part, *the mining industry has recognized that the issues of abandoned mines need to be resolved* (Office of the Auditor General p.17). Towards this end, in 2000 an Orphaned/Abandoned Mines Workshop was held and following the Mines Ministers Conference of September 2001 and Orphaned/Abandoned Mines Advisory Committee was established with the mandate to explore solutions to the problems.

This proposal presents our solution. In conjunction with both level of governments and the mining industry, we are certain that this proposed program will achieve the goals set for a sustainable development of Nunavik.

3.1 TRACING CURRENT TITLESHIP

The World Business Council on Corporate Social Responsibility (CSR) has defined CSR as

> *"the commitment of business to contribute to sustainable economic development, working with employees, their families, the local community and society at large to improve their quality of life. Corporate social responsibility allows organizations to move beyond environmental compliance and move progressively towards a solid social contract within the communities, regions and nations in which they operate. It moves beyond internal health and safety and environmental management regimes towards a participatory based approach with an organizations workforce and the communities where they are situated."*

There is little doubt that consumers, regulators and communities in general are becoming more aware of mineral exploitation taking place in their regions, and that they are increasingly looking for evidence of corporate social responsibility from mining companies. Nowhere is this more true than in Canada's north, where there is a continued reliance upon wildlife for subsistence and the overall health and welfare of people is so closely linked to the overall integrity of the ecosystem

As much as is possible, this proposal would like to take into consideration the corporate social responsibility of the mining companies and individuals involved in all mining exploration sites in Nunavik. However, to identify the private firms that are responsible

for leftover mining contamination and pollution is fairly complicated. There are two main reasons for this:

1) The protection of the northern environment in Québec Law dates back to only 1976. Many of the sites we target existed well before 1976, and few records exist prior to that year.
2) Since 1976, mining and exploration titles may have changed hands several times. It is very difficult to ascertain whether the most recent claimholder to the explored land is indeed responsible for the contamination

Due to these two factors, only in cases where the current exploration commenced after 1976, and the stakeholder of the parcel in question has not changed, can responsibility be determined with any certainty. However, even if a responsible firm is identified, there can be further complicating factors:

1) It has to be further determined whether this entity remains an ongoing and viable operation or if, as is the case with many mining companies, it is in receivership.
2) Further, the company in question may argue that the site is not their responsibility and that the debris was left behind by another party. Proof of liability of any exploration site would be extremely difficult to determine without an ensuing visit to the site and the existence of some sort of tangible and sound proof.

Appendix 3, "Current Titleship at Major Sites, March 2003" describes the major sites in terms of their underlying titleship. Three of the major sites are located directly on the border between two different titleholders, adding ambiguity to the current tenure and obscuring the forbear of the mining exploration debris. In 5 cases there is no current titleship, and in another, no information could be found. In nine cases, current titleship is clear. However, this does not indicate that the titleholder is responsible for causing environmental damage, as previous (and possibly defunct) titleholders or even neighbouring titleholders may have been responsible for the leftover debris. In certain cases, mining exploration companies have begun clean-up projects and encouraged involvement of local communities.

4. METHODOLOGY

4.1 PROJECT DESIGN

4.1.1 Major sites

The 2001-2002 site inventory provided information on 193 sites of which 90 were validated as abandoned mining sites. As a result of their classification and prioritization, a total of 18 sites were classified as major according to their size, content and contamination, of which 8 sites are located in the Labrador Trough, and 10 in the Ungava Trough-Hudson Bay region. They contain abandoned buildings, heavy equipment, barrels of hydrocarbons (some of which contain variable quantity of residue), contaminated soil, and waste. All major sites contain some soil areas, of variable size, contaminated by

petroleum hydrocarbons and, to a lesser extent, by lead where batteries were present. There was no PCB contamination where transformers were present.

In five major sites (K-28, K-61, KAW-35, TQ-1, and WB-9), there was evidence of recent mining exploration activities. Four of these sites, the residue and debris from the previous mining activities have not been removed nor had remedial measures been undertaken. Care should be taken by the companies concerned in using these sites. Comprehensive demobilization and cleanup should be undertaken following the completion of the present activities. In the case of Expo Ungava Site (K-61), the mining exploration company, on its own initiative, has begun remedial actions. This should be encouraged and a follow up by the Department in charge of these activities is recommended.

As previoulsy mentioned, Appendix 1 contains a detailed description of the Major sites. It is important to note that many of the assessments that follow are non-exhaustive, and the total extent of the remediation requirements is not fully known. The largest sites will require more costly and time-consuming remediation and repetitive soil decontamination to reduce their contamination charge, rather than a single one-time clean-up effort

4.1.2 Remedial Measures

It is proposed that the sites will be cleaned systematically in the following way:

1) Remove all hazardous materials, petroleum hydrocarbons and chemicals
2) Treat or remove soils so as to eliminate as much as possible their environmental hazard and restore biological feasibility
3) Conduct on-site burns of all combustible, non-toxic debris
4) Recovery of scrap metal for recycling where possible
5) On-site waste disposal should be established in accordance with MENV approval. When not feasible, as much as possible of the remaining debris will be broken down and carry out to the nearest municipal disposal sites or sent South.

Each site will require case-by-case analysis to determine the optimum approach of implementing a clean-up. Residents of nearby villages who have visited the sites and are knowledgeable of the area will be involved in this process. Also, scientists who understand the specific challenges and their implications will contribute the requisite knowledge to carrying out a safe and effective clean-up.

Remedial measures carried out in a nordic[1] environment must have as its objective to return the environment to its original condition. The decontamination objective proposed here will take account of the sensitivity of the environment and the impact of the decontamination activities. If they are more damaging to the environment than leaving the contamination in place, or if it proves technologically impossible, some or all of the contamination may be left in place. In all cases, the person responsible must, before the

[1] Nordic environment means any territory situated north of the 55th parallel

work is carried out, reach an agreement with the MENV on the measures to be taken and the monitoring to be provided.[2]

The following is a general approach that will be used when dealing with the various types of materials found at the abandoned mining exploration sites:

4.2 TREATMENT OF MATERIALS

4.2.1 Hazardous Materials

4.2.1.1 Definition

Paragraph 21 of Section 1 of the Environment Quality Act [3] defines a hazardous material as follows:

"... a material which, by reason of its properties, is a hazard to health or to the environment and which, within the meaning of a regulation under this Act, is explosive, gaseous, flammable, poisonous, radioactive, corrosive, oxidizing or leachable or is designated as a hazardous material, and any object classed by regulation as a hazardous material."

Properties which characterize a hazardous material are defined in Section 3 of the Hazardous Material Regulations[4], which sets out a list of materials or objects which, whatever their properties, are classed as hazardous materials. The main hazardous materials found in Nunavik are:

1. petroleum products : diesel, motor or bunker oil, grease and airplane fuel
2. chemical products (acids, bases, fire extinguisher powder, paints, etc)
3. batteries (lead)
4. electrical transformers

The following paragraphs define and summarize some of the requirements necessary to manage a safe and effective clean-up of abandoned mining sites in Nunavik.

4.2.1.2 Petroleum Hydrocarbons

Eg: diesel, motor oil, grease, airplane fuel. Source: leaking drums, tanks and engines.

Petroleum products are a mixture of more than 50 compounds (alkanes, cycloalkanes, alkenes, alkylbenzenes, polynuclear aromatic hydrocarbons, trace metals and possible additives), some of which are known to be carcinogenic and teratogenic to wildlife and

[2] Soil Protection and Contaminated Sites Rehabilitation Policy, Quebec Government
[3] Ministère de l'environnement du Québec
[4] Ministère de l'environnement du Québec

additives), some of which are known to be carcinogenic and teratogenic to wildlife and human beings. For these substances, environmental risks increase with contaminant concentration in soil and the size of the contaminated area.

As petroleum hydrocarbons are by far the main contaminants on these sites and as they contaminate large areas on some sites, their remedial measures is required to ensure the protection of the environment and wildlife health. Remedial measures techniques may be applied directly on site (see Treatment of Contaminated Soil, described below).

Petroleum hydrocarbon barrels and pails contaminated by rust are no longer usable. As they constantly decay and are very often located near water, the timely recovery of petroleum products is essential. Any residual petroleum product will have to be placed in the appropriate sealed containers and properly identified, be safely carried off the site and either transported to an authorized hazardous waste management site in southern Québec or properly stored and reused. In cases where fuels are still useful, it would be helpful if they could be claimed by residents of local communities. It is required to have a specialist present to obtain all the required authorizations, obtain the appropriated containers and give formation to those involved in the clean-up to securely manage those hydrocarbon products.

4.2.1.3 Batteries and Chemical Containers

Eg: batteries (source of Lead (Pb)), Acids (hydrochloric, sulphuric, and nitric acids), fire extinguishers (powder), raw storage.

These products will have to be placed in the appropriate sealed containers, properly packed and well identified, then be safely carried off the site and transported to an authorized hazardous waste management site in southern Québec. It is prohibited to place petroleum products and hazardous materials in local and municipal disposal sites (dumps).

Where there are hazardous materials, it is required to have a specialist present to obtain the required transportation and disposal authorizations, obtain appropriated containers, prepare hazardous materials for transport, and take charge of them until their delivery to an authorized hazardous waste management site in southern Québec. He or she will also have to instruct those involved in the clean-up effort and supervise the on-site clean-up of these products.

4.2.1.4 Heavy Machinery, Large Equipment, Vehicles, Propane Tanks, Motors, Water heaters, Generators, etc.

Like the treatment of oil barrels and other petroleum products, it is important that residues are removed from these items and placed in appropriated and well-identified containers. Then they should be safely transported, recycled or reclaimed with any salvageable parts distributed within local communities.

It is unlikely that it will be possible to dismantle large machinery to the point that it can be completely salvaged or carried back to a municipal dump site. Heavy equipment, vehicles and other large waste should be managed in such a way as to clean and secure sites against environmental threat and also against accident. As much as possible, these large items must be placed in nearby disposal sites where topography, soil composition and distance from water permit. Such sites must be constructed and managed following MENV recommendations and approval.

4.2.2 Non-Hazardous Materials

Large volumes of non-hazardous materials were found on the major sites. Their management will be function of their capacity for burning without generating toxic substances.

4.2.2.1 Materials that are Combustible and Non-toxic

Eg: Wood frames, floors, sheds, and canvas.
It is unnecessary to transport these material back to community disposal sites (dumps) as they can be safely burned on-site. However, authorization must be requested from MENV to burn any combustible debris on-site. Such burns may take place in empty, abandoned tanks or drums in good condition. Given that the material being burned has no chemical ingredient (as would be the case with plastics etc), ashes will be non-toxic and can be left at the site.

4.2.2.2 Materials that are Non-Combustible and Non-toxic:

Eg: metal and plastic garbage and residue, mattresses and springs, stoves, pipes, flexible hoses, metal and plastic furniture, and aluminium core trays, etc.

A nearby disposal site should be set up with MENV approval. If transport is feasible, the debris may be carried back to the closest community and, with permission, placed in the local municipal dump or transported south for recycling.

Empty drums, such as the 205 litre drums, 40 litre gasoline barrels, oil barrels, grease pails, will require special planning as there are numerous barrels known to be on the land at abandoned mining exploration sites in Nunavik. Empty barrels and, where possible, some heavy equipment and non-combustible debris are to be compacted prior to their transport to a municipal dump or approved local waste disposal site. Where there are several empty barrels (>70) it will be useful to use a compactor, or *"broyeur"* (Appendix 4) to decrease bulkiness and to ease transport. There are 14 major sites with more than 70 barrels which will require this apparatus (Appendix 5).

4.2.2.3 Dwellings/ Cabins/ Sheds

If the shed is in good condition and titleship of the land has lapsed, it should be up to the community whether they are interested in taking over the management and upkeep for hunting / camping purposes. However, all cabins and sheds will have to be cleaned of waste. If the dwelling is in poor condition, is unsafe and unsalvageable, the structure should be torn down and it's components dealt with according to the above guidelines.

4.3 TREATMENT of CONTAMINATED SOIL

4.3.1 Soil Contaminated with Petroleum Products

Petroleum hydrocarbonic residue leaking onto soil results in contamination of the local environment and the incapacity to sustain soil microorganisms and plant life. Remediation can be achieved through "soil bioremediation". Such treatment involves the biodegradation of the petroleum compounds by indigenous bacteria in the presence of the appropriate nutrients and water concentrations. This treatment has proved successful on other sites in Nunavik.

Soil bioremediation treatments should be performed on-site by an environmental expert in soil remediation with the help of local communities. To be most effective, treatments should be carried out in the spring and early summer when the soil has thawed. At that time nutrients can be most effective.

The largest contaminated areas require a *multiphase* bioremediation, requiring one treatment each spring *for three consecutive years*, with soil analysis taking place prior to treatment. A multiphase treatment is justified by the greater environmental impact of significant contaminated areas. Considering the testing, expertise, and time required to conduct multiphase soil bioremediation, only sites where contaminated areas exceed 25 m^2 is bio-restoration cost-efficient. This threshold allows for the repetitive treatment of 89% of the total 599 m^2 known contaminated soils. On the sites with smaller contaminated area, a one-time treatment will be applied at the time the site is cleaned.
A list of the sites requiring bio-remediation is presented in Appendix 6.

4.3.2 Soil Lead Contamination

Soil detection for heavy metals (lead and mercury) and PCBs was done by laboratory analysis. The mercury levels found were low and no PCBs contamination was detected under the 3 transformers that were seen during the inventory.

The soils under batteries were heavily contaminated by lead (Pb) on two sites (PJ-17 and SW-34), but the total area contaminated was only $2m^2$. Taking into account the small size of the contaminated area it is believed there will be a minimal environmental impact caused by lead.

4.3.3 Surface Water Contamination

Surface water samples were taken at 9 sites in close proximity to contaminated soils and diesel drums. Analysis for petroleum hydrocarbons detected no contamination in significant concentration. Water bodies were large in comparison to contaminated soil areas, and the advanced age of much of the contamination in addition to dilution likely explains the absence or quasi-absence of petroleum hydrocarbons in surface waters.

5. HUMAN RESOURCES

Human resources required to carry out the clean-up of major sites consist of the following:

1) **Project Coordinator**: To organize all project logistics such as scheduling, lodging, all transport including helicopter rental, hiring, remuneration and other financial arrangements (planning and forecasting). To work closely and in tandem with the communities in hiring the local persons willing and able to transport materials from abandoned mine sites and carry out other activities required for the clean-up. To oversee all phases of the remediation including the hazardous material handling (to be done in conjunction with the Soil Remediation Expert), and to ensure proper training of local peoples to this end. This includes training local peoples in handling, on-site packing and proper identification of hazardous materials, and implementing safe transportation techniques. This position would involve organizing the storage and transportation of hazardous materials to an approved management site in southern Québec. To ensure ongoing communications with Inuit peoples so that communities are kept informed of project objectives, schedules, and results. This person would also be responsible for reporting required by funding bodies.

2) **Contaminant Expert**. This could likely be a senior expert who has the ability and expertise to carry out all phases of soil remediation, and who also possesses expertise in construction of local waste disposal sites. This person will be responsible for contaminated soils analysis and treatment. This position will involve carrying out the storage and transportation of hazardous materials to an approved management site in southern Québec. He or she will also be called upon to troubleshoot and make decisions regarding how and when to carry out tasks involved in all parts of the remediation, and to communicate then clearly and effectively. This position would involve being up-to-date with current laws and making sure that the soil clean-up effort and local waste disposal site, if required, is in compliance with these laws. It is estimated that at least 124 days on-site in Year Two of the project is required, plus 10 days in both Year 3 and Year 4.

3) **Environment Canada support**. Expertise will be given by professional staff of Environment Canada, Québec region to facilitate the development of partnerships with federal government, to discuss the remediation objectives and decisions regarding how

and when to carry out tasks involved in the clean-up, and to analyse soil samples when requested.

4) **Local (Inuit and Naskapi) Peoples.** A manageable team of 5-7 local peoples (in summer) and 3-5 (winter), from each of the local communities nearest to the sites will be hired to provide the needed capacity for the remediation. Individuals should be hired according to their experience on the land, ability to get along in a team, and the trustworthiness of their vehicle. It is expected that local populations will be a vital source of information for issues related to weather and travel, but they are also expected to provide knowledge and expertise important to the daily decision making performed by the Project Coordinator.

6. COMMUNITY PARTICIPATION

Both the techniques of western science and the knowledge of local inhabitants will be put into use throughout all stages of execution and daily decision making. The transfer of knowledge, skills, and technology will take place both informally over the duration of the clean-up, as well as formally as each community "team" will undergo training session as to how to manage and perform safe hazardous waste removal. The capacities of northern communities will be enhanced in the areas of environmental management and improving the quality of ecosystems that underlie their subsistence economy.

Local authorities and collaborators from the community will, as team members, be remunerated for manual labour, the use of their skidoo or ATV, and for the expertise they provide as guides and specialists of the local environment.

7. SCHEDULE

This project will be conducted over a 5-years period including preparation and reporting. As detailed in Table 1 (see p. 22), the project could begin in the fall of 2003 with the obtention of funding, the formation of partnerships and field work preparation. In the summer of 2004, the first soil remediation experts would be in the field as well as the clean-up teams from various communities. The same scenario would be repeated in 2005-2006 and final reporting to the various funding agencies and the communities would be carried out in 2007.

7. 1 SEASON and TRANSPORTATION

It is proposed to carry out remedial measures activities (gathering and burning of materials, drum compaction, and collection of hazardous materials for transport to

TABLE 1. SCHEDULE

	ACTIVITY	LOCATION	AGENT
2003	**Year 1**		
	Presentation of proposal	various	Makivik/ KRG
	Form Partnerships with mining community / governments	various	Makivik/ KRG
	Purchase Broyeur	Montreal	Makivik
2004	**Year 2**		
Spring	Hire summer soil remediation and clean-up crews from 7 communities	Kuujjuaq	KRG/ Makivik Coordinator
	Reporting to funding agencies	Montreal/ Kuujjuaq	KRG/ Makivik Coordinator
Summer	Begin bio-remediation on all 18 major sites	on-site	Contaminant Specialist
	Burn, tear down debris. Compact and pile up barrels	on-site	Community Crews
	Transport hazardous materials back to Montreal, put in storage	on-site/ Montreal	Contaminant Specialist
	Site Assessment: Aerial Photography of the Sites to be assessed	[Val d'Or]	[outsourced to Corriveau]
Fall	Conduct soil samples analysis: Lab work	Montreal	Environment Canada
	Hire Winter crews	Kuujjuaq	KRG/ Makivik Coordinator
	Site Assessment: Prioritization of sites	Kuujjuaq	KRG/ Env't Can
2005	**Year 3**		
Winter/	Transport non-combustible materials to municipality dump	on-site/ community	Community Crews
Spring	Hire summer soil remediation and clean-up crews from 7 communities	Kuujjuaq	KRG/ Makivik Coordinator
	Reporting to funding agencies	Montreal/ Kuujjuaq	KRG/ Makivik Coordinator
	Site Assessment: planning summer assessment activities	Kuujjuaq	KRG/ Makivik Coordinator
Summer	Conduct bio-remediation on 6 "multi-phase" sites	on-site	Contaminant Specialist
	Burn, tear down debris. Compact and pile up barrels	on-site	Community Crews
	Transport hazardous materials back to Montreal, put in storage	on-site/ Montreal	Contaminant Specialist
	Site Assessment: begin site assessment (by helicopter)	on-site/ Kuujjuaq	KRG/ Env't Canada
Fall	Conduct soil samples analysis: Lab work	Montreal	Environment Canada
	Hire winter crews	Kuujjuaq	KRG/ Makivik Coordinator
2006	**Year 4**		
Winter/	Transport non-combustible materials to municipality dump	on-site/ community	Community Crews
Spring	Hire summer soil remediation and clean-up crews from 7 communities	Kuujjuaq	KRG/ Makivik Coordinator
	Reporting to funding agencies	Montreal/ Kuujjuaq	KRG/ Makivik Coordinator
	Site Assessment: planning summer assessment activities	Kuujjuaq	KRG/ Makivik Coordinator
Summer	Conduct bio-remediation on 6 "multi-phase" sites	on-site	Contaminant Specialist
	Burn, tear down debris. Compact and pile up barrels	on-site	Community Crews
	Transport hazardous materials back to Montreal, put in storage	on-site/ Montreal	Contaminant Specialist
	Site Assessment: continue site assessment (by helicopter)	on-site/ Kuujjuaq	KRG/ Env't Canada
Fall	Conduct soil samples analysis: Lab work	Montreal	Environment Canada
	Hire winter crews	Kuujjuaq	KRG/ Makivik Coordinator
	Site Assessment: Report of Site prioritization	Kuujjuaq/ Montreal	KRG/ Makivik Coordinator
2007	**Year 5**		
	Results returned to Community	9 Communities	KRG/ Makivik Coordinator

southern facilities) in the spring and early summer. Soil remedial measures must be conducted by a soil remedial mesures expert after snow and soil have thawed. It is therefore proposed that sites be visited in the early summer by a Soil Remedial Measures Expert accompanied by a team of local individuals, and that soil remedial measures, burning, and hazardous material handling take place at that time under the expert's supervision. Early summer (after snow cover has melted) will afford longer daylight hours and warmer temperatures ideal for the 4-12 days of work required by each of the sites.

Except for PJ-17 and WB-3 which are accessible by boat and by ATV, the major sites are accessible only by helicopter to transport team members, drum compactor, and other equipment needed for the remedial measures.

Collection and "carry-out" of the non-combustible debris will take place in winter. In most cases, this will be carried out by local team members by skidoo/ komatik. Sites which are over 150 kms round-trip will require a Twin Otter. These sites are Kaw-35, TQ-1, TQ-4, KV-1, Sal-1, SW-27, SW-34, and SW-42.

7.2 PRIORITY

Major sites pose a threat to the environment and the public since they contain a large quantity of buildings, equipment, barrels (often located close to water), various waste, and soil contamination. Consequently, it is highly recommended to put the major sites, and in particular sites KAW-35, PJ-1 and SW-34, at the top of a cleanup priority list. As budget permits, intermediate and minor sites will be treated on a case by case basis, considering as a priority the sites located close to Inuit or Naskapi communities and identified as their main preoccupation.

7.3 COMMUNICATION of RESULTS

As much as possible, reporting required by funding agencies will be made public to local inhabitants through the KRG website. Annual written reports will be sent to municipal boards and made available to community members. As well, the coordinator will have a continuously open line of communication to field the concerns and questions that the community members and employees of the project will likely have.

An end-of-project "Results Tour" to Naskapi and Inuit Communities will take place. This will recap the efforts undertaken since 1999 to accomplish the clean-up of the sites, (which was initiated at the request of the communities). This meeting will emphasize the people, expertise, funding and transfer of skills involved, and of course the general results pertaining to how many sites were cleaned, with details about the ones closest to their communities.

8. ASSESSMENT OF NON-VALIDATED SITES

Of the 595 potential abandoned mining exploration sites identified by GÉTIC (Duhaime and Comtois, 2002), 193 were visited and assessed between 2001-2002. Makivik and KRG intend to continue efforts, in partnership with communities and mining companies, to complete the inventory and assessment of the 402 remaining sites.

In order to undertake remedial measures of the non-validated sites, a systematic aerial survey of the remaining 402 potential exploration mining sites will be required. The first stage is to prioritize these sites- effectively labelling them as Major, Intermediate, and Minor. Sites which no longer contain remedial materials can be withdrawn from the survey. This prioritization could be accomplished through any of the following three means:

- A systematic survey by helicopter, associated with GPS positioning. This would give a precise location and description, and permit the estimation of the quantity of pieces of equipment, chemical products, debris and contaminated soil present on each site. It would also allow their prioritization, and, if the classification methodology of the present project is used, comparison with the sites already described. This approach, the best on a remedial perspective, offers the greatest quantity of information on each site. It is also the most expensive.

- A systematic survey by plane, associated with their GPS positioning. This would allow the rather precise location of the major, intermediate and most minor sites. Associated with a cursory description and photos of the sites, it would give an idea of their content. Based on a simpler classification methodology, it would allow for their prioritization. However, this method could not allow for an estimate of the quantity of equipment, chemical products, debris and contaminated soil present on each site, nor could it allow the comparison of these sites with those assessed during the present project. From a remedial perspective, it is less expensive but it is certainly not as accurate as the former approach in the inventory of the material or the assessment of the sites.

- **A combination** of the two previous proposals: i.e. first a plane survey of the land to locate, classify and prioritize all the sites followed by a helicopter survey of only the sites potentially more hazardous to the environment. This approach would be more cost efficient than the first one and would allow the collection of precise information on relatively important sites.

We propose to carry out the assessment of the final 402 potential abandoned mining exploration sites in the combination method described above.

The projected budget for the aerial survey is based on a quotation for this service from JL Corriveau and Associates of Val d'Or, Quebec. It assumes a low-level aerial photography of unassessed sites at 1-4 square meters of resolution.

Based on the ratio of 90 sites containing abandoned residual mining material out of the sample of 193 visited, it is projected that there are 277 of 595 potential mining exploration sites in Nunavik. The cost of assessing these 277 sites is deduced from the cost of the 2001- 2002 assessment of 193 sites (KRG and Makivik, 2003).

As was the case with the 2001-2002 project, information will also be obtained from the communities, mining companies, and others as to the location and description of other sites containing abandoned mining exploration material. This will allow for a more comprehensive database for KRG and Makivik.

9. CONCLUSION

This project has been designed to ensure the engagement of Native Peoples at all stages and to strengthen new partnerships and understandings between Native communities, the mining industry and governments.

Sustainable development of Nunavik requires a clean, healthy and safe environment. The objectives of the project are to restore the environment by remedial measures of abandoned and sometimes contaminated mining sites. It will also create local employment, transfer a know-how to the communities and improve our knowledge regarding the impacts of mining development activities in the North.

The proposed methodology is a proven one. For the past years Makivik and KRG, in conjunction with the Inuit and Naskapi communities, have undertaken abandoned mining sites remedial measures, conducted a survey of all abandoned exploration mining sites and have carried out an assessment and characterization of 90 of these sites. Moreover, both groups have acquired experience in the remedial measures of the Mid-Canada Line and the restoration of the former Cape Hopes Advance weather station and the Quaqtaq radiobeacon sites.

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World Business Council on Corporate Social Responsibility- find details on the Natural Resource s Canada website http://www.nrcan.gc.ca/mms/abor-auto/abo_e.htm

11. BUDGET

It has been the experience of Makivik Corporation and the Kativik Regional Government that contaminated sites believed to have been previously assessed were found, in reality, to contain more than the inventoried (recorded) debris and contamination. Mid-Canada Radar, Killiniq, and the Cape Hopes Advance are three examples of well-planned and well-managed projects in which overruns of time and budget were as high as 35%.

Likewise, the site assessment and inventory of dangerous materials conducted in Nunavik in 2000-2001 represents a limited amount of time spent on site by assessors. It is important to note that the inventories described in Appendix 1 represent the *minimum* amount of debris and contamination known to exist at the site and that, once back on-site with a remedial measures team, it is assumed that more debris and contamination will likely be discovered. It is the aim of this project to clean-up whatever debris is found at these sites.

Constraints of time, human resources, weather, or funds are typical realities when conducting fieldwork. As Makivik and KRG become experienced in implementing environmental remedial measures on abandoned and orphaned mining sites, projects will be completed safely and effectively with the appropriate transfer of skills. For this reason, a contingency factor has been added to the overall projected budget.

Summary of Per Site Costs

	one-time costs	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	WHA 1	WB 9	Totals	
HAZ.MAT- STORAGE AND TRANSPORT																					
Storage in Haz. Waste Facility		$2,982.76	$87.98	$3,025.17	$84.98	$171.84	$930.72	$790.02	$1,709.63	$879.75	$4,728.36	$351.90	$87.98	$90.20	$1,773.63	$779.81	$760.98	$175.95	n/a	$19,413.68	
Transport to South		$3,266.96	$69.90	$4,187.81	$168.25	$189.30	$1,359.25	$892.85	$1,752.10	$1,260.00	$4,958.50	$462.75	$26.50	$702.90	$1,988.88	$1,076.96	$915.03	$212.40	n/a	$23,040.34	
Subtotal		$6,249.72	$157.88	$7,212.98	$253.23	$361.14	$2,289.97	$1,682.87	$3,461.73	$2,139.75	$9,686.86	$814.65	$164.48	$793.10	$3,764.51	$1,856.77	$1,676.01	$388.35	n/a	$42,454.01	$42,454.01
MATERIAL COSTS																					
Year 1		$9,572.03	$148.97	$10,190.45	$148.97	$0.00	$1,076.60	$10,728.75	$148.97	$807.45	$8,037.25	$169.00	$148.97	$0.00	$169.00	$8,844.70	$687.27	$378.06	$1,345.75	$52,602.19	
Year 2		$9,572.03	$0.00	$10,190.45	$0.00	$0.00	$0.00	$10,728.75	$0.00	$0.00	$8,037.25	$0.00	$0.00	$0.00	$0.00	$8,844.70	$0.00	$0.00	$1,345.75	$48,718.93	
Year 3		$9,572.03	$0.00	$10,190.45	$0.00	$0.00	$0.00	$10,728.75	$0.00	$0.00	$8,037.25	$0.00	$0.00	$0.00	$0.00	$8,844.70	$0.00	$0.00	$1,345.75	$48,718.93	
Subtotal		$28,716.09	$148.97	$30,571.35	$148.97	$0.00	$1,076.60	$32,186.25	$148.97	$807.45	$24,111.75	$169.00	$148.97	$0.00	$169.00	$26,534.10	$687.27	$378.06	$4,037.25	$150,040.05	$150,040.05
DRUM COMPACTOR COSTS																					
Purchase Costs	$32,200.00																			$32,200.00	
Operating Costs		$63,700.00	$0.00	$34,700.00	$0.00	$22,300.00	$20,200.00	$11,700.00	$20,200.00	$19,150.00	$20,200.00	$20,200.00	$0.00	$32,600.00	$20,200.00	$89,550.00	$20,200.00	$0.00	n/a	$394,900.00	
Subtotal		$63,700.00	$0.00	$34,700.00	$0.00	$22,300.00	$20,200.00	$11,700.00	$20,200.00	$19,150.00	$20,200.00	$20,200.00	$0.00	$32,600.00	$20,200.00	$89,550.00	$20,200.00	$0.00	$0.00	$427,100.00	$427,100.00
SUMMER CLEAN UP AND SOIL REMEDIATION																					
Year 2		$44,272.03	$16,228.97	$56,263.78	$27,602.30	$15,913.33	$28,696.60	$40,168.75	$28,268.97	$28,177.45	$40,737.25	$17,769.00	$15,928.97	$15,780.00	$17,719.00	$45,014.70	$18,237.27	$16,958.06	$30,485.75	$504,202.18	
Year 3		$30,412.03	$0.00	$56,930.45	$0.00	$0.00	$0.00	$16,768.75	$0.00	$0.00	$20,377.25	$0.00	$0.00	$0.00	$0.00	$21,684.70	$0.00	$0.00	$13,685.75	$159,858.93	
Year 4		$22,412.03	$0.00	$23,030.45	$0.00	$0.00	$0.00	$16,768.75	$0.00	$0.00	$20,377.25	$0.00	$0.00	$0.00	$0.00	$21,684.70	$0.00	$0.00	$13,685.75	$117,958.93	
Subtotal		$97,096.09	$16,228.97	$136,224.68	$27,602.30	$15,913.33	$28,696.60	$73,706.25	$28,268.97	$28,177.45	$81,471.75	$17,769.00	$15,928.97	$15,780.00	$17,719.00	$88,384.10	$18,237.27	$16,958.06	$57,857.25	$782,020.04	$782,020.04
WINTER																					
Subtotal		$71,690.00	$3,137.94	$95,928.00	$8,410.00	$16,320.00	$7,815.49	$14,737.94	$7,737.94	$7,933.98	$15,525.96	$5,457.94	$8,410.00	$24,230.00	$8,410.00	$79,600.00	$8,410.00	$3,137.94	n/a	$386,925.12	$386,925.12
HUMAN RESOURCES																					
Env't Canada Expert																				$14,400.00	$14,400.00
Travel Costs	$14,400.00																				
Salary and Expenses Subtotal		$8,280.00	$2,760.00	$9,600.00	$4,080.00	$2,760.00	$4,080.00	$9,600.00	$4,080.00	$4,080.00	$7,620.00	$3,420.00	$2,760.00	$2,760.00	$3,420.00	$8,940.00	$3,420.00	$2,760.00	$6,300.00	$90,720.00	$90,720.00
Makivik/ KRG Coordinator																				$300,000.00	
Salary and Expenses	$60,000/ year																			$50,000.00	
Other costs	$10,000/ year																			$350,000.00	$350,000.00
Subtotal	$350,000.00																				
EQUIPMENT																					
Equipment	$30,800.00																				
Safety equipment	$28,280.00																				
Excavation equip't	$24,000.00																				
Safety Course	$8,400.00																			$91,480.00	$91,480.00
Subtotal	$91,480.00																				
ASSESSMENT																					
Air Survey	$40,000.00																				
Assessment of @277 sites	$264,040.00																			$304,040.00	$304,040.00
Subtotal	$304,040.00																				
RESULTS TOUR	$34,210.00																			$34,210.00	$34,210.00

		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	WHA 1	WB 9	Totals	
PER SITE COSTS		$275,731.90	$22,433.76	$314,229.01	$40,494.50	$57,654.47	$64,458.65	$143,613.31	$43,933.83	$42,288.63	$158,616.32	$47,830.59	$27,412.42	$75,063.10	$53,682.51	$294,864.97	$52,630.55	$23,622.41	$68,194.50	$1,847,059.23	
ONE-TIME COSTS	$826,330.00																			$826,330.00	
TOTAL																					$2,673,389.23
10% MAKIVIK/ KRG ADMIN. COSTS																					$267,338.92
HAZ MAT AND MATERIAL CONTINGENCY (30%)																					$802,016.77
WEATHER CONTINGENCY (15%)																					$401,008.35
GRAND TOTAL																					$4,143,753.30

Hazardous Material (Haz Mat) Transport and Storage

	KAW 35	KAW 45	PJ 1	TQ 1	TQ 4	PJ 18	PJ 17	TW	K 28	K 61	WB 3	KV 1	SAL 1	SW 27	SW 34	SW 42	WHA 1	WB 9*	Totals
DIESEL (L)	3,200	30	5,100		150	1,400	500	1,230	2,000	2,500	675	50		1,650		700	200	n/a	19,465
Storage																			
barrels	16	1	26		1	7	3	7	10	13	4	1		9		4	2		104
cost to store (per bar'l)	$75.00	$75.00	$75.00		$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00		$75.00		$75.00	$75.00		
+ 2% insurance	$24.00	$1.50	$39.00		$1.50	$10.50	$4.50	$10.50	$15.00	$19.50	$6.00	$1.50		$13.50		$6.00	$3.00		$156.00
subtotal	$1,224	$76.50	$1,989		$76.50	$535.50	$229.50	$535.50	$765.00	$994.50	$306.00	$76.50		$688.50		$306.00	$153.00		$7,956.00
GST (7%)	85.68	5.36	139.23		5.36	37.49	16.07	37.49	53.55	69.62	21.42	5.36		48.20		21.42	10.71		$556.92
PST (8%)	97.92	6.12	159.12		6.12	42.84	18.36	42.84	61.20	79.56	24.48	6.12		55.08		24.48	12.24		$636.48
total	1,407.60	87.98	2,287.35		87.98	615.83	263.93	615.83	879.75	1,143.68	351.90	87.98		791.78		351.90	175.95		$9,149.40
Transport																			
plus UN reg'n barrel	$960.00	$60.00	$1,560		$60.00	$420.00	$180.00	$420.00	$600.00	$780.00	$240.00	$60.00		$540.00		$240.00	$120.00		$6,240.00
tot. estimated weight (kilos)	3,200	30	5,100		150	1,400	500	1,230	2,000	2,500	675	50		1,650		700	200		19,465
boat: $300/ ton, 33¢ per kilo	$1,056.00	$9.90	$1,683.00		$49.50	$462.00	$165.00	$405.90	$660.00	$825.00	$222.75	$16.50		$544.50		$231.00	$92.40		$6,423.45
total	$2,016.00	$69.90	$3,243.00		$109.50	$882.00	$345.00	$825.90	$1,260.00	$1,605.00	$462.75	$76.50		$1,084.50		$471.00	$212.40		$12,663.45
GAS BARRELS (L)				20	60										40			n/a	120
Storage																			
barrels				1	1										1				3
cost of storage (per 1/2 bar)				$71.50	$71.50										$71.50				$214.50
+ 2% insurance				$1.43	$1.43										$1.43				$4.29
subtotal				$72.93	$72.93										$72.93				$218.79
GST (7%)				$5.11	$5.11										$5.11				$15.32
PST (8%)				$5.83	$5.83										$5.83				$17.50
total				$83.87	$83.87										$83.87				$251.61
Transport																			
plus UN reg'n barrel				$60.00	$60.00										$60.00				$180.00
tot. estimated weight (kilos)				20	60										40				120
boat: $300/ ton, 33¢ per kilo				$6.60	$19.80										$13.20				$39.60
total				$66.60	$79.80										$73.20				$219.60
GREASE (L)	50		50			40	100	120		920				260		12		n/a	1,552
Storage																			
bidons (20L)	3		3			2	5	6		46				13		1			79
cost to store (per bidon)	$58.75		$58.75			$58.75	$58.75	$58.75		$58.75				$58.75		$58.75			$470.00
+ 2% insurance	$3.53		$3.53			$2.35	$5.88	$7.05		$54.05				$15.28		$1.18			$92.83
subtotal	$179.78		$179.78			$119.85	$299.63	$359.55		$2,756.55				$779.03		$59.93			$4,734.08
GST (7%)	$12.58		$12.58			$8.39	$20.97	$25.17		$192.96				$54.53		$4.19			$331.39
PST (8%)	$14.38		$14.38			$9.59	$23.97	$28.76		$220.52				$62.32		$4.79			$378.73
total	$206.74		$206.74			$137.83	$344.57	$413.48		$3,170.03				$895.88		$68.91			$5,444.19
Transport																			
overpacks	$150.00		$150.00			$150.00	$300.00	$300.00		$2,400.00				$750.00		$150.00			$4,350.00
tot. estimated weight (kilos)	50		50			40	100	120		920				260		12			1,552
boat: $300/ ton, 33¢ per kilo	$16.50		$16.50			$13.20	$33.00	$39.60		$303.60				$85.80		$3.96			$512.16
total	$166.50		$166.50			$163.20	$333.00	$339.60		$2,703.60				$835.80		$153.96			$4,862.16
OIL (L)			55			260				2			120	26				n/a	463
barrels			1			2				burn at site			1	1					5
Storage																			
cost to store (per barrel)			$75.00			$75.00							$75.00	$75.00					
+ 2% insurance			$1.50			$3.00							$1.50	$1.50					$7.50
subtotal			$76.50			$153.00							$76.50	$76.50					$382.50
GST (7%)			$5.36			$10.71							$5.36	$5.36					$26.78
PST (8%)			$6.12			$12.24							$6.12	$6.12					$30.60
total			$87.98			$175.95							$87.98	$87.98					$439.88
Transport																			
plus UN reg'n barrel			$60.00			$120.00							$60.00	$60.00					$300.00
tot. estimated weight (kilos)			55			260							120	36					481
boat: $300/ ton, 33¢ per kilo			$18.15			$92.40							$39.60	$8.58					$158.73
total			$78.15			$212.40							$99.60	$68.58					$458.73
PROPANE (residue or full)						5-res	13-res	4-res	6-res	16 (all)				1-res				n/a	
# cylinders						3	7	2	3	16				1					32
BATTERIES (#)	3		20	1		1	5			5			2		14			n/a	51
kilos	15		100	5		5	25			25			10		70				255
Storage																			
cost to store (per kilo)	$0.19		$0.19	$0.19		$0.19	$0.19			$0.19			$0.19		$0.19				
+ 2% insurance	0.057		0.38	0.019		0.019	0.095			0.095			0.038		0.266				$0.97
subtotal	$2.91		$19.38	$0.97		$0.97	$4.85			$4.85			$1.94		$13.57				$49.42
GST (7%)	$0.20		$1.36	$0.07		$0.07	$0.34			$0.34			$0.14		$0.95				$3.46
PST (8%)	$0.23		$1.55	$0.08		$0.08	$0.39			$0.39			$0.16		$1.09				$3.95
total	$3.34		$22.29	$1.11		$1.11	$5.57			$5.57			$2.23		$15.60				$56.83
Transport																			
plus $100 transport per palette	$100.00		$500.00	$100.00		[illegible]	[illegible]			[illegible]			$100.00		$400.00				$1,700.00
tot. estimated weight (kilos)	15		100	5		5	25			25			10		70				255
boat: $300/ ton, 33¢ per kilo	$4.95		$33.00	$1.65		$1.65	$8.25			$8.25			$3.30		$23.10				$84.15
total	$104.95		$533.00	$101.65		[illegible]	[illegible]			[illegible]			$103.30		$423.10				$1,784.15
DEGREASER/ SOLV'T (L)	100																	n/a	[illegible]
Storage																			
bidons (20L)	5																		[illegible]
cost to store (per bidon)	[illegible]																		[illegible]
+ 2% insurance	[illegible]																		[illegible]
subtotal	[illegible]																		[illegible]
GST (7%)	[illegible]																		[illegible]
PST (8%)	[illegible]																		[illegible]
total	$344.57																		[illegible]
Transport																			
plus UN reg'n barrel	$60.00																		[illegible]
tot. estimated weight (kilos)	100.00																		100
boat: $300/ ton, 33¢ per kilo	33																		$33.00
total	$93.00																		$93.00
ACID+POWDER (L)	50.03							20		1					2	0.2		n/a	73.23
Storage																			$9.00
lab packs (L)	3							2		1					2	1			
cost to store (per lab pack)	$290.00							[illegible]		$290.00					$290.00	$290.00			
+ 2% insurance	$17.40							[illegible]		$5.80					$11.60	$5.80			$52.20
subtotal	$887.40							[illegible]		$295.80					$591.60	$295.80			$2,662.20
GST (7%)	$62.12							[illegible]		$20.71					$41.41	$20.71			$186.35
PST (8%)	$70.99							[illegible]		$23.66					$47.33	$23.66			$212.98
total	$1,020.5							[illegible]		$340.17					$680.34	$340.17			$3,061.53
Transport																			
lab packs (L)	$870.00							[illegible]		$290.00					$580.00	$290.00			$2,610.00
tot. estimated weight (kilos)	50.03							20		1					2	0.2			73
boat: $300/ ton, 33¢ per kilo	$16.51							[illegible]		[illegible]					$0.66	$0.07			$24.17
total	$886.51							[illegible]		$290.33					$580.66	$290.07			$2,634.17
TRANSFORMERS (#)			2				1											n/a	3
Storage																			
Over pack			2				1												3
cost to store (per transformer)			$150.00				$150.00												
+ 2% insurance			$6.00				$3.00												$9.00
subtotal			$306.00				$153.00												$459.00
GST (7%)			$21.42				$10.71												$32.13
PST (8%)			$24.48				$12.24												$36.72
total			$351.90				$175.95												$527.85
Transport																			
overpack already included																			
tot. estimated weight (kilos)			40				[illegible]												[illegible]
boat: $300/ ton, 33¢ per kilo			$13.20				$6.60												$19.80
total			$13.20				$6.60												$19.80
PAINT (L)			12							4								n/a	16
Storage																			
bidons (20L)			1							1									2
cost to store (per bidon)			$58.75							$58.75									
+ 2% insurance			$1.18							$1.18									$2.35
subtotal			$59.93							$59.93									$119.85
GST (7%)			$4.19							$4.19									$8.39
PST (8%)			$4.79							$4.79									$9.59
total			$68.91							$68.91									$137.83
Transport																			
overpack			$150.00							$150.00									$300.00
tot. estimated weight (kilos)			12.00							4.00									16
boat: $300/ ton, 33¢ per kilo			$3.96							$1.32									$5.28
total			$153.96							$151.32									$305.28

TOTAL COST	KAW 35	KAW 45	PJ 1	TQ 1	TQ 4	PJ 18	PJ 17	TW	K 28	K 61	WB 3	KV 1	SAL 1	SW 27	SW 34	SW 42	WHA 1	WB 9	Totals
Storage in Facility	$2,982.76	$87.96	$3,025.17	$84.98	$171.84	$930.72	$790.02	$1,709.65	$879.75	$4,728.36	$351.90	$87.98	$90.20	$1,775.63	[illegible]	[illegible]	[illegible]	n/a	[illegible]
Tran'n UN barrels to site _	$16,000		$16,000			$8,000		$8,000	$8,000	$8,000				$4,000					
Transport to South	$3,266.96	$69.90	$4,187.83	$168.25	$189.30	$1,359.25	$592.85	$1,752.10	$1,260.00	$4,958.50	$462.75	$76.50	$202.90	$1,988.88	[illegible]	[illegible]	$212.40	n/a	[illegible]
Grand Total	$22,249.72	$157.86	$23,212.99	$253.23	$361.14	$10,289.97	$1,382.87	$11,461.75	$10,139.75	$17,686.86	$814.65	$164.48	$293.10	[illegible]	[illegible]	[illegible]	[illegible]	n/a	[illegible]

NOTES:

_ Based on number of UN Barrels required for hydrocarbon transport out of site ($1000/ hour, 4 hour minimum, to and from the site)

* Site WB-9: no inventory taken: site still in use by Falconbridge.

Material Costs Per Site (includes nutrients for soil remediation and their transportation to the North, transport of samples south, and labwork/ reporting)

		Contam'd area (m2)	Cost (per m2) nutrients + trans'n to the north ($40.06)	Trans't of nutrients Comm'y to Site	No of Samples	Cost of Lab per yr ($60/ sample)	Reporting and Misc per year (Env't Canada)	# years	Annual Cost	Total Material Cost per site
LABRADOR TROUGH										
	KAW-35	103	$4,126.18	$4,000.00	21	$1,260	$186	3	$9,572.03	**$28,716.09**
	KAW-45	2	$80.12		1	$60	$9	1	$148.97	**$148.97**
	PJ-1	115	$4,606.90	$4,000.00	23	$1,380	$204	3	$10,190.45	**$30,571.35**
	TQ-1	2	$80.12		1	$60	$9	1	$148.97	**$148.97**
	TQ-4	0	$0.00		0	$0	$0	0	$0.00	**$0.00**
	PJ-10	20	$801.20		4	$240	$35	1	$1,076.60	**$1,076.60**
	PJ-17	125	$5,007.50	$4,000.00	25	$1,500	$221	3	$10,728.75	**$32,186.25**
	TW	2	$80.12		1	$60	$9	1	$148.97	**$148.97**
HUDSON AND UNGAVA										
	K-28	15	$600.90		3	$180	$27	1	$807.45	**$807.45**
	K-61	75	$3,004.50	$4,000.00	15	$900	$133	3	$8,037.25	**$24,111.75**
	WB-3	2.5	$100.15		1	$60	$9	1	$169.00	**$169.00**
	KV-1	2	$80.12		1	$60	$9	1	$148.97	**$148.97**
	SAL-1	0	$0.00		0	$0	$0	0	$0.00	**$0.00**
	SW-27	2.5	$100.15		1	$60	$9	1	$169.00	**$169.00**
	SW-34	90	$3,605.40	$4,000.00	18	$1,080	$159	3	$8,844.70	**$26,534.10**
	SW-42	12	$480.72		3	$180	$27	1	$687.27	**$687.27**
	WHA-1	6	$240.36		2	$120	$18	1	$378.06	**$378.06**
	WB-9	25	$1,001.50		5	$300	$44	3	$1,345.75	**$4,037.25**
Total		599	$23,995.94			$7,500	$1,106		$52,602	**$150,040.05**

NOTES:

- Transport of nutrients from Community to Site: Extra helicopter trip required for sites requiring more than 10 barrels of nutrients per year.
- Based on single (1) or multi-phase (3) treatment
- Based on @ 1 sample for every 5 square meters
- Note: Reporting based on $1000 per year (or $8.85 per sample)
- Nutrients : $20.18 per square meter contaminated soil
- Transport : $19.88 per square meter of contaminated soil (Montreal to community)

Cost of Nutrients and Transportation

Soil Nutrients	($140 x 240 barrels x 19 kg of «ammonium chloride 22:7:7»)	$33,600.00
Air Transport to North	($8 per kilogram) (4,140 kilograms)	$33,093.93
Total		$66,693.93

	m2 Treated	Nutrients	Transport of Nutrients
Year 1	599	$12,087.93	$11,905.86
Year 2	533	$10,756.04	$10,594.03
Year 3	533	$10,756.04	$10,594.03
	1,665	$33,600.00	$33,093.93

$20.18	Per sq meter: nutrients
$19.88	Transport of Nutrients/ sq. meter
$40.06	Total

Purchase and Operating Costs of Drum Compactor

Purchase Costs Of Drum Compactor

Initial Purchase Cost	$21,000.00
Parts	$4,000.00
Freight	$3,000.00
Subtotal	**$28,000.00**
GST (7%)	$1,960.00
PST (8%)	$2,240.00
Total	**$32,200.00**

$32,200

Operating Costs Of Drum Compactor

	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	WHA 1	WB 9	Totals
Days Work (10 hrs)	34	0	14	0	6	4	10	4	3	4	4	0	12	4	51	4	0	n/a	154
Relief Trips	3		1										1		5				
Heli Transport													$4,000		$20,000				**$40,000**
Relief Trips (@ 8-10 days)	$12,000		$4,000										$8,000	$8,000	$8,000	$8,000			**$96,600**
In/ Out	$8,000		$8,000		$8,000	$8,000	$600	$8,000	$8,000	$8,000	$8,000		$8,000	$8,000	$8,000	$8,000			**$96,600**
Equipment	$8,000		$8,000		$8,000	$8,000	$600	$8,000	$8,000	$8,000	$8,000								
Labour ($140/person/day)	$19,040		$7,840		$3,360	$2,240	$5,600	$2,240	$1,680	$2,240	$2,240		$6,720	$2,240	$28,560	$2,240			**$86,240**
Meals ($60/person/day)	$8,160		$3,360		$1,440	$960	$2,400	$960	$720	$960	$960		$2,880	$960	$12,240	$960			**$36,960**
Gas (for Compactor) (est'd $50 per day)	$1,700		$700		$300	$200	$500	$200	$150	$200	$200		$600	$200	$2,550	$200			**$7,700**
Misc. (tent, etc)	$6,800		$2,800		$1,200	$800	$2,000	$800	$600	$800	$800		$2,400	$800	$10,200	$800			**$30,800**
Total:	**$63,700**		**$34,700**		**$22,300**	**$20,200**	**$11,700**	**$20,200**	**$19,150**	**$20,200**	**$20,200**		**$32,600**	**$28,200**	**$89,550**	**$20,200**			**$394,900**

$427,100

TOTAL COSTS OF OPERATING DRUM COMPACTOR

NOTES

- Only site with ≥ 70 empty drums will require a Drum Compactor
- Cycle time is @ 20 mins per empty drum: this estimate includes moving the drum to the broyeur and draining.
- "Time (Hrs)" includes the set up, dismantling, and maintenance time of 4 hours
- Labour for the Compactor is additional to the @ 6 man clean-up crews.
- Transport is one way by helicopter. Compactor labour (4 extra people) arrive with the remediation crew, will leave after the remediation crew is picked up.
- Site PJ-17 is accessible by boat, 2 boats to stay on site with crew throughout clean-up

Per site cost of summer Clean up activity and Soil Remediation
(Year One: No clean-up and remediation to take place)

Year Two: Clean Up (Summer) and Soil Remediation

	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	WHA 1	WB 9	Total
MATERIAL COSTS																			
Labour/ Nutrients/ Transp't	$9,572.03	$148.97	$10,190.45	$148.97	$0.00	$1,076.60	$10,728.75	$148.97	$807.45	$8,037.25	$769.00	$148.97	$0.00	$769.00	$8,844.70	$687.27	$370.00	$1,345.75	**$52,602.19**
Year 2- SOIL AND SITE CLEAN UP																			**$20**
Days on site	10	4	12	6	4	6	12	6	6	9	5	4	4	5	11	3	2	4	**$19,200**
Team Leader	$1,600	$640	$1,920	$960	$640	$960	$1,920	$960	$960	$1,440	$800	$640	$640	$800	$1,760	$480	$320	$1,120	**$100,800**
Team of 6 labourers	$8,400	$3,360	$10,080	$5,040	$3,360	$5,040	$10,080	$5,040	$5,040	$7,560	$4,200	$3,360	$3,360	$4,200	$9,240	$4,200	$3,360	$5,880	**$50,400**
Meals	$4,200	$1,680	$5,040	$2,520	$1,680	$2,520	$5,040	$2,520	$2,520	$3,780	$2,100	$1,680	$1,680	$2,100	$4,620	$2,100	$1,680	$2,940	**$42,000**
Misc Camp costs (equip't)	$3,500	$1,400	$4,200	$2,100	$1,400	$2,100	$4,200	$2,100	$2,100	$3,150	$1,750	$1,400	$1,400	$1,750	$3,850	$1,750	$1,400	$2,450	**$212,400**
Subtotal	**$17,700**	**$7,080**	**$21,240**	**$10,620**	**$7,080**	**$10,620**	**$21,240**	**$10,620**	**$10,620**	**$15,930**	**$8,850**	**$7,080**	**$7,080**	**$8,850**	**$19,470**	**$8,850**	**$5,080**	**$12,390**	
TRANSPORTATION																			**$216,000**
Helicopter ($1000/ hour, 4 hr min)	$16,000	$8,000	$24,000	$16,000	$8,000	$16,000	$0	$16,000	$16,000	$16,000	$8,000	$8,000	$8,000	$8,000	$16,000	$8,000	$8,000	$16,000	**$7,200**
Boats and gas ($150/boat/day)	$0	$0	$0	$0	$0	$0	$7,200	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$223,200**
Subtotal	**$16,000**	**$8,000**	**$24,000**	**$16,000**	**$8,000**	**$16,000**	**$7,200**	**$16,000**	**$16,000**	**$16,000**	**$8,000**	**$8,000**	**$8,000**	**$8,000**	**$16,000**	**$8,000**	**$8,000**	**$16,000**	
MISCELLANEOUS																			**$9,000**
Comm'ns (phone)	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	**$7,000**
Trans't samples Comm'y--> MTL	$500	$500	$333	$333	$333	$500	$500	$1,000	$250	$250	$250	$200	$200	$200	$200	$200	$1,000	$250	
closest village	kawawa	Kawawa	Tasiujaq	Tasiujaq	Tasiujaq	Aupaluk	Aupaluk	Kangirsuk	Kangiq...	Kangiq...	Kangiq...	Salluit	Salluit	Salluit	Salluit	Salluit	Umiujaq	Salluit	
Year 2 Total	**$44,272.03**	**$16,228.97**	**$56,263.78**	**$27,602.30**	**$15,913.33**	**$28,696.60**	**$40,168.75**	**$28,268.97**	**$28,177.45**	**$40,717.25**	**$17,769.00**	**$15,928.97**	**$15,780.00**	**$17,719.00**	**$45,014.70**	**$18,237.27**	**$16,958.06**	**$50,385.75**	**$584,202.18**

Year Three: Continued Soil Remediation (Multi-Phase sites only)

	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	WHA 1	WB 9	Total
MATERIAL COSTS																			
Labour/ Nutrients/ Transp't	$9,572.03		$10,190.45				$10,728.75			$8,037.25					$8,844.70			$1,345.75	**$48,718.93**
Year 3- SOIL REMEDIATION only																			**$22.00**
Days on Site	2		12				2			2					2			2	**$3,520.00**
Team Leader	$320		$1,920				$320			$320					$320			$320	**$18,480.00**
Team of 6 labourers	$1,680		$10,080				$1,680			$1,680					$1,680			$1,680	**$9,240.00**
Meals	$840		$5,040				$840			$840					$840			$840	**$7,700.00**
Misc Camp costs (equip't)	$700		$4,200				$700			$700					$700			$700	**$38,940.00**
Subtotal	**$3,540**		**$21,240**				**$3,540**			**$3,540**					**$3,540**			**$3,540**	
TRANSPORTATION																			**$64,000.00**
Helicopter ($1000/ hour, 4 hr min)	$16,000		$24,000				$0			$8,000					$8,000			$8,000	**$1,200.00**
Boats and gas ($150/boat/day)	$0		$0				$1,200			$0					$0			$0	**$65,200.00**
Subtotal	**$16,000**		**$24,000**				**$1,200**			**$8,000**					**$8,000**			**$8,000**	
MISCELLANEOUS																			**$2,000**
Communications (phone)	$300		$500				$300			$300					$300			$300	**$5,000**
Trans't samples Comm'y--> MTL	$1,000		$1,000				$1,000			$500					$1,000			$500	
closest village	kawawa		Tasiujaq				Aupaluk			Kangiq...					Salluit			Kangiq...	
Year 3 Total	**$20,412.03**		**$56,930.45**				**$16,768.75**			**$20,377.25**					**$21,684.70**			**$13,685.75**	**$159,858.93**

Year Four: Continued Soil Remediation (Multi-Phase sites only)

	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	WHA 1	WB 9	Total
MATERIAL COSTS																			
Labour/ Nutrients/ Transp't	$9,572.03		$10,190.45				$10,728.75			$8,037.25					$8,844.70			$1,345.75	**$48,718.93**
Year 4- SOIL REMEDIATION only																			**$12.00**
Days on Site	2		2				2			2					2			2	**$1,920.00**
Team Leader	$320		$320				$320			$320					$320			$320	**$10,080.00**
Team of 6 labourers	$1,680		$1,680				$1,680			$1,680					$1,680			$1,680	**$5,040.00**
Meals	$840		$840				$840			$840					$840			$840	**$4,200.00**
Misc Camp costs (equip't)	$700		$700				$700			$700					$700			$700	**$21,240.00**
Subtotal	**$3,540**		**$3,540**				**$3,540**			**$3,540**					**$3,540**			**$3,540**	
TRANSPORTATION																			**$40,000.00**
Helicopter ($1000/ hour, 4 hr min)	$8,000		$8,000				$0			$8,000					$8,000			$8,000	**$1,200.00**
Boats and gas ($150/boat/day)	$0		$0				$1,200			$0					$0			$0	**$41,200.00**
Subtotal	**$8,000**		**$8,000**				**$1,200**			**$8,000**					**$8,000**			**$8,000**	
MISCELLANEOUS																			**$1,800**
Communications (phone)	$300		$300				$300			$300					$300			$300	**$5,000**
Trans't samples Comm'y--> MTL	$1,000		$1,000				$1,000			$500					$1,000			$500	
closest village	kawawa		Tasiujaq				Aupaluk			Kangiq...					Salluit			Kangiq...	
Year 4 Total	**$22,412.03**		**$23,038.45**				**$16,768.75**			**$20,377.25**					**$21,684.70**			**$13,685.75**	**$117,958.93**

Per-Site Cost of Summer Clean-up and Soil Remediation

	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	WHA 1	WB 9	Total
Grand Total	**$97,096.09**	**$16,228.97**	**$136,224.68**	**$27,602.30**	**$15,913.33**	**$28,696.60**	**$73,706.25**	**$28,268.97**	**$28,177.45**	**$81,471.75**	**$17,769.00**	**$15,928.97**	**$15,780.00**	**$17,719.00**	**$88,384.10**	**$18,237.27**	**$16,958.06**	**$57,857.25**	**$782,020.04**

Summer - Estimated time to take to clean up soil and take down site, burn, compact, etc

LABRADOR TROUGH	contam'd soil (m2)	indiv'l score	"work function"	/6 people	/8 hours	Time Required Summer (days)	No of summers	Camp Costs	No. Trips Req'd (1 way)	Heli Hrs (min 4 hrs)	Cost of Trans'n		Total
KAW-35	103	128	231	38.50	4.81	10.00	3	$3,500	4	12	$12,000		$15,500
KAW-45	2	84	86	14.33	1.79	4.00	1	$1,400	2	4	$4,000		$5,400
PJ-1	115	164	279	46.50	5.81	12.00	3	$4,200	4	6	$6,000		$10,200
TQ-1	2	134	136	22.67	2.83	6.00	1	$2,100	2	4	$4,000		$6,100
TQ-4	0	89	89	14.83	1.85	4.00	1	$1,400	4	8	$8,000		$9,400
PJ-10	20	122	142	23.67	2.96	6.00	1	$2,100	4	4	$4,000		$6,100
PJ-17	125	144	269	44.83	5.60	12.00	3	$4,200	4	4	$3,600	access by boat, cost includes gas	$7,800
TW	2	139	141	23.50	2.94	6.00	1	$2,100	4	4	$4,000		$6,100
HUDSON AND UNGAVA TROUGHS													
K-28	15	109	124	20.67	2.58	6.00	1	$2,100	4	6	$6,000		$8,100
K-61	75	131	206	34.33	4.29	9.00	3	$3,150	2	4	$4,000		$7,150
WB-3	2.5	118	120.5	20.08	2.51	5.00	1	$1,750	4	4	$4,000		$5,750
KV-1	2	95	97	16.17	2.02	4.00	1	$1,400	4	8	$8,000		$9,400
SAL-1	0	81	81	13.50	1.69	4.00	1	$1,400	4	6	$6,000		$7,400
SW-27	2.5	106	108.5	18.08	2.26	5.00	1	$1,750	4	8	$8,000		$9,750
SW-34	90	155	245	40.83	5.10	11.00	3	$3,850	2	4	$4,000		$7,850
SW-42	12	105	117	19.50	2.44	5.00	1	$1,750	4	8	$8,000		$9,750
WHA-1	6	82	88	14.67	1.83	4.00	1	$1,400	4	6	$6,000		$7,400
WB-9	25	138	163	27.17	3.40	7.00	3	$2,450	n/a	n/a			n/a*
						120.00		$42,000		100	$99,600		

if camping on the site it is 50 per day for food and camping equipment
make a garbage dump on site
helicopter can transport a small excavator where a dump needs to be made
also need equipment for cutting (metal saws) needs a generator, and gas for the generator
all 18 sites need a dump

_ Estim'd # of summer days = Work function divided by 6 people per team, then divided by 8 hours per day
_ Cost of camping based on 7 people (Soil remediation expert plus 6 team members) at 50$ daily camp costs (equip't etc)
_ Helicopter costs based on $1,000 per hour. Note: 4 hours minimum, plus 0.3 hour charge per start up= 0.6 hour charge for three starts= 4.6 hours per day
Two return trips: One for crew and soil remediation expert, another for Broyeur

* No inventory taken. Site still in use by Falconbridge

Soil Remediation Schedule

	Contaminated area (m2)	Days Required	Total Sq. Meters to be Treated	Schedule of Days Required (single/multi-phase remediation)			Closest Community
				Year 2	Year 3	Year 4	
LABRADOR TROUGH							
KAW-35	103	3	309	1	1	1	Kawawachikamach
KAW-45	2	1	2	1			Kawawachikamach
PJ-1	115	3	345	1	1	1	Tasiujaq
TQ-1	2	1	2	1			Tasiujaq
TQ-4	0	0	0	0			Tasiujaq
PJ-10	20	1	20	1			Aupaluk
PJ-17	125	3	375	1	1	1	Aupaluk NB: Boat Access
TW	2	1	2	1			Kangirsuk
HUDSON AND UNGAVA TROUGHS							
K-28	15	1	15	1			Kangiqsujuaq
K-61	75	3	225	1	1	1	Kangiqsujuaq
WB-3	2.5	1	2.5	1			Kangiqsujuaq
KV-1	2	1	2	1			Salluit
SAL-1	0	0	0	0			Salluit
SW-27	2.5	1	2.5	1			Salluit
SW-34	90	3	270	1	1	1	Salluit
SW-42	12	1	12	1			Salluit
WHA-1	6	1	6	1			Umiujaq
WB-9	25	3	75	1	1	1	Salluit
	599	**28**	**1665**	**16**	**6**	**6**	

Winter- Delivery of Waste from Site to Community

	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	WHA 1	WB 9	Totals
GENERAL INFORMATION																			
Nearest community	Kawawa...	Kawawa...	Tasiujaq	Tasiujac	Tasiujac	Aupaluk	Aupaluk	Kangirsuk	Kangiq...	Kangiq...	Kangiq...	Salluit	Salluit	Salluit	Salluit	Salluit	Umiujac	Kangiq...	
Distance (kms return)	120	60	80	150	150	70	30	40	100	120	40	150	120	140	140	150	100	140	**1900**
Add for difficult terrain	40	10	0	30	20	20	0	0	20	20	10	70	20	20	20	70	10	70	**608**
total kms	160	70	80	180	170	90	30	40	120	140	50	220	190	210	210	220	110	210	**2500**
Min Vol Material (m2)	100	5	100	10	10	25	30	20	25	75	5	5	10	15	30	10	5 n/a		**488**
# Barrels	1005	12	404	30	159	82	286	85	70	99	85	30	342	102	1510	81	28 n/a		**4408**
COSTS PER SITE																			
If by Skidoo:																			
Estimated # of Trips		1				3	6	3	3	6	3						1		$25.00
Total # kilometers		**1,690.38**				1,890	**1,690.38**	**1,690.38**	2,520	5,880	**1,690.38**						**1,690.38**		
# of liters of gas		264.95				296.24	264.95	264.95	394.99	921.63	264.95						264.95		
Labour cost: team leade		$160.00				$480.00	$960.00	$480.00	$480.00	$960.00	$320.00						$160.00		$4,000.00
team of 6		$840.00				$2,520.00	$5,040.00	$2,520.00	$2,520.00	$5,040.00	$1,680.00						$840.00		$21,000.00
skidoo _		$700.00				$2,100.00	$4,200.00	$2,100.00	$2,100.00	$4,200.00	$1,400.00						$700.00		$17,500.00
cost of gas ($1.20 per liter) _		$317.94				$355.49	$317.94	$317.94	$473.98	$1,105.96	$317.94						$317.94		$3,525.12
meals		$420.00				$1,260.00	$2,520.00	$1,260.00	$1,260.00	$2,520.00	$840.00						$420.00		$10,500.00
equipment		$200.00				$600.00	$1,200.00	$600.00	$600.00	$1,200.00	$400.00						$200.00		$5,000.00
subtotal:		**$2,637.94**				**$7,315.49**	**$14,237.94**	**$7,277.94**	**$7,433.98**	**$15,025.96**	**$4,957.94**						**$2,637.94**		**$61,525.12**
	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	WHA 1	WB 9	Totals
If by Twin Otter:																			
Estimated # of Trips	27		17	3	4							1	3	3	28	2		n/a	74
Estimated # of Days	3		17	3	2							1	3	1	10	1		n/a	46
Twin Otter rental _	$50,400.00		$67,200.00	$5,600.00	$11,200.00							$5,600.00	$16,800.00	$5,600.00	$56,000.00	$5,600.00		n/a	$224,000.00
Labour cost: team leade	$1,440.00		$1,920.00	$160.00	$320.00							$160.00	$480.00	$160.00	$1,600.00	$160.00		n/a	$6,400.00
team of 5	$3,780.00		$5,040.00	$420.00	$840.00							$420.00	$1,260.00	$420.00	$4,200.00	$420.00		n/a	$16,800.00
meals	$2,160.00		$2,880.00	$240.00	$480.00							$240.00	$720.00	$240.00	$2,400.00	$240.00		n/a	$9,600.00
equipment	$1,800.00		$2,400.00	$200.00	$400.00							$200.00	$600.00	$200.00	$2,000.00	$200.00		n/a	$8,000.00
Community Costs																			
Labour @ 140/person/day	$7.56		$10.08	$840	$1,680							$840	$2,520	$840	$8,400	$840			$33,600.00
Truck: airport to dump	$4.05		$5.400	$450	$900							$450	$1,350	$450	$4,500	$450			$18,000.00
(rental/ driver/ gas)																			
subtotal:	**$71,190.00**		**$94,920.00**	**$7,910.00**	**$15,820.00**							**$7,910.00**	**$23,730.00**	**$7,910.00**	**$79,100.00**	**$7,910.00**			**$316,400.00**
COMMUNICATIONS	**$500.00**	**$500.00**	**$1,000.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	**$500.00**	n/a	**$9,000.00**
	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	WHA 1	WB 9	Totals
TOTAL	**$71,690.00**	**$3,137.94**	**$95,920.00**	**$8,410.00**	**$16,320.00**	**$7,815.49**	**$14,737.94**	**$7,777.94**	**$7,933.98**	**$15,525.96**	**$5,457.94**	**$8,410.00**	**$24,230.00**	**$8,410.00**	**$79,600.00**	**$8,410.00**	**$3,137.94**	n/a	**$386,925.12**

NOTES:

Estimates: 12 compacted barrels fit on a komatik- 4 per square meter
3 cubic meters of material fit on a komatik
Gasoline cost estimated at $1.10 per litre
Return distances over 150 kms require a twin otter
Twin otter rental estimated at $800 per day
Team leader earns $160 per day, labourers earn $140

_ Bold indicates that a minimum of 1,690.38 kms is applied (7 skidoos * 37.85 liters in a tank * 6.38 kms per liter)
_ 7 people * $100 per day
_ $1.20 per liter of gas. Mileage per kilometer = 6.38 kilometers per litre (based on an average of 24.13 kilometers per gallon)
_ PJ-1 will take more than one year to clean - number of days and related expenses have been doubled
_ Based on Air Inuit quotation $7.52 per sq mile ($2.91 per sq km) for "off-strips", + daily minimum charge of $5,600.00 including mileage/ fuel and pilots.

Salary and Expenses: Soil Remediation Expert and Makivik Coordinator

		KAW 35	KAW 45	PJ 1	TQ 1	TQ 4	PJ 10	PJ 12	TW	K 28	K 61	WB 3	KV 1	SAL 1	SW 27	SW 34	SW 42	WHA 1	WB 9	Total
YEAR 2																				
Prep'n days (in MTL)	2																			
Field Days on Site (Year 2- Summer)		10	4	12	6	4	6	12	6	6	9	5	4	4	5	11	5	4	7	
Travel Days	2																			
Total Days	**4**	**10**	**4**	**12**	**6**	**4**	**6**	**12**	**6**	**6**	**9**	**5**	**4**	**4**	**5**	**11**	**5**	**4**	**7**	**124**
Salary ($600 per day):	$2,400	$6,000	$2,400	$7,200	$3,600	$2,400	$3,600	$7,200	$3,600	$3,600	$5,400	$3,000	$2,400	$2,400	$3,000	$6,600	$3,000	$2,400	$4,200	$74,400
Flight north	$2,000																			$2,000
Accommodation in Community	$240	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$2,400
Meals ($20 each)	$240	$600	$240	$720	$360	$240	$360	$720	$360	$360	$540	$300	$240	$240	$300	$660	$300	$240	$420	$7,440
Expenses	$2,480	$720	$360	$840	$480	$360	$480	$840	$480	$480	$660	$420	$360	$360	$420	$780	$420	$360	$540	$11,840
Total Year 2	$4,880	$6,720	$2,760	$8,040	$4,080	$2,760	$4,080	$8,040	$4,080	$4,080	$6,060	$3,420	$2,760	$2,760	$3,420	$7,380	$3,420	$2,760	$4,740	$86,240
YEAR 3																				
Prep'n days	2																			
Field Days on Site (Year 3- Summer)		1		1				1			1					1			1	
Travel Days	2																			
Total Days	**4**	**1**		**1**				**1**			**1**					**1**			**1**	**10**
Salary ($600 per day):	$2,400	$600		$600				$600			$600					$600			$600	$6,000
Flight north	$2,000																			$2,000
Accommodation in Community	$240	$120		$120				$120			$120					$120			$120	$960
Meals ($20 each)	$120	$60		$60				$60			$60					$60			$60	$480
Expenses	$2,360	$180		$180				$180			$180					$180			$180	$3,440
Total Year 3	$4,760	$780		$780				$780			$780					$780			$780	$9,440
YEAR 4																				
Prep'n days	2																			
Field Days on Site (Year 4- Summer)		1		1				1			1					1			1	
Travel Days	2																			
Total Days	4	1		1				1			1					1			1	10
Salary ($600 per day):	$2,400	$600		$600				$600			$600					$600			$600	$6,000
Flight north	$2,000																			$2,000
Accommodation in Community	$240	$120		$120				$120			$120					$120			$120	$960
Meals ($20 each)	$120	$60		$60				$60			$60					$60			$60	$480
Expenses	$2,360	$180		$180				$180			$180					$180			$180	$3,440
Total Year 4	$4,760	$780		$780				$780			$780					$780			$780	$9,440

MAKIVIK/ KRG COORDINATOR	
Salary	$60,000
Expenses	$10,000
Total	$70,000
5 years	$350,000

		KAW 35	KAW 45	PJ 1	TQ 1	TQ 4	PJ 10	PJ 12	TW	K 28	K 61	WB 3	KV 1	SAL 1	SW 27	SW 34	SW 42	WHA 1	WB 9	Total
Env't Canada Soils Specialist	$14,400	$8,280	$2,760	$9,600	$4,080	$2,760	$4,080	$9,600	$4,080	$4,080	$7,620	$3,420	$2,760	$2,760	$3,420	$8,940	$3,420	$2,760	$6,300	$105,120
Makivik/ KRG Coordinator	$350,000																			$350,000
GRAND TOTAL																				$455,120

Equipment

Basic Equipment

Argo (6 Wheel ATV)	$16,000
Gas for ATV	$3,000
Wagon	$600
500 Watt Generator/ Gas	$1,000
Rope	$500
Industrial Plastic (for Twin Otter)	$4,500
Satellite Telephone	$1,200
Cook Gear	$4,000
Total	**$30,800**

Equipment/ Gas for on-site excavation of dump

2-Year lease of:

Excavator	$8,000
Bulldozer	$8,000
Track loader	$4,000
Gasoline	$4,000
Total	**$24,000**

Safety Equipment	(8 people per 7 communities)
Rain wear (summer)	$6,720
Boots (summer)	$4,200
Gloves (summer)	$8,400
Shovels (summer)	$5,600
Eye protection (for Compactor)	$3,360
Total	**$28,280**

Safety Course _	**$8,400**
GRAND TOTAL	**$91,480**

NOTES: _ 7 communities, one day in winter and one day in summer

Projected Cost of Site Assessment

Projected cost to Assess 277* Sites in 2004 (Note 1)

a)	($160000 x 1.435)	$229,600.00 (Note 2)
plus 15% contingency		$34,440
	Total	**$264,040**

b) Cost to Photograph 402 sites: (Note 3)

Quotation - JL Corriveau	**$40,000**
GRAND TOTAL	**$304,040**

Note 1 : Cost of Previous Site Assessment: 193 sites assessed, 2001-2002

Cost of Site Assessment (includes planning, salaries, analysis and reporting, lodging and meals, air and helicopter transport, soil sampling, materials, communications and all honorariums.)

2001	$55,000
2002	$35,000
Subtotal	$90,000

Cost of Site Prioritization (includes planning, salaries, analysis and reporting, lodging and meals, air and helicopter transport, materials, communications and all honorariums)

2001	$45,000
2002	$25,000
Subtotal	$70,000
Total Historical Cost: 193 sites	$160,000

Note 2: according to the Makivik and KRG 2003 Site Assessment, a projected 277 sites are *expected* to contain residual mining exploration materials, thereby requiring assessment. 277/193 = 1.435

Note 3: based on a Quotation by JL Corriveau and Associates, of Val d'Or , Quebec, June, 2003.

Communication of results back to Communities

Per Person Costs	Cost per Unit	# of People	# of Days	TOTAL
Labour				
Prepar'n time (PPT presentation etc)	$230 per day	1	10	**$2,300.00**
Travel Time	$230 per day	2	14	**$6,440.00**
Expenses				
Airplane Travel	$9,000.00	2	1	**$18,000.00**
Accommodation	$120.00	2	14	**$3,360.00**
Meals	$20.00	6	14	**$1,680.00**
				$31,780.00

Per Community Costs	Cost per Unit	# of Units	# of Communities	TOTAL
Communication Materials	$150.00	1	9	**$1,350.00**
report(s) to leave in Communities	$30.00	1	9	**$270.00**
equipment rental	$60.00	1	9	**$540.00**
misc	$30.00	1	9	**$270.00**
	$270.00			**$2,430.00**

GRAND TOTAL **$34,210.00**

NOTES: Results are expected to be delivered by the Coordinator, a salaried employee of KRG or Makivik.
Labour is pro-rated from $60,000 per annum salary
Results Tour to be carried out by Coordinator and one other, in 2007
9 Communities are expected to be visited in the course of the results tour. These are:

Kawawachicamach
Aupaluk
Kangirsuk
Tasiujaq
Kuujjuaq
Kangiksujuak
Salluit
Umiujaq
Kujuraraapik

APPENDICES

APPENDIX 1
MAJOR SITES: DESCRIPTION

The 2001-2002 site inventory provided information on 193 sites of which 90 were validated as abandoned mining sites. As a result of their classification and prioritization, a total of 18 sites were classified as major according to their size, content and contamination, of which 8 sites are located in the Labrador Trough, and 10 in the Ungava Trough-Hudson Bay region. They contain abandoned buildings, heavy equipment, barrels of hydrocarbons (some of which contain variable quantity of residue), contaminated soil, and waste. All major sites contain some soil areas, of variable size, contaminated by petroleum hydrocarbons and, to a lesser extent, by lead where batteries were present. There was no PCB contamination where transformers were present.

In five major sites (K-28, K-61, KAW-35, TQ-1, and WB-9), there was evidence of recent mining exploration activities. At these sites, the residue and debris from the previous mining activities have not been removed nor had remedial measures been undertaken. Care should be taken by the companies concerned in using these sites. Comprehensive demobilization and cleanup should be undertaken following the completion of the present activities. Certain companies, on their own initiative, have begun remedial actions on some of these sites. This should be encouraged and a follow up by the Department in charge of these activities is recommended.

In collaboration with governments and mining associations, a programme with a funding mechanism should be set up for site remediation of intermediate and minor sites. Due to the environmental risk posed by the major sites, we feel they require separate and immediate attention. The funding required for Major sites is outlined in the following section.

Appendix 2 contains a detailed description of the Major sites. It is important to note that many of the assessments that follow are non-exhaustive, and the total extent of the remediation requirements is not fully known. The largest sites will require more costly and time-consuming remediation and repetitive soil decontamination to reduce their contamination charge, rather than a single one-time clean-up effort.

Kawawachikamach Sector

This section presents the description of the content of two major sites in the Kawawachikamach sector.

Site KAW-35

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contami-nated soil surface (m^2)
19	1 muskeg 1 insulated tank (in a shed) furnaces, water heaters motors (generators) 1 trailer 1 large sled 6 diesel reservoirs	Diesel barrels: >1000 total >6 full (>1200 L) >200 with residue : ?2000 L 6 X 4400-L diesel reservoirs: empty 16 Plastic bottles: Hydrofluoric acid 4%; 3 empty 10 full: 5 L 3 with residue: 10 ml Pails: 5 x 20-L: full or residue of biodegradable degreasing solvent dry extinguishers	3 batteries	500+ (including buildings)	100+	103

Site KAW-35 is well known by Naskapi informants. It is located near Retty lake at about 60 km E-N-E of Kawawachikamach and Schefferville and it covers about 0.15 km^2. Three sectors were identified during the field inventory. The first one comprises 7 house trailers containing various equipment (furnaces, beds, toilets, motors, fire extinguishers, water heater, etc.) and 9 other buildings. An approximate 1000 barrels in total, including 6 full of diesel (1200 L) and at least 200 containing residue (perhaps at least 2000 L), are present on the site, from which about 900 barrels are located near the lake, including 5 that are full of diesel. Bottles containing Hydrofluoric acid 4% (total of ~5 L) were found in a small building. Sector 1 also contains various debris including five 4400-L tanks, a large insulated tank in a shed, 3 batteries, antennae, wires, pipes, metal and wood debris, a muskeg, a large sled, a large quantity of wood core trays, pails with biodegradable solvent, etc. The total soil contamination area is estimated at 103 m^2. Water samples were not contaminated. Sector 2 contains mine tailings and a garage, while Sector 3 includes 2 house trailers and a 4400-L tank. **Considering the proximity to the lake of numerous barrels, the presence of bottles containing acid, and the huge quantity of buildings and debris, the cleanup of this site is a priority in a perspective of remediation for public and environment safety.**

The opening of this site occurred in September 1987, according to hard hats found with the inscription "D'ORVAL Mines Ltd, Opening Sept. 1987". Envelopes are identified with a letterhead: "Compagnie de gestion minière Louvicourt Ltée, Val d'Or".

Site KAW-45

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contami-nated soil surface (m^2)
5	-	Diesel barrels: 2 empty 3 with residue: 30 L 7 unknown content 1 X 4-L Naphta: empty	-	15+	5+	2

Site KAW-45 is located about 30 km W-N-W of Kawawachikamach and Schefferville near Musset lake. It was divided into 2 sectors, the first one comprises 3 wood platforms, a shed, a wood cabin, an outhouse, a total of 5 barrels (2 near the shore) with 3 containing residue of diesel (~30 L), and various debris (wood, plastic hoses, carpet, Styrofoam); there is an open rusted barrel in the lake. The second sector includes 7 barrels on the opposite shore where 2 m^2 of soil is highly contaminated by petroleum hydrocarbons.

Tasiujaq Sector

This section presents the description of the three major sites (PJ-1, TQ-1, and TQ-4) in the Tasiujaq sector.

Site PJ-1

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
7	2 bulldozers 2 muskegs 1 truck 2 crushers 2 conveyors 1 crane 8 machines 2 alternators 1 radiator 3 trailers 6 generators 10 X 40,000-L tanks 2+ motors	Diesel barrels: ~357 empty 3 full: 2500 L 43 with residue: 2595 L Propane tanks: 80 empty ~50 tubes of grease 1 X 2 kg grease 1 X 4 L motor oil 1 X 50 L motor oil 3 X 4L paint	20 batteries 2 transformers	150+	100+	115

Well known by informants and MRNQ, site PJ-1 is the largest site encountered during the survey. It is located between Leaf Bay and Lac aux Feuilles almost mid-way between Aupaluk and Tasiujaq. It was not merely an exploration site but was the hub of mining activities, and included a mining gallery and tailings at the time the mining company went bankrupt. It is a very large site, covering more than 3 km^2. During the survey, 9 sectors were identified: one for mine exploitation, another for ore segregation, living quarters, a core storage area, a chemical storage area, some dumps, etc.

The quantity of rusting stock and various debris is huge (>300 m^3). In addition to the presence of heavy equipment (bulldozers, truck, crushers, etc.), the site contains a lot of pipes, metal pieces, core trays, rubber hoses and a wide variety of waste. It also contains ten 40,000-L diesel tanks, 2 transformers, 20 batteries, grease pails, and a lot of diesel barrels containing approximately 2500 L of diesel. The soil is characterized by localized areas of heavy contamination, particularly near the mining gallery, the frame of one building (storage area), batteries and under grease pails close to Pio Lake. The total contaminated area is estimated at 115 m^2.

Furthermore, this site is not safe. The fences surrounding 3 mine shafts leading to the mining gallery have collapsed, creating a hazard for people and snowmobiles circulating on the hill above. **The remediation of this site is a priority for public safety and from an environmental point of view.**

Site TQ-1

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
8	1 snowmobile	Diesel barrels: 30 empty Propane tanks: 6 empty	1 battery	20+	10+	2

Well known by informants and MRNQ, site TQ-1 is an old mining exploration campsite reused as an outfitting camp and identified as Safari Nordik – Gerido camp. Also identified as VP-3 and P-24F/13-6 by GÉTIC (Duhaime and Comtois, 2002), it is located 10 m from Gerido Lake, at approximately 75 km west of Kuujjuaq. It contains 8 dwellings, one core tray storage, an old snowmobile, a few propane tanks, scattered diesel barrels and waste. The diesel barrels connected to the stoves of the dwellings have leaked and led to heavy contamination in the soil beneath some of the barrels (total contaminated area: ~2 m^2). One barrel containing ~100 L of diesel is located less than 2 meters from the lake.

It also contains newer and non-abandoned material: batteries, fuel tanks, freezers, a stove, launches, and a trailer. The site seems to still be in use, but is definitely not well maintained since there is scattered debris and one barrel with fuel near the lake.

Site TQ-4

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
2 + 1 cabin	1 ice drill	Diesel barrels: 153 empty 3 with residue = 150 L Propane tanks: 8 empty 3 X 20 L gasoline - full	0	10+	10+	0

Known through informants, also identified as VP-2 by GÉTIC (Duhaime and Comtois, 2002), and located 40 m from Garigue Lake south of Tasiujaq, site TQ-4 contains 2 log dwellings and one cabin, a medium size dump, 5 propane tanks, a cluster of 25 barrels, a pile of 98 barrels, the space for 2 diesel bladders, 1 new ice drill and 3 furnaces, and scattered debris. Some barrels contain approximately 150 L of diesel. Its soil is not contaminated.

Aupaluk Sector

This section presents the description of the two major sites in the Aupaluk sector, sites PJ-10 and PJ-17. Their descriptions are presented below.

Site PJ-10

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
1 base	1 tank	Diesel barrels: 39 empty 34 with residue: ~1400 L Propane tanks: 10 empty 5 with residue 2 X 20 L grease 7 X 40 L motor oil	1 battery	50+	25+	20

Known through informants, site PJ-10 is located 50 m from Ford Lake, approximately 30 km WSW of Aupaluk (Map 5). It is composed mainly of wood debris, propane tanks, and barrels containing a total of 1400 L diesel. We also found one battery, pipes, various metal pieces and wires (Appendices 2 and 9). The soil under the two piles of barrels is highly contaminated with petroleum hydrocarbons. The total contaminated area is estimated at 20 m^2 (Table 11).

Site PJ-17

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
2	1 truck 1 metal sled 1 runway roller 8 motors	Diesel barrels: 270 empty 15 with residue: 500 L Propane tanks 27 empty 13 with residue 1 pail full of grease: 100L	5 batteries 1 transformer	15+	30+	125

Located near Hope Advance Bay, well known by informants and accessible by boat and ATV from Aupaluk (Map 5), PJ-17 contains 2 buildings, one electricity line with a transformer, one airplane strip, some heavy equipment (1 truck, 1 runway roller, etc), 3 drum storages, 3 dumps of which one contains motor pieces and 5 batteries, and scattered waste (Appendices 2 and 9). The most important soil contamination was found inside the main building and close to it under 15 diesel barrels. Total contaminated area is about 125 m^2 (Table 11). Some barrels contain approximately 500 L of diesel.

Kangirsuk Sector

This section presents the description of the only Major site in the Kangirsuk sector (TW).

Site TW

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
2 bases	1 pipe threader	Diesel barrels: 70 empty 13 with residue: 1230 L Propane tanks: 7 empty 4 with residue 1 X 100 L grease 2 X 4 L grease 1 X 2 kg grease 20 L dry extinguisher powder	0	30+	20+	2

The Twin Lake site (TW) had not been previously identified by informants. Located on the shore of Twin Lake near Kangirsuk, it contains the base of a building, scattered and piled barrels with approximately 1230 L of diesel and 100 L of grease, a lot of core trays and pipes, a pipe threader, various pieces of machinery, and scattered waste. he most important soil contamination was found near a plywood sheet and under a grease pail. This latter patch of highly contaminated soil is located 3 m from a brook, which runs into Twin Lake. Total contaminated area is estimated at 2 m^2

Kangiqsujuaq Sector

This section presents the description of the three major sites in the Kangiqsujuaq sector: K-28, K-61, and WB-3.

Site K-28

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
1 tent	1 motor 2 X 1000-L tanks empty	Diesel barrels: 60 empty 10 with residue: 2000 L Propane tanks: 9 empty 6 with residue Bags with $CaCl_2$ (de-icing salt)	0	30+	25+	15

Known through informants, K-28 is located in the vicinity of Kangiqsujuaq and is far from water. It is composed of a collapsed wood tent, two 1000-L tanks, one motor, a lot of scattered barrels, wood, and a large quantity of metal debris and waste. The soil near the tent is heavily contaminated (5 m^2). Another dump and a cluster of barrels are located a short distances from the main site. About 10 barrels contain an estimated 2000 L of diesel.

Another part of the site comprises recent mining exploration equipment: an exploration tripod, Jet-B fuel barrels, calcium chloride ($CaCl_2$) bags (for de-icing), core trays, metal pipes, boxes of equipment, rubber hoses, etc. This material is well piled on a pallet. The soil near the pallet is moderately contaminated (10 m^2).

Site K-61

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
12	2 muskegs 1 X 40,000-L tank 1 bath 3 water heaters 6 motors	Diesel barrels: 25 empty 10 full: 2000 L >5 with residue Propane tanks: 18 total; 16 full 44 X 20 L grease 20 X 1 L grease 2 L motor oil 1 container with acid 1 X 4L paint	5 batteries	150+	75+	75

Known through informants, site K-61, which is known as "Expo Ungava Mines" (Duhaime and Comtois, 2000), seems to have been used recently. Located in the area of Kangiqsujuaq, more than 500 m from water, this very big site contains 12 dwellings, 2 muskegs, one 40,000-L diesel tank, at least 3 dumps, a lot of barrels - some piled, some scattered - 5 batteries and a huge quantity of wires, pipes and other waste.. Some pails contain grease, barrels contain approximately 2000 L of used diesel, and 16 propane tanks are full. The diesel barrels connected to the stoves of the dwellings have leaked and led to highly contaminated soil underneath. The total contaminated area is estimated at 75 m^2. As this campsite does not seem abandoned, and some buildings had a lock on the door, a complete inventory of the interior of the dwellings was not carried out, but a non-exhaustive inventory of the material scattered around the site was made.

Site WB-3

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
0	1 wood round base surrounded by aluminium	Diesel barrels: 76 empty 9 with residue: 675 L Propane tanks: 1 empty	0	20+	5+	2.5

Known through informants, site WB-3 is located 5 m from Qulusuttalik Lake, near Kangiqsujuaq. It consists mainly of a circular base made of wood and aluminium, scattered wood debris and a cluster of barrels, some containing about 675 L of residue. "CANICO (Canadian Nickel Company)" is written on many barrels. The soil at the dump is moderately contaminated (2.5 m^2).

Salluit Sector

This section presents the description of major sites in the Salluit sector (KV-1, SAL-1, SW-27, SW-34, SW-42, and WB-9).

Site KV-1

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
0	1 water heater	Diesel barrels: 28 empty 2 with residue: 50 L	0	10+	5+	2

Known through informants and located approximately 100 km S-W of Salluit on a lakeshore, KV-1 contains a platform for a floatplane, one water heater, scattered diesel barrels (2 with residue), and a small dump. The soil under one of the barrels containing residue is moderately contaminated (2 $m^{2)}$.

Site SAL-1

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
6	0	Diesel barrels: 336 empty Propane tanks: 15 empty 6 X 40 L Aviation oil 3 X 1 L Aviation oil	2 batteries	50+	10+	0

SAL-1 is a big site located near Nuvilik Lakes, approximately 90 km S-S-E of Salluit. It contains 6 collapsed dwellings, 2 clusters of barrels, at least 9 propane tanks, 2 batteries, a dump, a rather large quantity of wood and scattered waste. No contaminated soil was noted. All the barrels are empty but there is about 120 L of aviation oil in pails.

Site SW-27

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
1 base	1 muskeg 1 tractor 1 trailer	Diesel barrels: 77 empty 6 full: 1200 L 8 with residue: 450 L Propane tanks: 1 with residue 9 grease pails: 260 L ~20 L motor oil 6 L Aviation oil	1 battery	20+	15+	2.5

Known through informants, SW-27 is located at approximately 90 km S-S-W of Salluit and is far from water. It contains one muskeg, one tractor, wood and metal debris, clusters of diesel barrels and grease pails - some of which are full (about 1650 L diesel and 260 L grease)- core trays, one battery and a dump. The soil under some barrels and grease pails is heavily contaminated (2.5 m^2).

Site SW-34

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
1 base	0	Diesel barrels: large: 1220 empty medium: 14 empty small: 260 empty small: with gas residue (40L) Propane tanks: 42 empty 16 grease pails: empty 1 bottle with ~250 ml acid 1 bottle with powder	14 batteries	25+	30+	90

Site SW-34, about 90 km S-W of Salluit, had not been previously located by informants, and extends over a 500 m X 500 m area. It has no standing dwelling or heavy equipment but a huge quantity of scattered and piled barrels (some with residue) a lot of scattered propane tanks, and rusting waste. It also contains pieces of muskeg, one radio, a metal base, chemical products, a few grease pails and at least 14 batteries which have led to heavy soil contamination (90 m^2). **Taking into account the size of the site and its location on the shore of Esker Lake, its remediation is a priority from an environmental point of view and for public safety.**

Site SW-42

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
1	0	Diesel barrels: 74 empty 7 with residue: 700 L 3 X 4 L grease 200 ml insect repellent	0	10+	10+	12

Known through informants, SW-42 is located along Beauparlant Lake at approximately 100 km S-S-E of Salluit. Its principal contents are a plywood tent, a cluster of barrels and a dump of metal pails, wood and waste. Some barrels contain about 700 L of diesel. The soil under the drum cluster is heavily contaminated (12 m^2).

Site WB-9

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
9	N/D	N/D	N/D	N/D	N/D	25

N/D: not determined because the campsite was still used

The Falconbridge campsite, located some 10 m from Kenty Lake, at approximately 100 km S-S-E of Salluit was used recently and is well known by informants. It contains 9 dwellings and a pile of barrels. The diesel barrels connected to the stoves of the dwellings have leaked and contaminated the soil beneath (25 m^2). As this campsite does not seem abandoned, we did not undertake an inventory of the site.

Umiujaq Sector

This section presents the description of major sites in the Umiujaq Sector (WHA-1).

Site WHA-1

Dwellings (qty)	Heavy equipment (qty)	Hydrocarbons and other products (qty)	Batteries and trans-formers (qty)	Pipes/ core trays/ wood (m^3)	Waste (m^3)	Contaminated soil surface (m^2)
9	0	Diesel barrels: 4 empty 1 full: 200 L 3 with residue: ~30 L 16 small (40 L) empty 4 small with residue (~50L) 10 cans of deodorant cleaner	0	50+	5+	6

Located along the shore of an unnamed lake, this site is about 120 m long and 25 meters wide. It comprises a building and 9 wood platforms, a collapsed outhouse, 5 200-L barrels (one full ad 3 with diesel residue ~230 L), 19 small (40L) barrels of which 4 contain residue (~50L) , 10 cans of deodorant cleaner, wood debris, pipes, and various debris. A total of 6 m^2 of soil is contaminated by petroleum hydrocarbons. Even if no evidence of mining equipment was found on the site, the Cree informants confirm that this site was related to previous mining activities.

APPENDIX 2

Abandoned mining sites presented in relation to their proximity to the closest village and to their importance

Sector	Number of sites	Proximity to the village (from the closest to the farthest)
LABRADOR TROUGH		
Kawawachikamach	15	KAW-54, KAW-72, KAW-69, KAW-67A, *KAW-36*, **KAW-35**, **KAW-45**, *KAW-119*, KAW-63, KAW-43, KAW-42A, KAW-60, KAW-58, *KAW-59*, KAW-28
Kuujjuaq	7	KAW-112, PD-1, PD-2, KAW-10, KAW-5, KAW-26, *P24F*
Tasiujaq	9	**PJ-1**, *TQ-6*, *TA-2*, *TQ-14*, **TQ-4**, *TQ-10*, *TA-1*, **TQ-1**, *VP-11*
Aupaluk	6	*PJ-17A*, **PJ-17**, *PJ-19*, PJ-9, **PJ-10**, *G-24N04-3*
Kangirsuk	5	**TW**, *QC-3*, QC-2, KG-21, KG-19
Total	**42**	
UNGAVA TROUGH + HUDSON BAY		
Kangiqsujuaq	22	*I-32*, KAN-9, **WB-3**, *KAN-10*, *KAN-1*, **K-28**, *K-27*, K-36, **K-61**, KAN-11, *KAN-2*, I-12, KAN-3, *K-37*, *KAN-7*, *KAN-4*, KAN-12, K-41, KAN-8, KAN-5, *KAN-6*, *K-49*
Salluit	16	SW-14, **SW-27**, **KV-1**, SW-32, *Parent Lake*, *SW-24*, **SAL-1**, SW-13, **SW-34**, SAL-2, **WB-9**, **SW-42**, P-35G08-1002, P-35G08-1002A, G-35G08-1, P-35G08-1003
Umiujaq	8	**WHA-1**, UD-1, UD-6, UM-1,UM-2, UM-3, PH-11, GW-5
Kuujjuaraapik	2	*GW-8*, GW-2
Total	**48**	

Legend: **Major sites in bold**, *intermediate in italic and uderlined*, minor in regular letters.

APPENDIX 3 - Current Titleship at Major Sites, (as of March, 2003)

	Map	Zone	East	North	Current Title Holder (MRN reg #), Company Name, % Title, Mining Title #, Status	Long/ Lat
Labrador Trough:						
KAW- 35	23 0 01 E	19	683062	6124425	(18742) Black Ernest D (100%) CDC1010194 A	Long: -65:52:49.298
(Evidence of recent mining activities)					nearby:	Lat: 55:4:12.908
					(18923) Dasler, Peter (100%) CDC 1026597 A	
					(19696) Romios Gold Resources Inc (100%) CDC1027059 A	
Hardhat "D'ORVAL Mines Ltd, Opening Sept. 1987". Envelopes identified with a letterhead: "Compagnie de gestion minière Louvicourt Ltée, Val d'Or".						
KAW – 45	23 O 11	19	603854	6158489	(5806) Fronteneau Resources (100%) PEM 0000919A	Long: -67:14:57.132 Lat: 55:37:30.859
Tasiujaq Sector:						
TQ-1	24F13E	19	460394	6424601	(18783) Canadian Royalties Inc (100%) cell # PEM 0001002 A	Long: -69:47:12.661
(Evidence of recent mining activities)					nearby:	Lat: 57:56:25.105
					(1425) Groupe Platine de la Fosse Inc (Le) (100%) CL4528071 A	
					(13204) Mines d'Or Virginia Inc. CDC1006501 R	
					Identified as Safari Nordik – Gerido camp	
TQ- 4 (VP-2)	24L08	19	434268	6457517	No current Titleship- likely it has expired	Long: -70:30:6.406 Lat: 58:22:33.397
PJ-1	24K13	19	465744	6536010	(15261) 662707 Alberta Inc (100%), CDC1018054 A	Long: -69.5956
(TQ-20, P-24-K13-3, G-24 K13-4)					(14650) Ressources Troymin (100%) CDC1085749 A	Lat: 58.962
					The site lies directly on the border between these 2 Titles	
Aupaluk Sector						
PJ-10	24 M 01	19	436770	6568545	No current Titleship- likely it has expired	Long: -70:15:3.310 Lat: 59:22:30.814
PJ – 17	24N05	19	456452	6577950	(14650) Ressources Troymin Ltee (100%) CDC1117903 A	Long: -69:21:40.259 Lat: 59:23:8.580
Kangirsuk Sector						
TW	25C05W	19	448570	6661890	(10803) Mines D'or Virginia (50%) PEM 0001057 A	Long: -69:56:27.119
					(17358) Osisko Exploration Ltee (50%) PEM 0001057 A	Lat: 60:5:55.879
					(a partnership- both companies are on the Title)	
Kangiksujuak Sector						
K-28,	35H11E	18	593140	6828368	(18783) Canadian Royalties Inc (100%) PEM0001608 A	Long: -73.24583
(Evidence of recent mining activities)					(13920) Exploration Minerale Ungava (100%) CDC1005422 A	Lat: 61.5775
					(UTM coordinates fall between these two Titleholders)	
					nearby:	
					Nunavik Boreal Explorers (18645)	
					Northwest Exploration Company Ltd (19781)	
					Ressources Unifies Beaufied (2118)	
K-61	35H11W	18	582135	6825524	(13920) Exploration Minerale Ungava (100%) CDC1005246 A	Long -73.45426
(Evidence of recent mining activities)					nearby: (18783) Canadian Royalties Inc. (100%)	Lat: 61.55448
WB-3	35H08W	18	643667	6820363	No current Titleship- likely it has expired	Long: -72:16:47.942 Lat: 61:29:3.140
					Canadian Nickel Company written on drums	
Salluit Sector						
KV -1,	35F07W	18	406222	6811650	No current Titleship- likely it has expired	Long: -76:21:4.391
					nearby: (848) Falconbridge Ltee	Lat: 61:28:8.649
					NB: The site is on prohibited lands	
SAL-1	35G10	18?	506195	6820594	(16180) Novawest Resources Inc. (100%) CDC 1008120 A	Long: -74:22:18.493
					(4982) Bambic Peter (100%) CDC 1109069 A	Lat: 61:42:46.674
					The site lies directly on the border between these 2 Titles	
SW-27	35F08W	18	427490	6817085	No current Titleship- likely it has expired	
					nearby: (19472) Anglo American Exploration Canada Ltd (100%)	Long: -75:54:17.844
					nearby (18783) Canadian Royalties (100%)	Lat: 61:16:35.851
					nearby (848) Falconbridge (100%)	
SW-34	35G09W	18	528215	6827693	(2419) Societe Miniere Raglan du Quebec Ltee (100%) CDC1010271 A	Long: -74:36:39.906
					(16180) Novawest Resources Inc. (100%) CDC1107214 A	Lat: 61:35:14.759
					The site lies directly on the border between these 2 Titles	
					Some barrels have **Spartan** written on them	
SW-42	35G07E	18	522790	6807275	(19172) Menace Capital Corporation (100%) CDC1111888 A	
					very nearby:	Long: -74:44:56.408
					(19781) Northwest Exploration Company Ltd CDC1112769 A	Lat: 61:22:30.819
					(18607) 862539 Alberta Inc. (100%) CDC1109515 A	
WB-9	35G07E	18	523793	6813643	(17375) Dumont Nickel Inc (100%) PEM 0001441 A	
(Evidence of recent mining activities)					very nearby:	Long: -74:44:56.408
					(16180) Novawest Resources Inc. (100%) CDC1113578 A	Lat: 61:22:30.819
					(18607) 862539 Alberta Inc. (100%) CDC1109634 A	
					Falconbridge Exploration company site- in use	
Umiujaq Sector (1)						
WHA-1	34B05 M	18.0	439001	6251186	no info on website- awaiting response from Ronald Tremblay at MENV	

Legend:

BEP:	Bail Minier Particulier
CLD/CDC:	Claim Designe (proposed)
PEM:	Permis D'exploration Miniere
CL:	Claim Jallone
R:	Revoked
A:	Active

info in red relates to observations taken during site assessment

Notes:

K-28, K-61, KAW-35, TQ-1 and WB-9: Evidence of recent mining activities

APPENDIX 4

DRUM CRUSHER/COMPACTOR

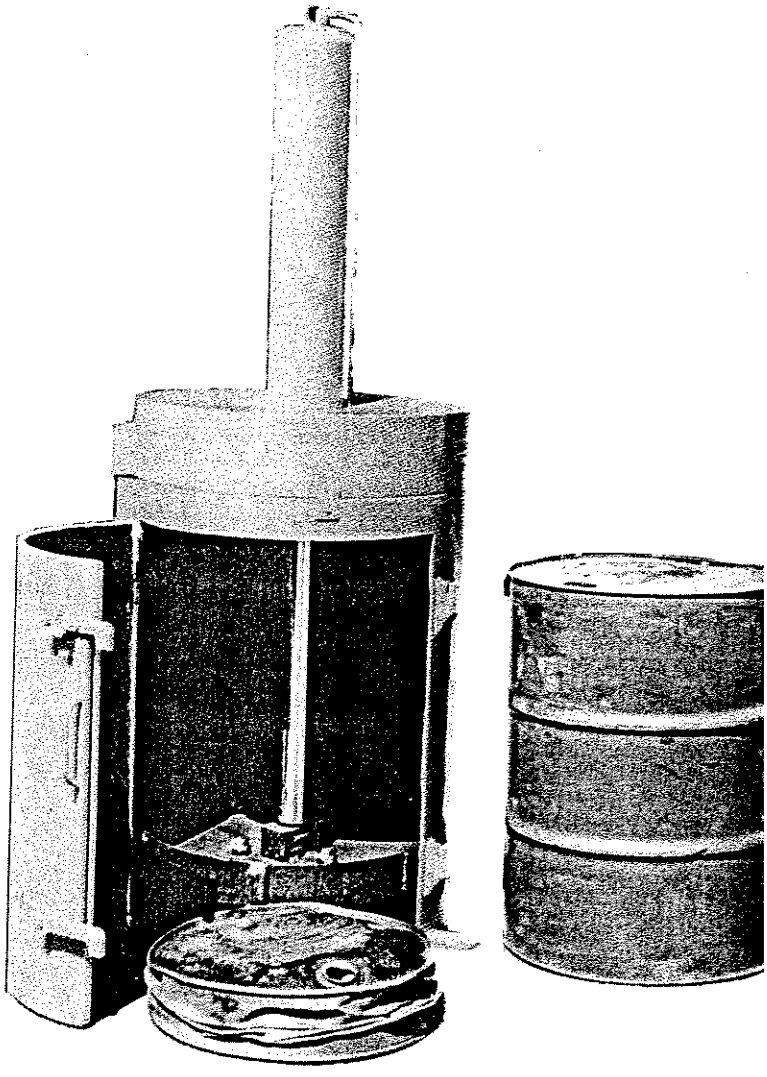
Model: DC-85-100 DRUM CRUSHER/COMPACTOR With Different Models To Produce Up To 85,000 Lbs. Of Crushing/Compacting Force

FEATURES:

- Will crush 55 gallon drums or 5 gallon pails
- Quick change platen for compacting waste **IN THE DRUM**
- Remote hydraulic power supply - to locate away from the crusher
- No electrical items mounted on the crusher for safety
- Heavy duty all steel construction
- Safety interlocks on the door to prevent operation while door is open
- Speed time **24 SECONDS** for compaction cycle
- Dimensions: 84" high x 31" diameter on crusher

POWER UNIT INCLUDED: 10hp electric motor, rugged gear pump, reservoir, relief valve, return filter, sight gauge and pressure gauge.

OPTIONS: optional water spray system - optional Hepa Filter - Hoses - Bottom drum slide



ADVANCED MANUFACTURING

5780 I-10 Industrial Park
Theodore, AL 36582

Phone (334) 653-6888 Fax (334) 653-6617

APPENDIX 5

Number of Sites Requiring A Drum Compactor

	Number of Barrels to be crushed	Requires Crusher?
LABRADOR TROUGH		
KAW-35	1005	YES
KAW-45	12	NO
PJ-1	404	YES
TQ-1	30	NO
TQ-4	159	YES
PJ-10	82	YES
PJ-17	286	YES
TW	83	YES
HUDSON AND UNGAVA TROUGHS		
K-28	70	YES
K-61	99	YES
WB-3	85	YES
KV-1	30	NO
SAL-1	342	YES
SW-27	102	YES
SW-34	1510	YES
SW-42	81	YES
WHA-1	2	NO
WB-9	n/a	NO

Sites with over 70 barrels will require a Compactor-
13 Sites in total

APPENDIX 6

Sites Requiring Multiphase Bio-Restoration

Treatment of Contaminated Soil (>25m^2)

Sites	Nature of the contaminants	Contaminated area (m^2)
LABRADOR TROUGH (LT)		
PJ-17	Petroleum hydrocarbons + Lead	125
PJ-1	Petroleum hydrocarbons	115
KAW-35	Petroleum hydrocarbons	103
Total LT		**343**
UNGAVA TROUGH + HUDSON BAY (UTHB)		
SW-34	Petroleum hydrocarbons + Lead	90
K-61	Petroleum hydrocarbons	75
WB-9	Petroleum hydrocarbons	25
Total UTHB		**190**
Total LT + UTHB		**533**

Sites with Contaminated Soil That Will Receive One-time Bio-Restoration Treatment (<25m^2)

Sites	Nature of the contaminants	Contaminated area (m^2)
LABRADOR TROUGH (LT)		
PJ-10	Petroleum hydrocarbons	20
KAW-45	Petroleum hydrocarbons	2
TQ-1	Petroleum hydrocarbons	2
TW (Twin Lake)	Petroleum hydrocarbons	2
Total LT		**26**
UNGAVA TROUGH + HUDSON BAY (UTHB)		
K-28	Petroleum hydrocarbons	15
SW-42	Petroleum hydrocarbons	12
WHA-1	Petroleum hydrocarbons	6
SW-27	Petroleum hydrocarbons	2.5
WB-3	Petroleum hydrocarbons	2.5
KV-1	Petroleum hydrocarbons	2
Total UTHB		**40**
Total LT + UTHB		**66**