INDIAN AND NORTHERN AFFAIRS CANADA
NUNAVUT REGIONAL OFFICE

SUMMARY OF TECHNICAL ACTIVITIES - 2003

RESOLUTION ISLAND PROJECT

BAF-5: ABANDONED POLE VAULT MILITARY RADAR STATION

Prepared by:

Sinanni Inc.

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QIKIQTAALUK CORPORATION

February 2004

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RESOLUTION ISLAND PROJECT

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EXECUTIVE SUMMARY

An abandoned radar station located on Resolution Island at the southeastern tip of Baffin Island was left in poor environmental condition. Previous investigations performed at this former USAF station determined the extent of environmental problems from past occupation. The Resolution Island Project consists in the removal and disposal of PCB contaminated soils, as well as the management of other health and environmental risks such as hydrocarbon and metal contaminated soils, asbestos, and waste drums. Training is an important aspect of this project. A fully operational core camp accommodates a working crew of approximately 70 persons.

The Resolution Island (RI) Project started in 1998 after several years of investigations. The work accomplished by Qikiqtaaluk Corporation (QC) is summarized as follows:

1997: Initial equipment mobilization from Iqaluit to RI. QC sends a 20 person crew to RI for sea lift operations and basic core camp renovations. QC also provides technical support to Queen's University ASU, and LDS (*i.e.,* Sinanni) for their respective field work.

1998: QC sends a 40 person crew to RI to complete camp renovations, to manage materials and equipment shipped from Montreal, to assemble a 290,000 litre fuel tank farm, to remove asbestos from abandoned buildings, to repair roads, and to provide training to Inuit in trades related to the scope of work.

1999: QC sends a 50 person crew to RI to proceed with scheduled clean up and training activities from June 15 to September 15. Activities include beach lead dump excavation and waste sorting, removal and containerization of mercury contaminated soils; off-site shipment of PCBs and other hazardous waste, furniture dump excavation, building demolition, construction/operation of a NH waste landfill, shredding and disposal of empty drums, incineration of POL products, structural steel construction to join the two maintenance buildings, and aluminium recycling.

2000: QC sends a 50 person crew to RI to proceed with scheduled clean up and training activities from July 5 to September 15. The main tasks accomplished include: excavation of the Furniture Dump, demolition of PCB contaminated buildings and containerization of CEPA material, removal of CEPA soil from S1/S4 building area, set up and operation of a drum staging/sorting/pumping/washing station, operation of an oil separator / water treatment system, waste oil incineration, construction of a road to Lower Lake borrow pit, relocation of the sewage line and lagoon.

2001: QC sends a 50 person crew to RI to proceed with scheduled clean up and

training activities from July 4 to September 3. Activities include: excavation of CEPA PCB soil from S1/S4 building and drainage area, excavation of waste from Beach Dumps, drainage and treatment of phenol contaminated water from beach POL tanks, clean up of Battery Dump, installation of trial silt fence in drainage path of former Furniture Dump, drainage of fuel from beach POL tank, management and incineration of waste POL products, construction of a new road to Radio Hill, operation of a new borrow pit located behind Radio Hill.

2002: QC sends a 50 person crew to RI to proceed with scheduled clean up and training activities from July 12 to August 28. Activities include: excavation of CEPA PCB soil from upper S1/S4 valley and PCL dump; repair old 3.1 m^3 steel containers to EIS specifications, containerize PCB CEPA soil from the Main PCB storage building; remove waste debris from Beach Dumps, remove and manage POL drums from various areas, incinerate grease and other waste POL products.

2003: QC sends a 60 person crew to RI to proceed with scheduled clean up and training activities from June 18 to September 14. The main tasks accomplished include:

- Transportation Services: Coordinate marine and air transportation of equipment and materials to, and from, Resolution Island. (Section 2)
- PCB Clean Up: Complete the removal of CEPA PCB soil from the S1/S4 valley; excavate CEPA PCB soil from the Airstrip dump and the DND helipad; remove PCB CEPA, Tier II and Tier I soils from the former Main PCB storage building. (Section 3)
- PCB Containerization and Storage: Thawing of the CEPA soil stockpile inside the Main PCB storage building; containerize PCB CEPA soil from the Main PCB storage building and the B2 storage building; empty old (1.6 m^3 and 3.1 m^3) CEPA soil containers into B2 building; repair old 3.1 m^3 steel containers according to EIS specifications. (Section 4)
- Other Clean Up Activities: Clean up and cover Airstrip dump; clean up debris from Maintenance dump; excavate hydrocarbon contaminated soils from collapsed POL tank area, west beach POL tank area, and incineration area; demolition of Main PCB storage building; removal of old water and power lines. (Section 5)
- Drums and POL Management: Incinerate grease and other waste POL products; wash empty drums and treat oily water; demobilize incineration equipment; containerization of waste drums according to new transportation regulations and ship south for disposal. (Section 6)
- Tier II Landfill: Quarrying and screening of gravel at Radio Hill and Airstrip borrow pits; construction of landfill berm core (north, east, and south sides); installation of monitoring wells; partial removal of central bedrock outcrop;

installation of soil testing lab. (Section 7)

- Other Activities: Pre-season community consultations; pre-season worker medical surveillance program, construction of road to S1/S4 beach contaminated area, etc. (Section 8)

Section 9 presents conclusions and provides a list of recommendations for the 2004 season and subsequent seasons.

This project is funded by the Environment and Contaminants Office, Indian and Northern Affairs Canada (INAC). The project was granted to QC through a Contribution Agreement. QC is owned by the Qikiqtani Inuit Association (QIA), the Inuit birthright organization representing the Qikiqtani (Baffin Island) region of Nunavut. The Resolution Island Project provides employment and training benefits to Inuit from Nunavut communities. By removing the source of pollution, the project will eventually attenuate the environmental impacts on nearby communities, thereby protecting the health and future of the Inuit.

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GLOSSARY

ASU:	Analytical Services Unit (Queen's University)
CEPA:	Canadian Environmental Protection Act (also refers to PCB concentration > 50 mg/kg)
DND:	Department of National Defence
EIS:	Environmental Impact Statement
ESG:	Environmental Sciences Group
HDPE:	High density polyethylene
H&S:	Health and Safety
INAC	Indian and Northern Affairs Canada
NTI:	Nunavut Tunngavik Incorporated
NWS:	North Warning System
NWT:	Northwest Territories
O&M:	Operations and Maintenance
NSSI:	Nunavut Sealink and Supply Inc.
PCB:	Polychlorinated Biphenyls
PCL:	PCL construction company
PMT:	Project Management Team
POL:	Petroleum Oil & Lubricants
QIA:	Qikiqtani Inuit Association
QC:	Qikiqtaaluk Corporation
RI:	Resolution Island
RRMC:	Royal Roads Military College
SMT:	Senior Management Team
Tier I:	DEW Line Clean up criteria (*e.g.*, 1 mg/kg $\leq$ PCB concentration < 10 mg/kg)
Tier II:	DEW Line Clean up criteria (*e.g.*, 10 mg/kg $\leq$ PCB concentration < 50 mg/kg)
USAF:	United States Air Force
drum:	45 imperial gallon steel cylindrical container

1- INTRODUCTION

The 2003 field season at Resolution Island (RI) started on June 18 with the initial crew mobilisation. Scheduled tasks initiated once the camp was operational. All planned activities were conducted and most were completed by the end of the season. The site was closed on September 14.

Indian and Northern Affairs Canada (INAC), in partnership with Qikiqtaaluk Corporation (QC), initiated this project in 1997 following several environmental investigations conducted by the Department of National Defence (DND), Environment Canada, the Royal Roads Military College (RRMC), and Queen's University Analytical Services Unit (ASU). QC and Sinanni have coordinated, and conducted previous work focusing on mobilisation, infrastructure, settings, and environmental remediation. In 2003, more than 70 individuals combined their efforts to make this field season a successful one. The following important tasks were completed during the field season:

- Excavation of PCB CEPA soil in the S1/S4 valley, Airstrip Dump, and DND Helipad;
- Excavation of PCB CEPA, Tier II and Tier I soils from the former Main PCB storage building area;
- Thawing of the CEPA soil stockpile inside the Main PCB storage building;
- Containerization of CEPA soil from the Main PCB storage building and the B2 building;
- Clean up debris and cover Airstrip dump;
- Excavate hydrocarbon contaminated soils from collapsed POL tank area, west beach POL tank area, and incineration area;
- Demolition of Main PCB storage building;
- Removal of old water supply line and former power line;
- Management and incineration of waste grease, and washing empty drums;
- Containerization of waste drums according to new transport regulations and ship south for disposal;
- Quarrying and screening of gravel at Radio Hill pit and Airstrip borrow pit;
- Construction of landfill berm core (north, east, and south berms);
- Partial removal of central bedrock outcrop, using hydraulic hammer;
- Construction of road to S1/S4 beach contaminated area.

Some other tasks were accomplished during the 2003 season:

- Clean up debris from Maintenance dump;
- Demobilize incineration equipment;
- Installation of monitoring wells at Tier II landfill and Airstrip Dump;
- Empty old (1.6 m^3 and 3.1 m^3) CEPA soil containers into B2 building;
- Repair old 3.1 m^3 steel containers according to the EIS requirements.

This document summarizes the construction activities carried out on site between June and September 2003. Section 2 of the report describes the activities related to the transportation of equipment and materials. Section 3 presents information on the excavation of PCB contaminated soil, while Section 4 describes the PCB CEPA soil containerization and storage activities. In Section 5, clean up activities other than those related to PCB soil are presented. Section 6 describes the activities of waste POL management, and incineration. Section 7 presents information related to

the construction of the Tier II landfill. Section 8 describes other tasks accomplished during the 2003 field season and Section 9 presents recommendations.

Photographs depicting fieldwork activities are presented throughout this report. The as-built drawings are submitted in a separate attachment as part of the current report.

2- TRANSPORTATION SERVICES

To successfully conduct the Resolution Island 2003 field season, various required transportation services were coordinated and managed. These included sealift operations and air transportation.

2.1-Sealift Operations

Nunavut Sealink and Supply Inc. (NSSI) was awarded the marine shipping contract to transport various equipment and materials to RI for the 2003 season and subsequent years. Approximately 1,600 cubic metres of equipment and materials were purchased for the project and most were shipped by sea. Details on the items purchased are presented in the 2003 RI Procurement Report[1]. The major equipment and materials shipped by sea include the following items:

- GMC Tandem axle (10-wheel) dump trucks (3 units) - *owned by QC and leased to the project*;
- Caterpillar 322L excavator with Tramac hydraulic hammer - *owned by QC and leased to the project*;
- Caterpillar Roller compactor - *owned by QC and leased to the project*;
- Caterpillar 950 wheeled front end loader - *owned by QC and leased to the project*;
- Ford F350XL Crew cab pickup - *owned by QC and leased to the project*;
- Ford Expedition SUV truck - *owned by QC and leased to the project*;
- Bobcat 763 skid steer loader with catalytic exhaust purifier - *owned by QC and leased to the project*;
- Atco sleeping trailers (2 unit)- *owned by QC and leased to the project*;
- Conical shaped (3.1 m^3) steel containers (225 units on 29 pallets);
- Polyethylene liner bags and gaskets for steel containers;
- Geomembrane and geotextile liners for landfill construction and B2 building setup;
- Empty overpack drums (150 units on 50 pallets);
- Drums of gasoline (48 units on 12 pallets);
- Drums (17) and pails (40) of oil and lubricants;
- 20-foot marine containers (seacan) (2 units)
- Miscellaneous items (*e.g.,* Maytag washers (2) and dryers (3), sorbent booms and sheets, mattresses and pillows).

Two sealifts were required this season to ship all equipment and supplies to the site. The liners required for landfill construction could not be delivered on time for the first sealift because of late funding and therefore had to be shipped on the second sealift.

Shipping and receiving of cargo at the port was coordinated with the suppliers and the transport companies. A representative from Sinanni also supervized the loading operations and verified that all equipment and materials were loaded on the ship. All cargo was loaded without any damage.

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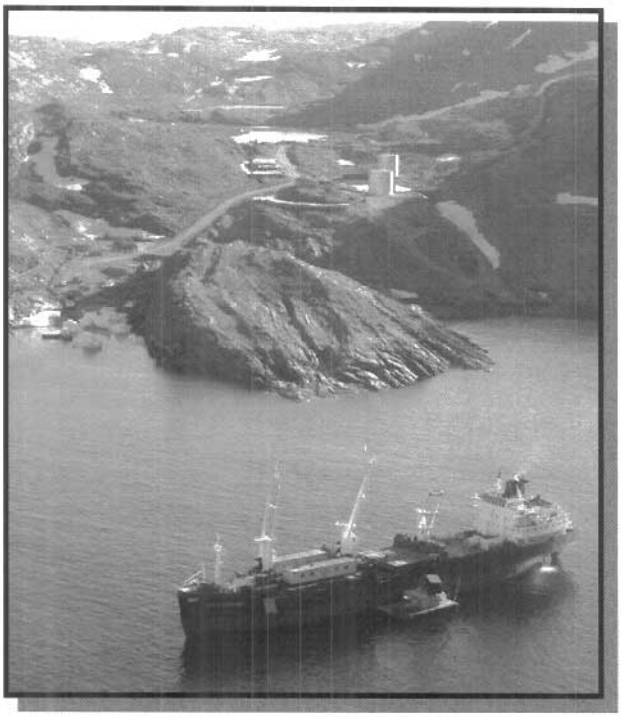
[1] Project Procurement 2003 - Resolution Island Project. Prepared by Sinanni Inc. and Qikiqtaaluk Corporation, January 2004.

The first sealift (*M.V. Cécilia Desgagnés*) left the port of Ville Sainte-Catherine (Montréal) on June 28, 2003. Prior to the ship's arrival at RI, the beach barging area was backfilled, and graded to provide a smooth working surface. Approximately 100 m^3 of screened sand was used to prepare the barging area. Ice blocks obstructing the barging area had to be broken and pushed aside using a bulldozer.



Photograph 2.1 Ship unloading cargo on a barge in Brewer Bay

The sealift arrived at Resolution Island on July 19. Cargo unloading started at 6:30 PM and was completed by 2:00 AM that same night. Initially, barges, loaders, and a tug boat were unloaded from the ship. The cargo was then transferred from the ship to the barges. The tug boat was used to push the loaded barges from the ship to the beaching area and back to the ship. The NSSI loaders unloaded the cargo from the barge to the beach highwater mark. All unloaded cargo was temporarily stored near the beach tank farm. Sinanni and QC representatives monitored all operations, and verified and signed the shipping manifest. The inventory warehouseman added all new items received to the general inventory list.

The second sealift (*M.V. Amélia Desgagnés*) left the port of Ville Sainte-Catherine (Montréal) on September 13, and arrived at Resolution Island on September 27. However, because of adverse weather conditions the ship could not unload cargo and had to continue on to its next destination. On the second attempt, because the weather forecast was not favourable, it was decided to unload the cargo in Iqaluit and ship it back to RI early next season.

A copy of the NSSI transport manifest (1st shipment) is provided in Appendix 1.

2.2-Air Transportation

Air transport services were required for crew mobilization and rotation, as well as for shipment of equipment and supplies to and from the island. Following a tendering process, Canadian Helicopters Ltd was selected, and contracted to provide regular air transportation services using a Bell 212 helicopter. QC coordinated, and managed the helicopter contract on a daily basis over the duration of the field season. Total flying time was logged and reported[2]. A Sikorsky S-61 helicopter was also used on one occasion to haul the ground heater from Iqaluit to the site.

Photograph 2.2 Ground heater slung under Sikorsky S-61 helicopter

In addition to the helicopter services, chartered Twin Otter flights were used to transport crew and cargo to and from the site. Twin Otter flights were mainly scheduled at the beginning and at the end of the field season to carry bulky materials and supplies as well as larger crews. Unaalik Aviation and Kenn Borek Air were contracted on an as required basis.

The following equipment and materials were shipped by air:

- Ground Heater model E1700 for soil thawing scheduled early in the season;
- 2" and 4" screens and other parts for screening units;
- Queen's University material and equipment;
- Roof cladding and lumber for camp roof repair;
- Monitoring wells and thermistors;
- Miscellaneous items (*e.g.,* mobile radios, aluminium labels, ventilation fan and ducts, health and safety supplies).

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2 Summary of 2003 Activities - Resolution Island Project, prepared by Qikiqtaaluk Corporation, January 2004.

3- PCB CLEAN UP

The excavation and removal of CEPA soils (*i.e.,* contaminated soils > 50 ppm PCB) from the site continued during this past season. Work was conducted in the S1/S4 valley, at the airstrip dump, and on the DND helipad. Most soils were containerized and some were stored inside the PCB storage buildings. Soil containerization and storage are discussed in Section 4 of this report. Containers filled with CEPA soil were shipped south for disposal during the 2003 season. Since these activities are part of a separate contract, they are discussed in a different report [3].

Excavation of CEPA, Tier II (*i.e.,* PCB levels between 10 and 50 ppm PCB) and Tier I (*i.e.,* PCB levels between 1 and 10 ppm PCB) contaminated soils was also carried out this season. The work was conducted as part of the Main PCB storage building demolition and Tier II landfill site preparation and clean up prior to beginning the construction of the berms.

The following section describes the nature of the PCB clean up activities conducted during the 2003 season.

3.1- S1/S4 Valley

All remaining CEPA soil in the S1/S4 valley was removed during the season. Activities were concentrated mostly in two areas of the lower valley, 1) up gradient from the west barrier, and 2) on the access road up gradient from the east barrier. Excavation was also required along the access road below the S4 building and billboard. Some soil was also excavated from the screener area upon completion of CEPA soil screening and containerization operations. Approximately 261 m^3 of soil was removed from the area and a total of sixteen (16) quadrants were decontaminated and signed off this season. These quadrants, identified on the As-Built Drawings, are: I12, I13, J12, J13, L17, L18, M17 to M20, and N15 to N20. Copies of the signed quadrant log sheets are presented in Appendix 2.

The removal of CEPA soil started on June 29 and was completed on July 31. The 315 excavator equipped with the ditching bucket was used to load soil into the International dump truck. In order to reach and remove CEPA soil in certain areas, boulders had to be removed before, as well as during, the excavation of soil. Some boulders were pushed aside, and others were used to build access paths for the excavator. Screening reject was also used to build access paths.

Because of the early start to the season, some snow had to be removed in order to gain access to the contaminated soil. After snow removal the soil had to be left to thaw for a few days.

Water accumulation from snow melt and precipitation hampered excavation operations in quadrant N15. Water had to be pumped from a depression on a continual basis to drain the area and allow soil removal to proceed. The water was pumped past the east barrier onto Tier II contaminated soil.

[3] Resolution Island - Disposal of PCB Contaminated Soil - Final Report, Qikiqtaaluk Corporation, September 2003

The vacuum truck was used to remove CEPA soil down to bedrock in hard to reach areas (*i.e.*, cracks and crevasses). Soil vacuuming was only required in certain parts of quadrants J12, L17, and H10.

All the CEPA soil that was removed (*i.e.*, excavated and vacuumed) was hauled from various locations to the contaminated soil screening unit located to the east of the S4 building. The 322 excavator with grapple attachment was used to feed the screener. A few loads of screened soil were hauled to the Main PCB storage building, however most of the screened soil was loaded directly into the steel containers. The screening rejects, consisting of rocks larger than 2 inches (5 cm) in diameter, automatically fell off the screener and onto a pile located below the screening unit. CEPA soil containerization and storage operations are is presented in Section 4.

Photograph 3.1 Removing snow and water from S1/S4 valley prior to excavation

3.2- Airstrip Dump

The removal of CEPA soil from the airstrip dump was carried out on July 5 and 6. A total of 61 m^3 of CEPA soil was excavated. Since the soil contained a large amount of debris the excavated material was processed on site through a Grizzly screener. The screened soil was then hauled to the screening plant using an International dump truck, and processed through the screener along with other CEPA soil. Vacuuming of soil was not required in this area. Testing conducted by Queen's University ASU confirmed all CEPA soil was removed from this area.

3.3- DND Helipad

The removal of CEPA soil from the DND helipad was conducted on July 7. A total of 2 m^3 of CEPA soil was excavated and hauled to the screening plant using an International dump truck. This soil was then processed through the screener along with other CEPA soil. Vacuuming of soil was not

required in this area. Again, testing conducted by Queen's University ASU confirmed all CEPA soil was removed from this area.

3.4- Tier II Landfill Area

Prior to beginning the construction of the Tier II landfill berms, PCB contaminated soils at CEPA, Tier II, and Tier I levels had to be removed from inside and around the former building. Soil excavation in this area began on August 15 and was completed by August 20. Approximately 13 m^3 of CEPA soil was removed from the area outside the west entrance of the former storage building. The soil was then hauled to the B2 storage building using the International dump truck.

Approximately 232 m^3 of Tier II contaminated soil was removed from inside the eastern half of the former building, and outside in different areas around the building footprint. This soil was hauled to a temporary stockpile area located in the S1/S4 valley near the screening plant. Approximately 88 m^3 of Tier I contaminated soil also present outside the former building in different areas was excavated and then hauled to the camp non-hazardous waste landfill before being covered by clean soil.

Photograph 3.2 Excavation of CEPA soil at the Airstrip Dump

The following table summarizes the quantities of PCB contaminated soil and debris that were excavated and removed from the S1/S4 valley area, the airstrip dump, the DND helipad, and the Tier II landfill area during the 2003 season.

Table 3.1: Summary of PCB Clean up during 2003 season

Area - Type of Material	Estimate (m^3)	Volume removed (m^3)	Action
S1/S4 Valley			
CEPA soil	*400*	261	Screened and containerized
Airstrip Dump			
CEPA soil	*50*	61	Screened and containerized
DND Helipad			
CEPA soil	*10*	2	Screened and containerized
Tier II Landfill Area			
CEPA soil	-	13	Hauled to B2 storage building
Tier II soil	-	232	Stockpiled in S1/S4 valley
Tier I soil	-	88	Disposed in camp landfill

The total volume of unscreened CEPA soil excavated during the 2002 season is approximately 337m^3 (*i.e.*, 261 + 61 + 2 + 13). This volume is slightly lower than the excavation volume objective/estimate of 460 m^3 set in the 2003 work plan. All the CEPA soil was removed from these areas before the objective could be met.