SUMMARY OF 2001 ACTIVITIES

RESOLUTION ISLAND PROJECT

presented to:

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December 2001

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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 USAF station determined the extent of environmental problems from past occupation. The Resolution Island Project consists in the removal, containerization, storage, and disposal of PCB contaminated soils (> 50 ppm PCBs), as well as the management of other immediate health and environmental risks such as contaminated soils located near water bodies, asbestos, and drum contents (POL products). Training is an important aspect of this project. A core camp is now fully operational to accommodate a working crew of approximately 60 persons.

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

1997: Initial equipment mobilization from Iqaluit to RI. Qikiqtaaluk Corporation (QC) sends a 20 person crew to RI for sea lift operations and basic core camp renovations. QC also provides technical support to 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 receive and handle new material and equipment sea lifted from Montreal to RI, 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; shipment of PCBs and other hazardous waste, furniture dump excavation start up, demolition/landfilling of old dormitories, construction/operation of a non-hazardous waste landfill, shredding and disposal of empty drums, incineration of POL products, structural steel to join the two maintenance buildings, *roof and wall cladding, garage door installation, 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: camp renovations following polar bear damages, excavation of the furniture dump (PCB CEPA and Tier II soils), 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 a road to Lower Lake borrow pit, relocation of the sewage 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. The main tasks accomplished are summarized below:

- Transportation Services: Coordinate the road transportation of 1) the new crane truck from Alberta to Montreal, and 2) the old vacuum truck from Montreal to the NWT. Coordinate marine shipment of required equipment and material to Resolution Island. (Section 2).

- PCB Clean Up: Excavate and vacuum CEPA PCB soil from the S1/S4 building and drainage area, containerize CEPA soil in conical shaped steel containers, remove and containerize CEPA PCB demolition debris from S1/S4 area. (Section 3)

- Other Clean Up Activities: Remove waste debris from Beach Dump and other dump across the road, drain and treat phenol contaminated water from beach POL tanks, clean up Battery Dump, build and install silt fence in drainage path of former Furniture Dump, add waste items to beach hazardous waste storage facility. (Section 4)

- Drums and POL Management: Drain fuel from beach POL tank into sound drums, remove and manage POL drums from various areas (*e.g.,* Barrel Cache Valley, Imploded Tank, Cotton Grass Area, Airstrip Area), incinerate waste POL products, wash and shred empty drums. (Section 5)

- Road Construction and Maintenance: Improve and maintain site roads, construct a new road from the former Furniture Dump to the lower S1/S4 valley, construct a new road to Radio Hill. (Section 6)

- Camp Operations and Maintenance: Obtain drinking water from a new source (Lower Lake), adjust drinking water pH, install and use a new communication system, install and use a weather station. (Section 7)

- Training: Provide on site training to workers in specialized fields: TDG, WHMIS, first aid / CPR, construction, heavy equipment operations, safety, environmental technologies, mechanics, management, etc. (Section 8)

- Other Activities: Operate a new borrow pit located behind Radio Hill, complete Training Centre and render it operational, clean up and prepare Radome Building for renovation, etc. (Section 9)

This report also provides a list of recommendations for 2002 and subsequent seasons.

This project is funded by the Contaminated Sites Office, Department of Indian Affairs and Northern Development (DIAND). The project was granted through a

Contribution Agreement to Qikiqtaaluk Corporation (QC), a company owned by the Qikiqtani Inuit Association (QIA), the Inuit birthright organization representing the Baffin Island region of Nunavut. The Resolution Island Project provides employment and training benefits for the local Inuit populations. 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 of Queen's University
CEPA:	Canadian Environmental Protection Act
DIAND:	Department of Indian Affairs and Northern Development
DND:	Department of National Defence
ESG:	Environmental Sciences Group
INAC	Indian and Northern Affairs Canada
NTI:	Nunavut Tunngavik Incorporated
NWS:	North Warning System
NWT:	Northwest Territories
PAHs:	Polycyclic Aromatic Hydrocarbons
PCB:	Polychlorinated Biphenyls
PMT:	Project Management Team
PPE:	Personal Protection Equipment
QIA:	Qikiqtani Inuit Association
QC:	Qikiqtaaluk Corporation
RI:	Resolution Island
RRMC:	Royal Roads Military College
SMT:	Senior Management Team
USAF:	United States Air Force

1- INTRODUCTION

The 2001 field season at Resolution Island started on July 4th with the crew mobilization. Scheduled tasks rapidly started once the camp was operational. All planned activities were accomplished and the site closed on September 3rd.

DIAND, in partnership with QC, initiated this project in 1997 following several environmental investigations conducted by DND, Environment Canada, RMC and Queen's University ASU. QC and Sinanni (formerly LDS Consultants) have coordinated/conducted previous work focused on mobilization, infrastructure settings and environmental remediation. In 2001, more than 75 individuals combined their efforts to make this field season a successful one. The following important milestones were achieved in 2001 at Resolution Island:

- Implement the excavation protocol and complete the excavation of PCB CEPA soil near the S1/S4 building area;
- Complete the removal of CEPA soil in the S1 building drainage area;
- Initiate the CEPA soil excavation at the S1/S4 building road access;
- Complete the remediation/excavation of the beach dump;
- Investigate the airstrip dump;
- Complete the battery dump remediation;
- Reorganize the PCB storage facilities and set up the power supply;
- Manage the remaining fuel and treat phenol contaminated water from the beach POL tanks;
- Manage scattered drums, complete the POL management at the barrel cache, incinerate POL products and wash empty drums;
- Consolidate/secure/label and store inside the hazardous waste storage most drums of POL products to be shipped south;
- Shred and landfill non-hazardous waste and debris;
- Construct a silt fence at the Furniture Dump drainage area; and,
- Improve the camp facilities and operations - adjust drinking water pH, install a new communication system and a weather station, set up H&S and medic offices, and women's washroom.

Some other tasks were accomplished during the 2001 field season:

- Remove debris located across the road from the beach dump;
- Remove scattered debris along the road between Freshwater Lake and the airstrip;
- Construct a road and initiate the exploitation of a new borrow area at Radio Hill;
- Construct a road to access the S1/S4 valley PCB CEPA contaminated area;
- Replace many camp furnaces and install new washers and driers;
- Complete the new training center; and,
- Clear the second floor of radome building.

This document summarizes the construction activities carried out on site between July and September 2001. The 2001 as-built drawings are submitted in a separate attachment as part of the Sinanni Inc. report.

2- TRANSPORTATION SERVICES

To successfully conduct the Resolution Island 2001 field season, various transportation services were required, coordinated and managed. These included road transportation, sealift operations, and air transportation.

2.1-Road Transportation of Crane Truck

Prior to the field season, services were required for the transportation of a new crane truck and trailer purchased by DIAND/QC from Northwest Crane in Leduc, Alberta. The truck and trailer had to be shipped to Montreal, Quebec, in time for the sealift departing for Resolution Island. For various reasons, the shipment of the truck and trailer was challenging. For one, Northwest Crane completed the manufacturing/assembly contract less than a week before the sealift departure date. Furthermore, the truck and trailer were fitted with off-road tires and thus could not be driven to destination.

Both rail and road transportation services were evaluated[1]. After reviewing various alternatives, a contract was given to Mullen Trucking Inc. Because of the excessive height of the crane truck, its tires had to be removed in order to comply with transportation regulations. Despite this, the shipment still required oversize permits. The crane truck was thus installed on wooden beams and secured on a low-boy which was pulled by a tractor. In addition, the trailer, truck tires, and crates of spare parts were placed on another trailer, also pulled by a truck. Mullen Trucking had to obtain oversize transport permits from each province through which the convoy travelled.

The convoy left Leduc, Alberta on June 29. One of the problems encountered was that Ontario does not allow oversized truck transport during weekends. Therefore, the Mullen trucks were stalled at the Manitoba-Ontario border during the Canada day long weekend. Sinanni representatives were in constant contact with truck drivers and Mullen Trucking office staff to coordinate this activity. Both trucks finally arrived at the port of Ste-Catherine, near Montreal, on July 5. Some six hours later, the tires had been reinstalled and the truck was off-loaded (see photograph 2.1). The crane truck and trailer were the last items to be loaded on the ship, just in time for the scheduled departure.

2.2-Sealift Operations

The services of a marine shipping company, Nunavut Sealink and Supply Inc. (NSSI), was used to transport various materials and equipment required for 2001 and subsequent seasons. Approximately 460 cubic metres of materials and equipment were purchased for the project. The list of equipment and materials includes the following items:

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1 Procurement Report, Resolution Island Project, prepared by Sinanni/Qikiqtaaluk Corporation, submitted to Indian and Northern Affairs Canada (INAC), December 2001.

- Crane truck and trailer: Kenworth truck, 30 tonne capacity crane;
- Vacuum truck (Supervac 2000);
- Conical shaped (3.1 m^3) steel containers (75 units);
- Overpack drums (50 units);
- Gasoline drums (8 pallets);
- Equipment and supplies for wastewater treatment (pump, activated carbon, chemicals);
- Commercial washer and dryer sets (3);
- Gas cylinders for the on-site laboratory;
- Miscellaneous items and tools places inside trucks and overpack drums.

The shipping manifest is presented in Appendix 1. The following subsections describe the loading (Montreal) and receiving (Resolution Island) operations that were completed in July 2001.

2.2.1-Loading in Montreal

Equipment and materials were delivered by each supplier to the port of Ville Ste-Catherine between June 15 and July 5, 2001. Cargo loading proceeded from July 4 to 5 on the *M.V. Anna Desgagnés*, a 24,935 m^3 capacity, 10,300 Horsepower Class A1 vessel owned by Transport Desgagnés/NSSI. A Sinanni representative supervized the loading operations and verified that all equipment was on the ship. The ship departed Ville Ste-Catherine on July 6. All cargo was loaded without any equipment/material being damaged.

2.2.2-Operations at Resolution Island

The *Anna Desgagnés* sailed from Montreal and arrived at Resolution Island on July 14th at 5:00AM. Later that morning, two barges and tug boats were unloaded from the ship. Equipment and material was transferred from the ship to the barges (see photograph 2.2). The tug boats then pushed the loaded barges to the beaching area. NSSI mobilized two loaders on the beach to unload the cargo from the barges. During the unloading operations the *Anna Desgagnés* crew damaged some of the conical steel containers. One crate of containers tipped over and fell on its side puncturing two containers and denting the remaining five. Three containers in another crate were also dented during handling operations. Cargo unloading was completed within 4 hours.

Once all the cargo was unloaded off the second barge, the old vacuum truck present on site (*i.e.,* purchased and shipped to RI in 1999), was loaded onto the barge and then onto the ship. It was later shipped south to Montreal, for furtherance to the Northwest Territories by road transportation (see section 2.4).

All unloaded cargo was temporarily stored near the beach tank farm. Prior to unloading, the barging area had been backfilled and graded to provide a smooth working surface. Approximately 50 m^3 of sand was used to prepare the barging area. Sinanni/QC representatives monitored all operations and verified the shipping manifests. A copy of NNSI manifest is provided in Appendix 1. The inventory warehouseman added all new items to the general inventory list.

2.2.3-Sealift from Iqaluit

Various supplies and equipment were also shipped to Resolution Island from Iqaluit by Russell. The cargo shipped by ship and barge includes:

- oil furnaces;
- drums of gasoline; and,
- miscellaneous parts and supplies for vehicle and heavy equipment repair and maintenance as well as for camp operations.

2.3- Air Transportation

Air transport services were required for crew mobilization and rotation, and for shipment of daily/weekly supplies (food, parts). Following the tendering process, Canadian Helicopters was selected and contracted to provide the services of 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].

In addition, nine (9) twin otter flights were used to transport crew and material 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 material and larger crews. QC coordinated and managed the twin otter services throughout the 2001 Resolution Island Project field season.

2.4- Road Transportation of Vacuum Truck

Once the *Anna Desgagnés* returned to Montreal, road transportation services were required to ship the old vacuum truck from Montreal to the Northwest Territories. Transport Varennes was contracted to carry out the shipping of the truck.

[2] 2001 Field Season Summary Report - Resolution Island Project, prepared by Qikiqtaaluk Corporation, to be submitted to Indian Affairs and Northern Development (INAC), 2002.

3- PCB CLEAN UP

The 2001 work plan prepared during the pre-season PMT meetings (winter and spring 2001) was defined to address PCB contaminated soils in the S1/S4 building and drainage area, as well as the storage and containerization of these soils. The field season's objective was to remove approximately 500 m^3 of CEPA soil. The following paragraphs describe the nature of the clean up activities conducted during the 2001 field season.

3.1- S1/S4 Building and Drainage Area

During the pre-season, a gridding system was developed to facilitate the management (*i.e.,* identification, excavation, declassification) of CEPA soil on site. During the season, this system was successfully used in the S1/S4 Area. A log sheet was filled out for each quadrant that was being worked on. Once a quadrant was decontaminated its log sheet was signed off by a representative from QC, Sinanni and ASU. This season, a total of 21 quadrants were decontaminated and signed off, these quadrants are: G13, G14, H13 to H17, I14 to I18, J16 to J19, K18 to K20, L19 and L20. Copies of the signed quadrant log sheets are presented in Appendix 2.

During the 2000 season, the CEPA soil in the former S3 Building Area had been completely excavated and vacuumed. At the beginning of the 2001 season that area was found to be contaminated again. It seems that runoff water (*i.e.,* from precipitation and snow melt) carried contaminated soil particles from surrounding areas onto the area cleaned the previous year. Clean up activities in the S1/S4 building area thus started by the pumping of a large puddle of water that had accumulated in the former S3 building area. This water was pumped onto a CEPA area further down gradient. The contaminated sediments were then vacuumed. Once cleaned, the area (quadrants H14, H15, and I15) was backfilled with clean soil and leveled to prevent future re-contamination. The decon trailer was then installed on that area. Approximately 150 m^3 of clean pit run, sand/gravel, and screening reject were used to access the area and build a pad to install the decon trailer.

In order to gain access to that area, the corridor still attached to the S4 building had to be demolished and removed (see photograph 3.1). This was accomplished using the 315 excavator with thumb attachment and a D250 rock truck. The non-contaminated demolition debris was hauled to the camp shredder. In order to reach and remove CEPA soil in the S1/S4 area, other materials such as debris, Tier II soil, and boulders had to be removed before as well as during the excavation of CEPA soil.

Wood and other types of debris were manually removed for the soil surface in the S1/S4 valley area. The debris removed were classified and managed according to a protocol written by ASU. The protocol classifies the wood debris based on the contaminated area (CEPA soil or >2000 ppm) and on the type of contact with soil. CEPA debris removed from the soil surface was placed in red vaults. A total of five (5) vaults (approximately 5 m^3) were filled and then hauled down to the Beach PCB storage facility along with five other vaults that had been filled the previous season. Three (3) conical shaped (3.1 m^3) steel containers were filled with CEPA wood debris and hauled to the

Beach PCB storage facility. Tier II debris was stockpiled with other Tier II debris in the S3 area (see photograph 3.2), and Tier I debris was sent to the camp shredder.

Large boulders (Tier I) were removed from the S3 area, hauled away and dumped behind the sewage lagoon. A total of approximately 420 m^3 of boulders were removed. Concrete blocks (Tier I) from the S1 building area, were also hauled and dumped behind the sewage lagoon. Approximately 10 m^3 were removed. Timbers from the CEPA area in the S1/S4 valley were removed and stockpiled temporarily as Tier II waste near the contaminated soil screener. Tier I wood debris (52 m^3) was removed from the CEPA area using the 322 excavator, and hauled to the summit shredder. Approximately 110 m^3 of Tier II soil was removed from the S1/S4 area and hauled to the temporary Tier II soil storage pile located along the upper road to the S1/S4 valley.

The excavation of CEPA soil started on July 20th. The 315 excavator equipped with the ditch bucket was used to load soil into an International dump truck driving on contaminated ground. The excavation began near the former S1 building (quadrants H16 and H17) and proceeded down along the drainage path towards the upper valley road. Excavation was carried out down to bedrock and the remaining soil (*i.e.,* in cracks and voids) was removed with the vacuum truck (see photograph 3.3). The cleaned bedrock surface was backfilled with clean soil on a regular basis to make a road for the vacuum truck to progress (see photograph 3.4).

Excavation and vacuuming were also carried out to the east of communication dish A and down along the road towards the upper valley road (quadrants I16, J16). A clean road was also built there to accommodate the vacuum truck. In all, approximately 100 m^3 of clean pit run was used to build the various access roads for the vacuum truck. Soil excavation underneath Dish A was carried out manually as well as with the vacuum truck.

Excavation was also carried out in the lower S1 area (quadrants K18 to K20), however vacuuming was not required in that area.

Part of the contaminated road in the upper valley area was also removed (quadrants K16, K17). In order to prevent re-contamination of this cleaned area by the area up-gradient, a barrier/berm was built to stop erosion and migration of soil particles.

All the excavated and vacuumed CEPA soil was hauled from various locations to the contaminated soil screening unit located to the east of the S4 building (see photograph 3.5). The 322 excavator with grapple attachment was used to feed the screener. It was also used to load the screened CEPA soil into the second International dump truck (driving on clean ground) as well as into steel containers. The dump truck then hauled the screened soil to the PCB storage building. The CEPA > 2000 ppm soil was placed, unscreened, directly into steel containers. All the soil filled steel containers were hauled by truck to the PCB storage building. Details on the storage and containerization of the soil is presented in section 3.2.

The following table summarizes the quantities of PCB contaminated soil and debris that were excavated and removed from the S1/S4 building and drainage area during the 2001 season at Resolution Island.

Table 3.1: Summary of PCB Clean up in the S1/S4 area

Type of Material	Volume (m^3)	Storage
CEPA soil (> 2000 ppm)	115	PCB storage building: - 53 (1.6 m^3) steel containers, outside - 9 (3.1 m^3) steel containers, inside
CEPA soil	870	PCB storage building: - 11 (3.1 m^3) steel containers, outside - 835 m^3 bulk, inside
Tier II PCB reject rocks*	260	Stockpiled in small valley below screener
Tier II PCB soil	110	Stockpiled along upper road to S1/S4 valley
CEPA debris	11	Beach PCB storage facility: - 5 red steel (1 m^3) vaults, outside - 3 conical (3.1 m^3) steel containers, outside
Tier II debris	215	Stockpiled in S3 area (I15 quadrant)
Tier I boulders and concrete	430	Stockpiled behind sewage lagoon

* from CEPA soil screening

The actual volume of excavated CEPA soil this season is approximately 1,105 m^3 which is slighlty less than the sum of the three first items in the previous table (*i.e.,* CEPA soil > 2000, CEPA soil, and reject rocks), that is 1,245 m^3. This can be explained by the large voids present in the screening reject material that make up a fair amount of volume. Furthermore, the bulk soil stockpiled in the PCB storage building is not compacted and thus takes up a larger volume than the soil *in situ* prior to excavation.

3.2- Containerization and Storage

One of the scheduled activities in the 2001 season was the containerization of CEPA soil. Some of the excavated CEPA soil was containerized and some was stored bulk inside the PCB storage building.

3.2.1-Containerization

During the pre-season, a conical shaped 3.1 m^3 steel container was designed for the containerization of CEPA soil to be shipped south at an authorized disposal facility in the province of Québec. In January 2001, two prototype containers were built and tested according to ASTM Standards D997 (1980) and D5276 (1998). The test consisted in filling the containers with clean soil and then dropping them from a height of 2.9 m. The goal of the test was to determine if the

containers would resist the impact, and more importantly, if the contents would be spilled. The drop tests proved to be successful and the design was approved for fabrication.

A total of 75 containers of comparable design were manufactured and shipped north on the sealift. Upon arrival on site it was apparent that 10 of those containers had been damaged during shipping and handling by the shipper. Two containers presented gashes on their sides, and the others had their flange dented. A complaint for damages was filed to the shipping company (Transport Desgagnés).

After filling up a few containers with CEPA soil it was noticed that the side weld was defective and that water leaked out from the container. It was then decided that these containers could not be used for the transportation of soil without some modifications. Waterproofing and pressure testing was carried out on the containers. Tar and silicone were used to seal the side and bottom welds from inside. These modifications proved to be sufficient to render the containers waterproof.

The use of these new containers for CEPA soil was halted for the season pending a decision on the modifications required. However, containerization of CEPA soil > 2000 ppm proceeded with the use of smaller 1.6 m^3 conical shaped steel containers already present on site. These containers are not approved for transport but were used for temporary storage.

A storage pad was built outside the PCB storage building to accommodate the soil filled steel containers. Approximately 180 m^3 of sand along with 12"x12" creosote timbers were used to build the pad. The 53 small containers (1.6 m^3) filled with CEPA > 2000 ppm soil and the 11 large containers (3.1 m^3) filled with CEPA soil were stored outside, on the new storage pad (see photograph 3.6).

3.2.2-PCB Storage Building

The 156 blue drums (CEPA soil and concrete from Iqaluit Upper Base) and the 3 wooden crates of CEPA soil from the Furniture Dump, stored inside the PCB storage building (west end), were moved outside to increase storage capacity inside the building. The 9 large conical containers filled with CEPA > 2000 ppm soil were stored inside the PCB storage building.

Excavated CEPA soil was also stored bulk inside the PCB storage building. The floor protection membrane was extended in the west end of the building prior to dumping new CEPA soil inside. The floor protection consisted in placing a layer of 30 mil geomembrane (SF830R) deployed in between layers of geotextile (2.6 mm thick). The 3-layer protection mat was installed to overlap about one metre on side walls. The central area was first covered. CEPA soil was dumped on the protection mat and a bobcat was used to push/stockpile soil. Two decontamination platforms and sign up sheets were set up at the entrance of the building. The floor protection mat was extended to the door level. Workers deploying the geosynthetics used personal protection equipments (*i.e.,* Tyvek coveralls, rubber boots, and masks) to minimize exposure from stockpiled CEPA soil. All screened PCB CEPA soil was unloaded inside the building. At the end of the season, a loader (IT38) was used to pile the soil up higher. At the end of the season there was approximately 1,465 m^3 of bulk CEPA soil inside the building.

A monthly inspection was conducted and logged as per regulations. The complete inventory of

containers and CEPA soil stored inside this storage facility is presented in Queen's University ASU 2001 report.

3.2.3-Beach PCB Storage Facility

Waste items were added to and removed from this storage facility. The 8 drums of oil containing between 2 and 50 ppm PCB, and the drum of ethanol, stored in sea can #3 were transferred with the other non-PCB hazardous waste inside the Beach hazardous waste storage facility.

The Beach registered PCB storage facility now contains the following waste items:

-sea can #1: All drained transformers from the Furniture Dump (1999 and 2000 seasons). One drained transformer from the airstrip dump (2001 season). The transformers were strapped on pallets and secured inside the sea can using wood bracing. Packaging was conducted in compliance with shipping requirements.

-sea can #2: Blue plastic drums containing PCB contaminated floor tiles, capacitors, ballasts and one overpack drum containing PCB oil.

-sea can #3: No waste, used for temporary storage of PCB water treatment unit.

-outside area: 26 red vaults containing CEPA demolition debris, 3 small (1.6 m^3) steel containers containing CEPA soil > 2000 ppm from S1 building area, and 3 large (3.1 m^3) steel containers containing CEPA wood debris from S1/S4 area.

All sea cans are locked. A monthly inspection was conducted and logged for this PCB storage facility. The full inventory of containers are presented in Queen's University ASU 2001 report.

4- OTHER CLEAN UP ACTIVITIES

Other clean up activities listed in the 2001 work plan and carried out during the field season include: remediation of the beach dumps, treatment of diesel and phenol contaminated water, clean up of the battery dump, assessment of the airstrip dump, installation of a silt barrier in the former furniture dump, and the storage of non-PCB hazardous waste. The following sections describe in detail the nature of the clean up activities conducted during the 2001 field season.

4.1- Beach Dumps and Waste Shredding

4.1.2-Old Beach Dump

On July 11th, the clean up of the beach dump, also known as the lead dump, began by the removal of waste debris. An excavator with grapple attachment was used to pick debris items out of the pile (see photograph 4.1). Suspicious waste items such as drums and electrical equipment were segregated and put aside for further inspection. A few small transformers and capacitors were found in the debris pile. These items were sampled and analyzed by the ASU lab. Analytical results revealed no PCBs in those electrical equipment. Most drums encountered during the clean up were empty, however a few were found to contain some oil. These oil filled drums were put aside and temporarily stockpiled on spill pans. They were later sampled and analyzed by the ASU lab personnel.

Once the oil was analyzed, it was pumped from the old drums and spill pans into sound drums. The new drums were then managed appropriately (*i.e.,* incinerated on-site or temporarily stored prior to shipment south). Approximately 8 drums were filled with used oil and managed.

Non-hazardous waste items were loaded into a rock truck and hauled to the beach shredder located adjacent to the non-hazardous landfill. Approximately 510 m^3 of compacted waste (*i.e.,* 102 truck loads) were hauled to the beach shredder. It can be assumed that a truck load contained approximately 5 m^3 of compacted waste (*i.e., in situ*) or 10 m^3 non-compacted waste (*i.e.,* actual debris volume in truck). Light metal debris such as empty drums were shredded and dumped into the landfill (see photograph 4.2) while larger bulkier metal debris (*e.g.,* vehicle and heavy equipment carcasses and parts, structural steel) was dumped directly into the landfill. Occasionally, the landfill debris was compacted by driving the D7 bulldozer on top of the pile.

Eventually, permafrost was reached and excavation had be halted temporarily until a sufficiently thick layer of soil and debris had thawed. Excavation then became periodic, with periods of thawing between each period of activity.

During waste excavation, drums containing a substance apparent to contact cement (*i.e.,* gelatin-like substance emitting strong solvent odours) was found. This substance was sampled and analyzed by ASU to determine its composition. These drums were segregated and placed in 3 conical shaped (3.1 m^3) steel containers and stored outside of the beach hazardous waste storage facility. They were not stored inside because the exact composition of the substance is not yet

known.

Also during the beach dump clean up some empty drums were found to contain residual waste that caused spontaneous combustion when processed through the shredder. These drums caused a fire in the shredder on two separate occasions. Both fires, that burned rapidly and intensively, were quickly controlled and extinguished. After the second fire, the substance causing the fire was identified as a silver coloured metallic crust lining the interior of certain drums. Afterwards, all the drums were individually inspected before being processed through the shredder. The drums containing the substance were placed in a single conical shaped (3.1 m^3) steel container and stored outside of the beach hazardous waste storage facility. The container was not stored inside because the exact composition of the substance is not yet known.

Once most of the waste was removed from the dump, the underlying soil was characterized by ASU. Analytical results showed that the soil was contaminated by lead (Tier II level) and PCBs (Tier I level). The detailed results are presented in the ASU 2001 report.

4.1.2-New Beach Dump

From August 21st to the end of the season, the pile of waste debris located across the road from the beach dump was addressed. Waste debris was removed using an excavator with grapple attachment and loaded into a rock truck. The waste was then hauled to the non-hazardous beach landfill shredder. Approximately 180 m^3 of compacted waste (*i.e.,* 36 truck loads) were hauled to the shredder.

The debris located across the road were expected to be all non-hazardous waste, however, some drums containing POL were found (see photograph 4.3). Excavation halted when these drums were encountered. This new landfill will be addressed next season.

4.2- Water Treatment

During the 2000 season, a water licence inspection was carried out on site by the Water Resources Officer from INAC. One of the recommendations of the inspection report was to address the damaged and deteriorating beach POL tanks. This meant that both tanks had to be emptied of their contents. The east tank contained water and the west tank contained both water and fuel. The water in both tanks was found to contain phenols at concentrations above the discharge criteria of 20 µg/L. The phenols concentration in water from the east tank and the west tank was 188 µg/L and 1,320 µg/L, respectively. Furthermore, in both tanks, a floating oil film was present on top of the water (even after removing the fuel from the west tank). This water had to be treated before being discharged on land.

The water was treated on site by filtration though a series of filters (see photograph 4.4). A portable PCB water treatment unit present on site was used as part of the system. This unit consists in three modules:

- module #1: oil separator / holding tank;
- module #2: pump, GAF particle filter, 2 Ultrasorption filters;
- module #3: 2 activated carbon filters.

The water filtration unit had to be upgraded in order to insure the efficient removal of diesel and phenols. A second oil separator / holding tank was added to efficiently remove the floating oil phase and provide for greater holding capacity of the raw water. A dry sorbent filter was also added to the process train to remove the remaining diesel fuel from the water and to protect the activated carbon filters which are needed for the removal of the phenols. Conical shaped (1.6 m^3) steel containers were used to build both the oil separator and the sorbent filter. The water treatment unit was set up beside the east POL tank. The complete water treatment system is presented on the Project Drawings.

The water was pumped out of the POL tank into the first oil separator / holding tank using a submersible pump. The water then flowed into the second oil separator / holding tank by gravity. Once both holding tanks were full the main pump was turned on. The pump then drew the water through the GAF particle filter and the dry sorbent filter, followed by the 2 Ultrasorption filters, and finally through the 2 carbon filters. The treated water was then discharged into one of two holding tanks for temporary storage and confirmatory testing. The water was sampled from the tank and sent to the ASU lab on site for analysis. Upon receiving the analytical results confirming that the treated water met the 20 ppb discharge criteria, the water was discharged to the land in a pit located more than 30 m away from the nearest stream, as per Land Use Permit conditions.

The water from the east POL tank was treated first. Afterwards, the water from the west POL tank was transferred into the east POL tank using a mobile tank hauled by a loader. That water was then treated as well. A total of 35,000 litres of contaminated water was successfully treated to concentrations below 20 ppb phenols. One 4,500 litre batch of treated water had to be treated a second time because the phenols concentration was 25 ppb after the first treatment.

Upon completion, the water treatment unit was dismantled and winterized. The pump, filters, hoses, and tanks were drained, and stored in sea can #3 located beside the Beach PCB storage facility.

4.3- Battery Dump

As part of the 2001 work plan, the clean up of the Battery Dump had to be addressed. The dump was located at the eastern end of the upper site near a steep cliff. Broken batteries and zinc salt particles were scattered on the ground over a large surface area, but concentrated mostly in an area of approximately 80 m^2. On a clear weather day, a crew of five workers conducted the clean up. Because of the location of the site, and because of moderate winds, two workers were fitted with harnesses tied to ropes (see photograph 4.5). The rope ends were secured to large boulders and controlled by other workers.

Battery parts were manually removed from the ground surface and placed in two waste wranglers. The white zinc granules, along with soil, were removed using shovels, dust pans, brooms, and by hand picking. One full drum of soil and zinc particles was generated by the clean up. Because the Battery Dump was isolated, the two waste wranglers and the drum had to be airlifted out by helicopter. They were transported by air from the dump to a flat area near the training centre. Afterwards, they were labelled and then hauled by truck to the beach hazardous waste storage facility.

4.4- Airstrip Dump

During the investigation of the airstrip dump, carried out the previous season (2000), a PCB transformer as well as free phase oil were found in two separate test pits. This prompted the need for further investigation. On July 13th 2001, new test pits were dug in the airstrip dump, down to permafrost, using the 315 excavator. From these test pits, ASU personnel were able to gather soil samples for analysis. Analytical results from these soil samples are presented in the ASU 2001 report.

The transformer that was discovered last year, was removed from the dump and hauled to the beach PCB storage facility, where is was stored in sea can #1. Also during the investigation, a substance emitting strong ammonia odours was found in the dump.

4.5- Furniture Dump Silt Barrier

Following the clean up of the Furniture Dump during the 2000 season, a silt barrier was installed at the end of the dump drainage path (*i.e.,* down gradient from the decontaminated dump). This was done in order to intercept and recover any remaining contaminated soil particles washed away by run off water from precipitation and snow melt. Upon inspection of the trial barrier at the beginning of the 2001 season, it was found to contain a fair amount of sediments. PCB levels were analysed on these sediments (see ASU 2001 season report).

In order to increase the efficiency of sediment interception, a new larger silt barrier was built and installed in the drainage path, slightly up gradient from the previous barrier. The barrier was made of recovered aluminium pipe structure, covered with Pyramat geosynthetic liner (see photograph 4.6). Sorbent booms were also installed behind the structure to recover any oil from the intercepted runoff water. The structure was tied to bolts driven into the bedrock. Small boulders were placed on top of the liner to hold it in place.

4.6- Hazardous Waste Storage

During the 2001 season, various types of hazardous waste were recovered and added to the inventory. These items were sent to the beach warehouse, used as a hazardous waste storage area since the 2000 season. The following waste items are now securely stored in this facility:

-30 wooden crates filled with mercury contaminated soil
-29 wooden crates filled with metal contaminated soil (Lead Dump)
-1 red metal vault filled with batteries (Airstrip building)
-2 overpack drums filled with batteries
-1 blue plastic drum filled with paint products and thermometers
-1 drum filled with NiCad batteries
-2 waste wranglers filled with batteries (Battery Dump, 2001)
-1 drum filled with zinc contaminated soil (Battery Dump, 2001)
-1 conical (3.1 m^3) container filled with self combusting substance (Beach Dump, 2001)

-3 conical (3.1 m^3) containers filled with old contact cement (Beach Dump, 2001)
-8 drums of oil (< 50 ppm PCBs) and 1 drum ethanol (transferred from seacan #3, 2001)
-131 drums of POL products to be shipped south (drum consolidation, 2001)

5- DRUMS AND POL MANAGEMENT

The activities of drum and POL (Petroleum, Oil and Lubricants) management, initiated during the 1999 season, were scheduled as an on-going process for the 2001 season. Last summer, the west beach POL tank was emptied of its fuel, drum consolidation was initiated, waste oil was incinerated. The operations surrounding the oil incineration platform includes drum staging and sorting, fluid pumping and temporary storage, drum washing as well as oil separation and water treatment.

5.1 Beach POL Tanks

Following the 2000 water licence inspection report, issued by the INAC Water Resources Officer, the damaged and deteriorating beach POL tanks, had to be addressed. This meant that both tanks had to be emptied of their contents. The west tank contained both water and fuel.

During the 2001 season, the fuel was pumped out of the west beach POL tank. Approximately 32,000 litres of fuel (~ 160 drums) were pumped into sound drums for further use. When approaching the oil-water interface, the fuel was pumped into a wheel tank to improve separation. Approximately 1,400 litres of oil were pumped into a wheel tank which was then hauled from the beach area to the oil incineration platform. After settling, the bottom of the wheel tank was drained of residual water and the oil was then pumped into a feeding tank. Finally, another 2,700 litres of oil and water mixture was pumped out of the beach POL tank and into the wheel tank. After settling, residual water from the tank bottom was drained into the other POL tank for water treatment, and the remaining oil was hauled up to the incineration platform for incineration.

5.2 Drum Consolidation

This past season, a staging area, used for the temporary storage of drums, was set up behind the beach hazardous waste storage warehouse. Approximately 90 m^3 of sand were used to provide a flat surface for the staging area. This area is used for storing drums that require further sampling, or those in the process of being analyzed. It serves as a transition zone where waste drums are brought from different locations and then dispatched to their final location.

Waste drums were completely removed from different locations on site, such as: Imploded Tank, Cache Valley (see photograph 5.1), Cotton Grass Valley, Airstrip, and a few other areas. Most of these drums were classified and either sent to incineration or to temporary storage. Drums of non-PCB waste (less than 50 ppm), and chlorine and/or heavy metal contaminated oil to be shipped south for further disposal were stored inside the building. All drums were strapped on pallets, codified and labeled in compliance with TDG and IMDG Regulations.

At the end of the season, drums still awaiting results were move into the storage building for the winter. Furthermore, there are currently approximately 100 drums of grease from Cache Valley, stored on a geomembrane in the staging area.

5.3 POL Incineration

5.3.1 System Upgrade

In order to improve the burning efficiency of the oil incinerators as well as operations safety, parts of the system were modified during this past season.

The first major change involved replacing all the flexible hoses used to supply the waste oil to the burners. The old feeding lines were replaced by steel pipe (1.5 inch diameter). An electric shut-off valve was added on both waste oil supply lines. The new piping has eliminated the problem of water accumulation in the feeding line. The waste oil flow rate was significantly increased as a result of the new piping.

The electrical control panels on both burners were replaced and an emergency shut-off button was added. The emergency button shuts off all burners and blowers, as well as the waste oil feeding line, via the new electric valve installed on line. The ignition switches on the old panels were not working properly. The new ignition system facilitates and accelerates the start-up of the burners. The new control system is set up to automatically close the feeding line in the event that a blower stops for whatever reason. The improved system also reduces the risk of a back flame firing up into the feeding line and tank.

A gear pump was also installed between the feeding tank and the feeding lines to increase and regulate the flow of oil to the burners.

5.3.2 Operations

Drums were hauled from their original location and the drum staging area, using the boom truck, to the incineration platform, located adjacent to the PCB storage building. Drum identification numbers were logged. Compressor operated diaphragm pumps were used to transfer the POL product from drums (staged on a spill pan) to a temporary holding/settling tank (identified as the wheel tank - see as-built drawings). POL products were then pumped from the top of this holding tank to the incinerator feeding tank.

During the 2001 season, the incinerators were operated for a period of 400 hours. A total of 68,200 litres (15,000 gals) were burned. The average burning rate with both units was 171 litres/hr (38 gals/hr).

A total of 406 drums of waste oil, oily water and waste fuel were transferred into the settling tank. The bottom water was drained out of the tank and treated, while the remaining oil was incinerated (see photograph 5.2). Approximately 9,000 litres of waste fuel from the beach POL tank was also processed through the burners.

The following table summarizes the amount of drums incinerated as part of the POL incineration program.

Table 5.1: Summary of POL Incineration Program

Sectors	Incinerated 2000	Incinerated 2001
Barrel Cache Valley	67	171
Upper Beach	29	32
Airstrip / Maintenance Complex	42	50
S1/S4 Valley	27	19
Imploded Tank	31	57
Other Locations	24	77
Total	**220**	**406**

5.4 Drum Washing and Shredding

The drum washing station, installed beside the incineration platform, was operated for most of the season. The washing station, operated by one person, uses high pressure steam to remove residual oil from inside the empty drums (see photograph 5.3). Oily water, which drains out of the drums by gravity, is collected and processed through the oil-water separator.

Drums processed through the washing station came from various sources:

- drums emptied of their waste oil contents;
- empty oily drums found during drum consolidation all over the site;
- empty drums from the Beach Dump clean up.

Drum washing was required to render the waste non-hazardous and to allow for the on site disposal of the drums in a non-hazardous landfill. Approximately 700 empty drums were processed through the drum washing station during the 2001 season.

Washed drums were temporarily stockpiled near the incineration platform and then hauled to the beach shredder (located next to the non-hazardous landfill). The shredded drums were dumped into the landfill.

6-ROAD CONSTRUCTION AND MAINTENANCE

In order to gain access to the contaminated soil in the lower S1/S4 valley and to establish a safer route to Radio Hill, new roads had to be built during the 2001 field season. Also, due to erosion caused by rainfall and snow melt, most roads on Resolution Island were partly damaged and thus needed repairs. Road maintenance is required on a regular basis due to the normal wear of the roads caused by vehicle and heavy equipment traffic.

6.1- Road Construction

6.1.1-Road to Lower S1/S4 Valley

CEPA soil excavation in the S1/S4 building area required that roads be built to gain access to the various contaminated areas. Roads were built on both the north and south sides of the buildings. The lower valley area was expected to be reached by extending the road located on the south side of the buildings. However, all attempts made to reach the valley from above failed because of the difficult terrain (*i.e.*, steep drop, presence of bedrock outcrops, etc.). Approximately 40 m^3 of sand and gravel were used in an effort to extend the existing road into the lower valley.

A new road was therefore built to reach the lower S1/S4 valley. This road starts near the entrance to the former Furniture Dump and extends east to west along a relatively flat surface area mostly on bedrock. Eventually, the road reaches the lower valley where sediments are present over the bedrock. Approximately 100 m^3 of sand and gravel, hauled by rock truck, were needed to build the road foundation. A bulldozer was used to flatten the area as well as to push and compact the sand and gravel. This new road is approximately 510 metres long. The approximate layout of the road (not surveyed) is presented on the Project Drawings.

6.1.2-Road to Radio Hill

During the 2001 season, a new borrow pit was developed behind the summit of Radio Hill. The road to Radio Hill, which was narrow in certain areas and passed along steep cliffs, was considered unsafe. The increase in road traffic which would be caused by the development of a new borrow pit justified the construction of a new safer road to Radio Hill.

The new road starts approximately 75 metres before the present south-north part of the road reaches the north face of the hill. The old road used to circle the hill along its northern edge. Now, the new road cuts across the hill (east to west), along a seasonal drainage path, through a natural large rock crevasse. Approximately 340 m^3 of sand and gravel, hauled by rock truck, were needed to build the road foundation. A bulldozer was used to flatten the area as well as to push and compact the sand and gravel. This new road is approximately 325 metres long. The approximate layout of the road (not surveyed) is presented on the Project Drawings.

6.2- Road Maintenance

Despite the late start to the field season (*i.e.,* July 4th opening date), large amounts of snow were present on some roads. Three days were required to clear the snow from all the roads.

Otherwise, heavy equipment was used to grade roads, fill holes, and widen narrow sections. At the beginning of the season, drainage ditches along some roads were widened to allow for better drainage of snow melt water. Approximately 90 m^3 of sand and gravel were used for road maintenance and repair. Throughout the 2001 season, all site roads had to be maintained in proper condition for vehicle and heavy equipment traffic. Small piles of sand, used for road maintenance, were staged all along the road from the beach area to the upper camp area. Approximately 70 m^3 of sand was used for those piles.

7- CAMP OPERATIONS AND MAINTENANCE

As part of the commitment to maximize worker health and safety and comply with all regulations, various activities related to camp operation and maintenance were completed. In 2001, the drinking water source was changed and the water itself was treated. A new communication system and a weather station were installed and operated. Furthermore, the health and safety officer and medic offices were moved, and the laundry room was also moved to make room for a second women's washroom. Many other minor activities were also accomplished, through training, to improve camp facilities as well as the workers' well being and comfort.

7.1- Drinking Water

During clean up along the shores of Freshwater Lake (*i.e,* scattered debris, demolition and removal of old water pumphouse), an empty pail identified as deadly poison was found near the lake. As a preventative measure, this source of drinking water for the camp was abandoned. From that moment on, the drinking water was obtained from Lower Lake, located near the borrow pit used since the 2000 season, at the extreme southwest end of the site.

Water from Lower Lake, as the water from Freshwater Lake, presented a low pH value (*i.e.,* approximately 4.2). Furthermore, one of the recommendations of the water licence inspection report, issued by the Water Resources Officer from INAC, was to adjust the drinking water pH to the aesthetic objective of 6.5-8.5 (*Guidelines for Canadian Drinking Water Quality*). To achieve this, sodium carbonate powder was added to the camp water feeding tanks, every time water was transferred from the tanker truck. Turbulence caused by the water rushing in helped dissolve the powder which has a relatively low water solubility. By adding approximately 550 g of carbonate on a daily basis, the pH value was maintained between 6.5 and 7.2. Tap water pH levels were measured on a daily basis by ASU personnel, which reported the values to the site engineer. The amount of carbonate added was determined from the daily pH level measurements.

7.2- Communication System

Past experience with various types of communication systems on Resolution Island proved difficult. The VHF/UHF interface system set up in 1999, to establish a direct communication link between Resolution Island and Iqaluit, did not function properly. The satellite telephone / fax system used since 1998 also had its limitations, notably with the efficiency of the fax.

During the 2001 season, a new communication system was installed on site. Two technicians from Network Innovations spent a few days on site installing the system (*i.e.,* large satellite dish, telephones, lines, etc.). The satellite dish was installed on top of a seacan which was placed between hallways 1 and 2 of the main core camp. A total of 6 digital lines were installed for telephone, fax, and internet/email use.

The overall system proved to be very reliable. The use of high speed internet increased the

efficiency of document transferrals, for administrative personnel, between the site office and the Iqaluit head office. In general, the communication lines were clearer than with previous systems, and the fax transmission and reception was drastically more reliable. The availability of many independent lines for phone, fax , email, increased work efficiency and worker satisfaction. The availability and reliability of the system also makes living and working on the island safer.

7.3- Weather Station

In order to assist the helicopter pilots in landing on and taking off from Resolution Island, a weather station was purchased and installed on site. The station modules were first set up and tested, and then the station was installed on the roof of the small engine repair shop. The system was then hooked up to the main data output module as well as to a the computer system via a short range modem. The WeatherLink software program was installed on the computer system in order to read and log output data from the weather station.

The station measures wind velocity and direction, temperature, humidity, barometric pressure, and rainfall. From this data, the software calculates windchill factor, humidity index, dew point, and logs all this measured and calculated data on an hourly basis. The weather data can also be presented on graph form. The barometric pressure data is particularly interesting because the pressure trends give an indication on the weather to come (*i.e.,* increasing pressure indicates clear weather to come, while decreasing pressure indicates bad weather). This information combined with the marine weather forecast for the Resolution area provided on internet (now available on site) gives the site personnel an indication of weather systems affecting the area and allows for better activity planning.

7.4- Miscellaneous

In order to bring about continuous improvements to the camp facilities, various modifications were carried out during the field season. The Health & Safety Officer and Medic offices/rooms were moved out of the main camp building and set up in the building adjacent to the warehouse which used to house the on-site lab and the engineer's office. The medic office was isolated from the rest of the camp for health and safety reasons. From now on, sick patients can be isolated from the rest of the camp population, and be kept under surveillance over night as well as.

The laundry room was moved into the miscellaneous storage room located between the small engine repair shop and the overflow bedroom. Because of the growing female population in the camp, the former laundry room was converted into a second ladies' washroom.

Finally, new furnaces were installed in some of the bedrooms. Heating oil fumes were emanating from the old furnaces and causing discomfort to many occupants.

8-TRAINING

This year again, the Resolution Island work site was a unique opportunity for Inuit workers to acquire on-the-job training skills in various fields. As per the Contribution Agreement between Qikiqtaaluk Corporation and DIAND, training was identified as a priority.

Formal training sessions were organized and presented on-site by certified instructors. These training courses included:

TRANSPORTATION OF DANGEROUS GOODS (TDG):

10 workers received a 5-hour training course on TDG provided by Jacques Dion, technical adviser (Stabilis Environment). The course dealt with the identification, classification, labeling, packaging, and transportation of dangerous goods in accordance with the Canadian *Transport of Dangerous Goods Act & Regulations*. Certificates, valid for three years, were issued to all 10 workers.

WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS):

9 workers received a 4-hour training course on WHMIS provided by Roy Caley, health and safety officer (AERO). The course dealt with the identification, classification and labeling of hazardous materials used in the workplace, MSDS, health and safety risks involved in using them. Certificates were issued to all 9 workers.

FIRST AID / CPR: 12 workers received an 8-hour first aid and CPR training course and were issued certificates. 8 workers received a 4-hour first aid and CPR refresher course and were issued certificates. The courses covered the practical application of first aid techniques in a remote setting.

Training was also offered in the following fields:

- Construction: including welding, carpentry, plumbing, and electricity.
- Heavy Equipment: operating excavators with various attachments (*i.e.,* bucket, thumb, grapple), bulldozers, loaders, rock truck, vacuum truck, 6-wheeler dump truck, waste shredder, and soil screener.
- Safety: including workplace and work environment safety, fire fighting, first response training, and decontamination procedures.
- Environmental Technologies: operating a waste oil incineration platform (*i.e.,* drum handling, oil transfer, drum washing, incinerators); and a water treatment unit.

- Mechanics: including heavy equipment repairs / maintenance and welding, small engine mechanics.

- Management: including procurement, finances, administration, office management, inventory and expediting.

- Others: including housekeeping, kitchen maintenance, and cooking.

Details related to the training protocol are to be found in a document entitled "RI 2001 Project Summary" prepared by Harry Flaherty, site superintendent, Qikiqtaaluk Corporation. These details include:

- People trained;
- Area of training;
- Number of hours per training area;
- Detailed description of tasks;
- Statistics.

Photograph 8.1 shows workers part of the Resolution Island Fire/Rescue Team members during training.

9-OTHER ACTIVITIES

The following tasks were accomplished throughout the course of the 2001 field season. Some of these tasks were not specifically scheduled in the work plan but were conducted as an integral part of the 2001 field season.

9.1- Management Committee

The Contribution Agreement signed between DIAND and QC included provisions for the management team. The Project Management Team (PMT) responsibilities are to closely monitor project progress, hold bi-monthly meetings and to report to the Senior Management Team (SMT). The following individuals (or company representatives) are part of the PMT:

- DIAND - Scott Mitchell (observer on site)
- Queen's University Analytical Services Unit (John Poland or representative)
- Site Superintendent - Harry Flaherty
- O&M Supervisor - Chris Giroux
- Health & Safety Officer - Roy Caley
- On-site Emergency Medical Technician - Rahul Singh
- On-site Comptroller - Peepeelee Qappik
- Heavy Equipment Supervisor - Dave Lorenzen
- Technical Adviser - Stabilis Environment Inc. (Jacques Dion)
- Project Engineer - Sinanni Inc. (Philippe Simon, Simon Desjardins, Karl Côté)

Minutes of all PMT meetings held on-site during the season are found in Appendix 3.

9.2-Permits

Several permits were obtained prior to the 1998 field season. Some of these permits require yearly reporting to various agencies. The main field permits are land use (DIAND and NIRB - Nunavut Impact Review Board), water license (NWB - Nunavut Water Board) and quarrying (DIAND).

9.2.1- Land Use

The land use permit obtained in 1998, for the clean up project at Resolution Island, expired on July 12, 2001. Therefore, an application for a new permit was submitted to DIAND in the spring of 2001. The new land use permit was granted on May 17th. A copy of permit #N2001X0011 is presented in Appendix 4. The permit excludes any activities related to the storage, treatment, transportation, and disposal of PCB CEPA soils. This aspect of the project was discussed between NIRB and DIAND, and public hearings were held in Iqaluit and Kimmirut in September 2000. Following this, it was decided that the CEPA soils would be shipped off site to an authorized disposal facility.

9.2.2- Water Licence

A water licence (#NWB5RES9803), for the clean up project of Resolution Island, was granted on July 31, 1998. The current license expires on August 1, 2003. This license allows for the use of up to 400 m^3 of freshwater per month and provides various conditions related to the following operations:

- Water use
- Waste disposal
- Undertaking
- Studies
- Spill prevention and contingency planning
- Modifications
- Operation and Maintenance
- Abandonment and Restoration

The monthly quantities of freshwater, sewage water and waste discharge shall be compiled and reported later to NWB. Furthermore, ASU analytical results from the drinking water source and tap water samples will be included. As mentioned previously, in Section 7.1, the drinking water source was changed at the beginning of the season. Drinking water for camp use is now obtained from Lower Lake.

As mentioned in previous sections, a report issued following the Water Licence site inspection recommended that a few actions be taken. One of the recommendations was that the drinking water pH be adjusted, which was effectively carried out during the season (see Section 7.1). Also in response to the report, both beach POL tanks were drained of their contents (see Sections 4.2 and 5.1). Finally, signs indicating the presence of potential health hazards were posted adjacent to both non-hazardous waste landfills, and adjacent to the sewage lagoon (see photograph 9.1). A sign was also posted near Lower Lake to indicate the presence of a source of drinking water (see photograph 9.2).

9.2.3- Quarrying

A permit application for quarrying sand, gravel and glacial till was submitted to DIAND in the spring of 2001. New Quarry Permits (2001QP0035, 2001QP0036, 2001QP0037) were issued on May 17th 2001 (see Appendix 5). The permits provide conditions for the use 30,000 m^3 of sand and gravel at Resolution Island. This permits will expire in May 2002.

During the 2001 season, a new borrow pit located behind the summit of Radio Hill was exploited. Most of the excavated material was screened on site, while some was used as pit run. Table 9.1 summarizes data for granular material usage this year.

Table 9.1: Summary of Granular Material Uses

Borrow Pit Location*	Type of Soil	Approximate Volume (m^3)	Usage
Radio Hill pit	sand and gravel	1140	screening
Lower Airstrip pit	glacial till	530	backfilling, road construction
Lower Lake pit	sand and gravel	990	screening
Total		**2660**	

* Refer to as built drawings for exact location

9.3- Miscellaneous

9.3.1- PCB Storage Building

Work was carried on the PCB storage building during the 2001 season. The building's electrical circuit was hooked up to the genset in order to provide lighting and ventilation to the building. Lighting is now available in the building, however, ventilators will have to be installed. Wiring was also installed in order to hook up the incinerator platform to the genset.

Liners were also installed on the floor in the west end of the building in order to extend the CEPA soil storage area. The floor protection consisted in placing a layer of 30 mil geomembrane (SF830R) deployed in between layers of geotextile (2.6 mm thick). The 3-layer protection mat was installed to overlap about one metre on side walls.

9.3.2- Training Centre

During the 2001 field season, various tasks were carried to complete the Training Centre and render it operational. These tasks included:

- √ general electrical work;
- √ installing a gen set and hooking it up to the building circuit;
- √ installing a shed for the gen set;
- √ carpentry, plumbing, and painting.

After completing the Training Centre and supplying it with furniture, it was actually used to give various training sessions.

9.3.3- Radome Building

Converting the Radome Building into the new site offices was identified, on the 2001 work plan, as

an activity to be carried out budget and time permitting. Minor work was carried out on the building. All stored equipment and materials was moved out into other buildings and general clean up was carried out.

9.3.4- Camp Winterization Procedures

A few days prior to camp closure, vehicles and heavy equipment were stored in the main garage and in the beach warehouse. Due to limited storage area, equipment such as shredders were not stored inside buildings. All engine powered vehicles or equipment stored outside were winterized by blocking exhaust systems and air intakes.

Windows of the core camp, training centre, and hallways were placarded with plywood to prevent snow from entering the facilities. All entrances were locked and blocked with lumber. All food supplies were shipped out (for donation).

The drinking water tanks, toilets, urinals, sinks, and water lines were drained. The water lines were then filled up with antifreeze prior to departure. The procedures for camp winterization were followed.

The Caterpillar D7 bulldozer was parked next to the dump adjacent to the core camp. This heavy equipment is used to clear snow from roads during camp opening.

9.3.5- Health and Safety

Health and Safety was identified as one of the priorities for the 2001 field season. Various procedures were implemented to comply with the health and safety plan, and other achievements were met as part of this commitment. These include but are not limited to:

- √ weekly health and safety committee meetings;
- √ new employee site orientation (*i.e.,* site visit, general and specific safety rules, restricted areas, PPE provided);
- √ weekly camp safety inspections and audits;
- √ project accident/incident reports were filled and logged;
- √ Worker's Compensation Board's reports were logged;
- √ spill reports were filled and reported;
- √ camp evacuation procedures were developed (signage was installed in every hallway, responsibilities were assigned to individuals, drills were conducted);
- √ daily site inspections were conducted where safety procedures were enforced by the health and safety officer; and
- √ safety tips were provided during morning meetings.

More details on health and safety activities are reported in QC's report of activities prepared by Harry Flaherty.

10-CONCLUSIONS AND RECOMMENDATIONS

Based on the 2001 field season activities and observations, QC and Sinanni are formulating technical recommendations for 2002 and subsequent years.

10.1 Environmental Concerns/Remediation Procedures

The Project's goal is to bring the site into legal compliance. Apart from CEPA soils, other environmental concerns need to be addressed.

Management of CEPA Soils

The priority for the 2001 season was the excavation and storage of CEPA soil. The removal objective for the season was 500 m^3. The CEPA soil removal activities proceeded efficiently and the objective was largely surpassed.

To date, almost 1,500 m^3 of CEPA soil is stored inside the PCB storage facility. An additional 200 m^3 of CEPA soil could probably be stored in the PCB storage facility. Otherwise, the building storage capacity is reached. All other CEPA soil will have to be placed directly into the 3.1 m^3 conical shaped steel containers.

Furthermore, almost 150 m^3 of CEPA soil is currently stored in conical shaped steel containers (1.6 m^3 and 3.1 m^3). However, neither of these types of containers are suitable for marine transportation as per the EIS. Therefore, the soils in these containers will have to be transferred into containers designed and built in accordance with the EIS. Such containers are expected to be purchased prior to the 2002 field season.

As for the 3.1 m^3 conical shaped steel containers presently on site, empty and full, they will be modified to make them conform to the EIS specifications. First of all, the interior seams (*i.e.*, bottom and side) will be welded to render the containers waterproof. Secondly, a steel plate will be welded onto the bottom of each container to obtain the proper bottom thickness. Furthermore, the gasket will be changed for a thicker and wider one, to obtain a better watertight seal. The retrofitted containers will then be available to be filled with CEPA soil. This activity should be a priority for the beginning of the season since storage space is becoming scarce and because the newly purchased containers will only arrive on site later in the season.

Outside temporary bulk storage of CEPA soil on and covered by geosynthetic liners is also an option, but only as a last resort.

Since a considerable volume of CEPA soil is now stored on site, the priority for next season should be put on the shipment of soil down south. This will require good coordination as well as efficient operations in terms of containerization, movement of containers, and further excavation and storage of the remaining soils on site.

Finally, the excavation of the S1/S4 valley should be completed during the 2002 field season.

Management of Tier II PCB Soil and Debris

As part of the clean up of the Furniture Dump and the S1/S4 building and drainage area, PCB Tier II soil and debris was excavated. The Tier II soil, temporarily stored in a natural depression along the lower road to the S1/S4 building area, will eventually be placed in an engineered lined landfill. More Tier II soil will be excavated during the clean up of other areas on site.

As for the Tier II debris, four management options were evaluated during the 2001 field season:
- off site disposal to a southern facility;
- on site disposal into an engineered lined landfill;
- solvent washing (on site);
- high pressure soap washing (on site).

After a thorough evaluation it was determined that the most cost-effective option was the on site disposal in an engineered lined landfill. The future design of such a landfill will include the volumes of Tier II debris.

Engineered Lined Landfill

During the 2001 season, potential locations for the construction of an engineered lined landfill were evaluated. The preferred location is near on the upper site in the S1/S4 valley, up-gradient from CEPA areas. A preliminary design followed by the specifications and drawings are being prepared.

Such a landfill site will be used for the on site disposal of the following types of waste:
- Tier II PCB soil;
- Tier II heavy metal soil;
- Tier II PCB debris;
- Tier II PCB reject rocks from CEPA soil screening;
- Hydrocarbon contaminated soil;
- Creosote timbers.

All these waste items will be placed in different cells within the same landfill.

Clean up of the Beach Dumps

Removal of buried debris from the Beach Dump has almost been completed. Permafrost encountered during the excavation and removal of debris slowed the progression. The few remaining debris will be removed during the 2002 season.

After most of the debris was removed, the underlying soil was sampled and characterized. The Tier II lead contaminated soil will eventually have to be removed and placed in the engineered landfill site.

A second dump, located across the road was also addressed this past season. During the removal waste debris, drums containing POL products were encountered. These drums will have to be removed and managed next season. Clean up the remaining waste debris will also have to be

addressed during the 2002 field season.

POL Management and Incineration

The major part of the POL waste inventory on site has been addressed. Most drums to be incinerated on site have been eliminated. The large drum stockpiles (*i.e.*, barrel cache valley, imploded tank area, airstrip and maintenance complex) have been completely cleaned up. The beach POL tanks have been drained. Most of the drums to be shipped down south are strapped, labelled and ready to go.

A few drums scattered around the site still need to be recovered and managed. However, the major item remaining to be addressed is the stockpile of some 100 drums of grease. Testing will be carried out to determine whether or not these can be incinerated on site. So far, it seems that the grease can be made more fluid and less viscous by heating and dilution in waste fuel. If the tests are not conclusive (*i.e.,* if the on site incineration of the grease is not cost effective), the drums will be shipped south to an authorized disposal facility.

10.2 Proposed Schedule, Work Plan and Budget for 2002

Following the fall 2001 joint PMT/SMT meeting, QC and Sinanni, reviewed the proposed work plan for the Resolution Island project, 2002 - 2003 year. The work schedule and budget will be prepared in the following months. The development of the schedule, work plan and budget will take into consideration the expected early commitment of funds by DIAND to purchase conical shaped steel containers.