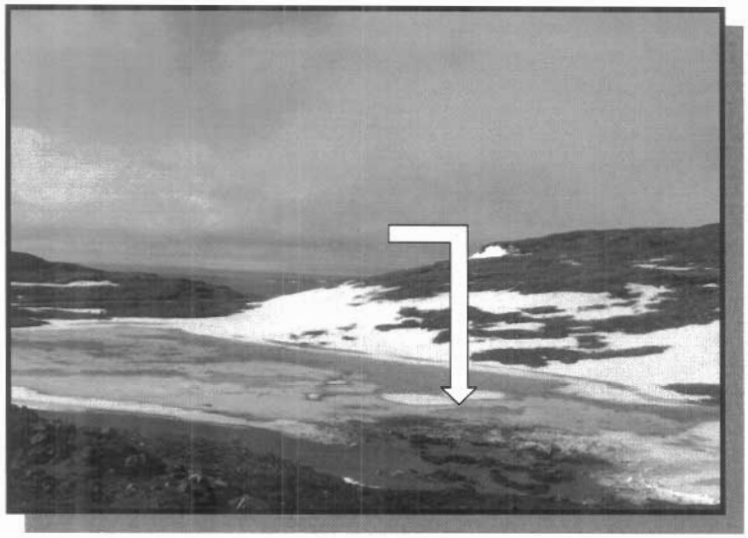
from the lakeshore. The last part of the access road was not completed (*i.e.*, stream crossing) since quarrying operations were postponed to another season.



Photograph 7.2: Landslide at the Lake Borrow Pit

Other Borrow Pits

A Permit was obtained for quarrying material from the S1/S4 Beach Borrow Pit. This borrow pit will likely be used mostly for rip-rap (*i.e.*, Type 1 material). Since this type of material was not required in large quantities during this past season, quarrying operations were not conducted there. An access road to this pit still needs to be built.

In order to find alternate sources of borrow material, soil samples were taken in areas suspected of containing large volumes of granular materials.

The Airstrip Terrace borrow area, located northwest of the Airstrip borrow pit, previously investigated, was investigated again at the end of the season. From the depth of the test pits that were dug, and the sieving results of the samples analysed, it was determined that this area contains a larger volume of gravel (approx. 35,000 m^3) than what was previously estimated (approx. 26,500 m^3).

Test pits were also dug in two (2) areas near the freshwater lake and soil samples were analysed for grain size distribution. The following volumes of gravel have been estimated in these two areas: 2,500 m^3 in Freshwater Lake - West borrow pit, and 6,000 m^3 in Freshwater Lake - East borrow pit. The grain size analysis versus specified gradations are presented in Appendix 5.

Table 7.1: Borrow Pits - Summary of Volumes Used and Remaining

Borrow Pit	Est. Volume in Place (m^3) 2003	Volume Quarried (m^3) 2003	Est. Volume in Place (m^3) 2004
Radio Hill	7,500	5,200	> 2,000
Airstrip (Pit 9)	17,500	8,400	1,100
Lake	17,500	0	17,500
S1/S4 Beach	N/D	0	N/D
Airstrip Terrace	26,500	0	35,000
Freshwater Lake (West)			2,500
Freshwater Lake (East)			6,000

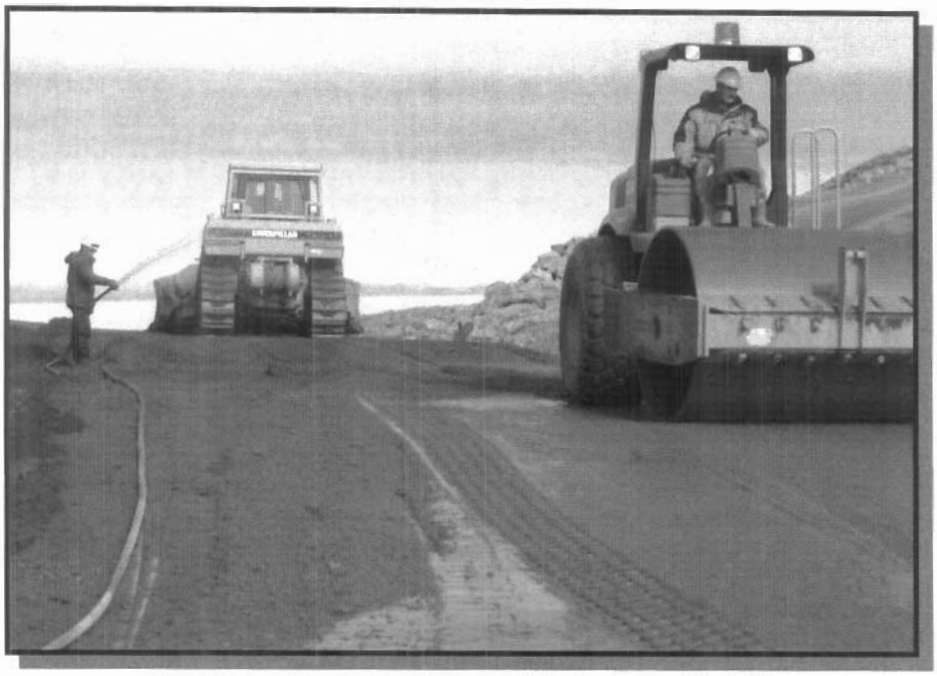
N/D: Not Determined

7.2-Construction

Prior to construction activities, site preparation and clean up was conducted. Various types of debris as well as boulders were removed from the work surface area to ensure good soil compaction. In certain areas, holes and depressions had to be backfilled, levelled, and compacted with proper granular materials.

Furthermore, in order to increase the landfill site volume capacity, the bedrock outcrop, located between the road and the former PCB building was partially removed. A Cat 322 excavator equipped with a Tramac hydraulic hammer was used to break the surface layer of the bedrock outcrop. The maximum outcrop elevation was lowered by over one (1) metre, and approximately 885 m^3 of bedrock were removed from the area.

Based on construction drawings by UMA and GPS survey data from ASU (2002), Northtech surveyors staked out the interior and exterior boundaries of the berm core and shell. Using existing site control monuments, the surveyors set up survey benchmarks near the construction site. Temporary benchmarks and visual reference points were also set up by site personnel to facilitate re-positioning of the stakes and overall construction work.



Photograph 7.3: Construction of the south berm core

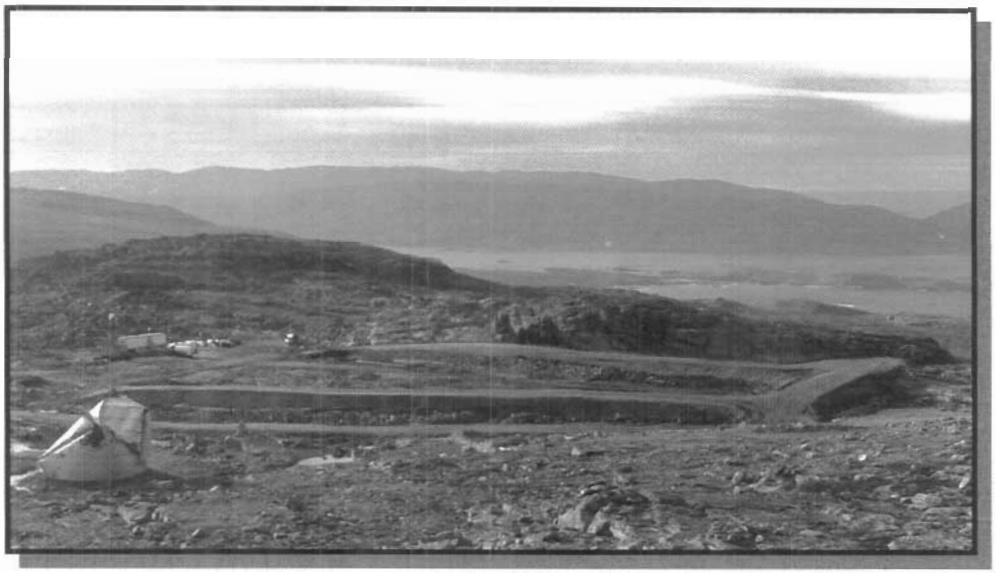
Construction of the berm core was initiated on August 16. Work began in the north-east corner of the site and proceeded simultaneously on the east and south berms as well as on the north berm along the rock face. Type 3 soil was hauled from the borrow pits (mainly the Airstrip pit) and dumped directly in the berm footprint. Soil was placed in 1-foot lifts, evened out using a bulldozer, moisture conditioned, and then compacted using a roller-compactor. Boulders and rip-rap were placed along most of the core base to stabilize the over-90%-saturated soil.

Heavy rain that fell on August 22, 23, and 24 severely hampered the progression of work. The screened gravel from the Airstrip pit was completely soaked above the required moisture content and furthermore could not be worked to the required compaction level. The compacted berm core, also soaked by the rain, became saturated, unstable, and unsafe to work on for heavy equipment. The north berm was mostly affected from the rain. Groundwater resurgence from the adjacent bedrock outcrop (*i.e.*, cliff) kept the compacted berm core saturated long after the rain had stopped.

Runoff water from the deluge also caused problems. Water accumulation inside the berms at the east end, as well as outside the berms on the east side of the site kept the berm core in a state of saturation. A drainage ditch was dug inside the berms to drain the standing water towards the west, along the natural drainage path that flows across the former maintenance dump. A temporary culvert was installed under the access ramp to the north berm, at the end of the drainage ditch. A second drainage trench was dug to the east of the site to drain the standing water outside the east berm towards the east, also along a natural drainage path. Bedrock had to be broken in that area to improve drainage. However, these efforts were not sufficient to completely drain the area. A culvert was then installed under the main road to drain the remaining water to the ditch located

across the road.

The exterior section of the south berm was partly built over the existing main road. For safety and convenience, the road was widened to allow two-way traffic to continue. Construction of the berms also blocked off the two (2) existing site access roads. A new road was built to access the site from the west side.



Photograph 7.4: Landfill site at the end of the 2003 season

Three (3) of the four (4) required monitoring wells were installed down-gradient of the landfill site, while the remaining up-gradient well should be installed in 2004. Boreholes were drilled to a depth of 4.5 metres using an Air Track Drill. Stainless steel wells were installed according to Tier II landfill construction specifications. The location of the monitoring wells is presented on the 2003 As-Built Drawings.

Most of the north, east, and south berm cores were completed by the end of the season, however, the construction of the west berm could not be initiated because of the presence of hydrocarbon contaminated soil in the berm footprint. Despite this unexpected situation and the delays due to heavy rain, construction was completed to over 80% of the construction objective for the 2003 season (*i.e.*, 3.5 of the 4 berms).

A detailed report on the construction of the Tier II landfill site will be presented at a later date as a separate document.

7.3-Soil Testing Lab

As per Tier II landfill site construction specifications a soil testing lab was set up on site. The trailer formerly used by the incineration personnel was transformed into the soil testing lab for use by EBA personnel. Carpentry, plumbing, and electrical work were required to install shelves and counters,

a water tank, running water, a fuel storage tank and generator, as well as lighting and heating. Approximately one third of the surface area serves as office space while the rest is used to conduct sieve tests on borrow pit gravel samples.

The trailer was set up at the west end of the site (refer to 2003 As-Built Drawings for approximate location). A marine container set up on the former PCB storage building concrete slab, and used as storage of contractor equipment, tools, and supplies, was also used to store EBA's densimeter.

8- OTHER ACTIVITIES

Other miscellaneous tasks accomplished throughout the course of the 2003 season are presented in this section. Some of these tasks were not specifically scheduled in the initial work plan but were nonetheless conducted as an integral part of the field season. Also, activities related to camp operation and maintenance such as the camp roof repair and the set up of two additional sleeping trailers are reported in the 2003 Field Summary Report prepared by QC.

8.1-Community Consultations

On April 7, 2003, community consultations were held in the hamlet of Kimmirut in order to inform the local residents on the site clean up progress, on the remaining work to be carried out, as well as on job opportunities at RI. This event also allowed people to voice their concerns and get answers to their questions.

Present at the consultations were Stephen Traynor from INAC, Chris Giroux from QC, Allison Rutter from ASU, and Karl Côté from Sinanni. A total of fifteen (15) people from Kimmirut, including the mayor, attended the meeting. Each of the four (4) project members addressed the attendees and presented various project related information to the small crowd. Slides and a video on RI were also presented.

A copy of the community consultation minutes of proceedings is presented in Appendix 6.

8.2-Medical Surveillance Program

On April 10, 2003, medical testing of RI employees and sub-contractors was conducted in Iqaluit, in order to determine if work carried out at RI was having an impact on the health of personnel. Twenty-three (23) of the thirty (30) workers scheduled for the examination showed up for the medical examination. The list of employees tested is presented in Appendix 7.

A physician and two (2) medical technicians from WMC Occupational Health Services Inc., Hamilton, Ontario, performed the following medical investigations:

- Medical and work history questionnaire;
- Physical examination;
- Pulmonary function testing (PFT);
- Urine dipstick;
- Vision testing;
- General lab investigations (*e.g.,* glucose, cholesterol);
- Work specific lab investigations (*i.e.,* blood lead and PCB).

The Medical Surveillance Program Report concluded that: "Based upon the obtained medical evaluation results at the Exit Medical, no signs or symptoms of intoxication with chemical hazard anticipated to be present at the work site, were revealed". Furthermore, the report stated that the "Employees were found to be in good physical condition". A copy of the Medical Surveillance

Program Report is presented in Appendix 7.

8.3-Management Committee

The Contribution Agreement signed between QC and INAC included provisions for the establishment of a management team. The Project Management Team (PMT) has the responsibility of monitoring the progression of work, of holding project meetings, and of reporting to the Senior Management Team (SMT). The following individuals and/or organizations were part of the 2003 PMT:

- INAC - Glen Stephens
- Scientific Adviser - Queen's University ASU (Allison Rutter, Graham Cairns)
- Site Superintendent - Harry Flaherty
- Assistant Site Superintendent - Chris Giroux
- Health & Safety Officer - Pierre Sansfaçon (Stabilis inc.)
- On-site Emergency Medical Technician - Andrew Bullion
- On-site Financial Comptroller - Caroline Rennie
- Heavy Equipment Supervisor - Joe Erkidjuk
- Technical Adviser - Jacques Dion (Stabilis Inc.)
- Project Engineer - Sinanni Inc. (Philippe Simon, Karl Côté, Greg Johnson)

Minutes of PMT meetings held on-site during the season are presented in Appendix 8.

8.4-Project Permitting

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 the land use permit (INAC and Nunavut Impact Review Board - NIRB), the water license (Nunavut Water Board - NWB), and the quarrying permits (INAC).

Land Use Permit

The initial land use permit for the RI clean up project was obtained in 1998. The permit was then renewed in 2001 (permit #N2001X0011). The current land use permit was to expire in May 2003. In accordance with article 31 subtitle (5) of the Territorial Land Use Regulations, a written request was sent to INAC in order to obtain a one year extension to the current permit. This extension was granted and the permit is now set to expire in May 2004. A copy of the permit extension is presented in Appendix 9.

A new permit application was filed in the fall of 2003. New activities allowed under the future permit will include the construction of a landfill for the disposal of soil and debris contaminated at Tier II levels for various contaminants such as PCB, metals, and heavy hydrocarbons. The application document is also found in Appendix 9.

Quarrying Permits

A permit application for quarrying sand and gravel from four (4) borrow pits on RI was submitted

to INAC before the field season. The new Quarrying Permits for the Lower Lake, Radio Hill, and Airstrip borrow pits (#2003QP0031, #2003QP0029, #2003QP0030) were issued on March 26, 2003 while the permit for the S1/S4 Beach Area borrow pit (#2003QP0081) was issued on July 7, 2003. The locations of these borrow pits are presented in the 2003 As-Built Drawings.

The Quarrying Permits are valid for a one year period. Copies of these permits are presented in Appendix 10. The permits provide conditions for the use of the following volumes of sand and gravel:

- Lower Lake borrow pit 20,000 m^3
- Radio Hill borrow pit 10,000 m^3
- Airstrip borrow pit 20,000 m^3
- S1/S4 Beach Area borrow pit 25,000 m^3

Volumes of granular material quarried from these pits during the 2003 season are reported in Section 7 of this report. These volumes were all below the maximum allowed quantities listed above. Most of the excavated pit run was screened prior to usage. The sand and gravel was mainly used for the construction of the landfill berm core, as well as for road construction, repairs and maintenance.

Water Licence

The original water licence (NWB5RES9803) issued in 1998 for the RI clean up project expired in 2003. An application for a new water licence from the Nunavut Water Board (NWB) was submitted on April 7, 2003. A new licence (NWB5RES0308) was issued on August 29, 2003 and is set to expire in 5 years (*i.e.*, August 31, 2008). This licence provides various conditions related to the following operations:

- Water use (20 m^3/day);
- Sewage disposal;
- Solid waste disposal;
- Undertaking;
- Emergency response planning;
- Modifications;
- Abandonment and restoration;
- Monitoring programs.

One of the conditions of the new license (as per Part G, Section 2) required that the RI Spill Emergency Plan be revised to include:

- the updated "INAC Water Resources and Environment Canada personnel in Iqaluit" to the spill response contact list for Nunavut;
- the notification of the INAC Water Resources Inspector at (867) 975-4298 following the occurrence of any spill of chemicals, petroleum products or waste associated with the project.

This amendment to the spill plan was submitted to NWB. Copies of the application document and

the new Water License granted by NWB last August are found in Appendix 11.

Another condition of the new license (as per Part J) required that a post-remediation monitoring plan be submitted to the Board for approval. This plan was submitted to NWB in December 2003.

An annual report is to be presented to NWB after completion of the field season. Information such as the volume of freshwater used, and the quantities of sewage water and solid waste discharged during the season will be included in this report. Analytical results of water sampled from the drinking water lake are also reported.

8.5-Road to S1/S4 Beach

Construction of the access road to the S1/S4 beach contaminated area was conducted at the end of the 2003 season. The work was conducted over a six (6)-day period between August 29 and September 4. No external supply of gravel was required during construction. Operations consisted of simple cut-and-fill using the existing gravel. Work was carried using a bulldozer, a loader, and an excavator.

Photograph 8.1 Layer of boulders across streambed

Approximately halfway to the final destination, a stream had to be crossed. The option of installing culverts across the stream was rejected because of the risk of the culverts being damaged or even washed away during spring snow melt. Instead, boulders were placed in the streambed to allow water to flow through. Smaller rocks and gravel were placed atop the first layer to obtain a smoother driving surface. The final top layer of gravel will be placed in 2004, before regular dump truck traffic begins running across the stream. The road alignment is presented on the 2003 As-Built Drawings.

8.6-Road Maintenance

At the beginning of the season, large snowdrifts were still present on some roads. Approximately three (3) days were required to clear the snow from all the roads. Snow removal was also required in roadside ditches to allow for proper drainage of runoff water.

Spring time erosion caused by rainfall and snow melt had partly damaged some roads on site and therefore minor repairs were needed. Approximately two (2) weeks of road work (*i.e.*, from June 23 to July 5) was required to get the site roads in good condition for the season.

Photograph 8.2 Grading of main site road

After the heavy rainfall of August 22 to 24, most roads on site sustained major damage from erosion. A whole week of full time work was required to repair potholes, crevasses, and drainage ditches. Most of the heavy equipment available (*i.e.*, loaders, dump trucks, and excavators) was used exclusively for this task. Over 1,000 m^3 of granular material was required for road repairs following the downpour.

The rock outcropping at the junction of the main road and the road to Radio Hill was removed using the Tramac hydraulic hammer. This will make maneuvering around that corner easier ans safer for heavy equipment and dump trucks.

Regular road maintenance is also required due to the normal wear of the roads caused by vehicle and heavy equipment traffic. Generally, the roads are simply graded as needed, and the larger holes are backfilled prior to the grading operations. During the 2003 season a total of 2,000 m^3 of gravel was used for all minor and major road repairs as well as for regular maintenance. At the end of the season, small piles of sand, used for road maintenance, were staged all along the road from the beach area to the upper camp area, in preparation for site startup in 2004.

9- CONCLUSIONS AND RECOMMENDATIONS

This final section summarizes the main information presented in the previous sections of the report. Furthermore, based on the activities conducted and tasks accomplished during the 2003 season, QC and Sinanni have formulated technical recommendations for the following years. These recommendations are complementary to the three (3)-year remediation plan presented by ASU in 2003.

9.1-Remediation Activities

The project's main goal is to bring the site into legal compliance. However, apart from PCB CEPA soils, other environmental concerns also need to be addressed.

Most tasks conducted during the 2003 season revolved around two (2) major activities: 1) the construction of the new Tier II landfill site, and 2) the off-site shipment of PCB CEPA contaminated soil.

Tier II Landfill

The site chosen for the construction of the landfill site was a busy area where important operations were being carried out: PCB soil storage and containerization, and waste POL incineration. Before construction of the landfill could begin the area had to be cleared of all existing infrastructure and equipment. Therefore, the following activities had to be carried out:

- Thawing of the CEPA soil stockpile inside the Main PCB storage building;
- Containerization of the thawed soil into the steel containers;
- Empty beach hazardous storage building and convert into B2 building for CEPA storage;
- Transfer of the remaining soil from the Main building down to the B2 building;
- Demolition of the Main PCB storage building;
- Excavation and removal of PCB CEPA, Tier II, and Tier I contaminated soil from the area.

Simultaneously, all remaining waste petroleum products had to be incinerated, before the incineration equipment could be demobilized and the area completely cleaned up.

Gravel production at the Radio Hill and Airstrip borrow pits was also a major activity that was required before construction could begin as well as during construction.

Other activities, although minor, were also necessary to meet the landfill berm core construction objectives. These activities included: the construction of an access road to the Airstrip pit, the transfer of the soil screener from S1/S4 valley to the Airstrip pit, the construction of a new access road to the west of the landfill site, the installation of survey pegs, the setup of a soil testing lab.

Construction of the landfill berm core was completed to over 80% of the construction objective for the 2003 season as set in the new remediation plan and in UMA/EBA construction specifications (*i.e.,* 3.5 of the 4 berms). Unexpected heavy rainfall at the end of August seriously delayed

progression of work. Furthermore, construction of the west berm could not be initiated because of the presence of subsurface hydrocarbon contamination in the area.

Off-site Shipment of CEPA Soil

In order to ship the maximum number of CEPA soil containers off site, the following tasks were conducted:

- Excavate and screen all of the remaining CEPA soil from the upper site (*i.e.,* S1/S4 Valley, Airstrip Dump, DND Helipad);
- Thaw the CEPA soil stockpile inside the Main PCB storage building;
- Empty the old CEPA soil containers (1.6 m^3 and 3.1 m^3) into the B2 building;
- Repair the old 3.1 m^3 CEPA soil containers to EIS specifications;
- Containerize the CEPA soil from the Main PCB building and the B2 building.

In order to successfully conduct the containerization operations at the B2 building, other related activities were required: installation of an overhead garage door at the east end of the B2 building; transfer of the genset from the Main PCB building to the B2 building; and set up of a break trailer beside the B2 building.

In preparation for the 2004 season CEPA soil excavation, containerization, and shipment, the access road to the S1/S4 beach area was completed.

During the 2003 season, a total of 604 containers were filled with CEPA soil and 838 containers were shipped south for disposal.

Other Activities

Substantial efforts were given to various tasks not initially planned. In general, these tasks did not interfere with the work plan schedule. These unexpected activities included:

- Repair polar bear damages and clean up the kitchen area at the beginning of the season;
- Install a drainage culvert underneath the main road to drain pooled water from the north-east end of the Tier II landfill;
- Coordinate and monitor the off-site shipment of 168 drums of waste oil and other hazardous waste for disposal at a registered facility down south;
- Construct a drainage ditch in the middle of the lower airstrip terrace (TP7 & TP8) to allow for the potential use of the granular material in 2004, previously considered too wet;
- Construct and install bear-proof steel barrier-gates on all exterior camp doors;
- Explore potential borrow areas and dig test pits to collect samples for grain size analysis.

9.2-Recommendations

The following recommendations provide guidance for the 2004 season activities in order to increase efficiency and help in attaining the project objectives. These recommendations could be discussed as part of the next project planning meeting.

Excavation of Tier II Soil

Excavation of Tier II and Tier I contaminated soil is scheduled to begin next season in two (2) main areas, the S1/S4 valley and the Lead Beach Dump. This activity is dependent on the construction of the landfill site. Placing the excavated Tier II soil inside the landfill immediately after excavation would be more efficient than temporary stockpiling. However, since the landfill might not be ready to receive soil as early as previously expected (assuming the membrane is shipped by sealift), this activity might have to be postponed to later in the season. It might also be possible to start landfilling soil even if the landfill berm cores are only partly completed.

Engineered Tier II Landfill

Construction activities are dependent on the availability of granular materials. Unfortunately, only small volumes are ready to be used. Therefore, efforts will have to be made in order to begin quarrying and screening activities early in the season.

Once sufficient quantities of gravel are available, construction activities should resume as early as possible. Working on the frozen berm core will provide a stable work surface for heavy equipment. Activities include the completion of the three (3) existing berm cores (north, east, and south) to final elevation and grading of the berm sides to the required slopes. Afterwards, the protective sand layer (Type 4) could be placed on the berm core and the bottom of the landfill. This will allow installation of the geomembrane liners to be initiated. The installation of the geomembrane may begin even if the west berm core has not been completed. This might require the installation to be executed in two (2) parts instead of all at once, as previously planned.

Work on the west berm core also needs to be initiated as a priority. However, before that can be done, the hydrocarbon contaminated soils in the area must be addressed. These soils should be removed in order to eliminate any external interference of future landfill monitoring data analysis. An option document reviewed by all project partners was provided by Queen's ASU to INAC. A decision from INAC on how to address the hydrocarbon contamination in the Tier II landfill footprint is still pending.

The installation of the thermistors in the landfill berms should also be conducted early in the season to take advantage of the frozen material which is easier to drill with our equipment.

CEPA Soil Excavation and Containerization

The volume of CEPA soil remaining inside the B2 building is approximately 695 m^3. This volume should fit inside approximately 278 steel containers. There are no empty containers presently on site. A total of 472 containers are currently stored in Iqaluit. These will be transferred to RI on the first available sealift early in the season (unless INAC proceed otherwise). Another 366 empty containers are ready to be shipped north from Saint-Ambroise, Québec.

Before the empty containers return to site and soil containerization can resume, CEPA soil excavation at S1/S4 beach could be initiated. However, the limiting factor of this activity will be available space in the B2 building. Approximately 400 m^3 of soil could be added to the B2 building before its maximum capacity is reached. In case the containers cannot arrive on site early enough,

temporary CEPA soil stockpiling measures should be made available.

Airstrip Dump

The Airstrip dump should be monitored for stability and performance of the granular cover layer. If the presence of erosion or any instability is observed, remedial work will be carried out. This could include reshaping and/or placing additional granular material in and around the areas, if required.

Heavy Equipment Requirements

The 2004 field season will require a lot of contaminated soil, gravel processing and hauling. To ensure the feasibility of the workplan with the existing on-site heavy equipment, a detailed analysis of the scheduled activities combined with the heavy equipment allocation will need to be prepared. The 2003 field season experience will be used to estimate the productivity vs work site locations. From this analysis, it will be possible to recommend/suggest other requirements for heavy equipment (*e.g.*, additional dump trucks, screener), if required.