4.5.1 Kiggavik Grid

Very little elevated gamma readings have been identified at the Kiggavik grid outside of the naturally elevated areas identified in Section 4.2 (Figure 4.2-1). As locations of these elevated gamma readings at the surface are correlated to subcrops and not to drilling activities, remediation of this grid will deal with debris, steel casing etc. but not with radioactive cuttings.

4.5.2 Andrew Lake Grid

Impacted areas identified at the Andrew Lake grid correspond to drill holes with cuttings on surface which contain elevated uranium content. In particular, boreholes 14, 38, and 39 had measured grade thickness of 305 m °/oo, 1450 m °/oo, and 1542 °/oo respectively. As shown on Figure 4.5-1 Andrew Lake Grid, peak radiation measurements at these locations ranged from 2-3 µSv/h 1 m from the ground surface. Elevated readings occurred as sandy deposits at the surrounding of these drill hole collars. This material will be removed within a radius of up to 5 m from drill hole collar by manually shovelling the material into a drum. A cover of clean soil may also be used to further reduce radiation fields, in the event that cutting clean up is insufficient to reduce gamma readings below 1 µSv/hr.

4.5.3 End Grid

Although measured grade thickness values for boreholes in the End Grid indicated uranium mineralization was encountered during the drilling, radiation measurements are well below the 1 µSv/h threshold. Remedial measures will not be required based on radiation levels in this area.

4.5.4 Other Locations

UGC and COGEMA have investigated other grids (i.e., Jane, Bong, Granite, etc.) associated with the Kiggavik Sissons project. Due to poor or lack of mineralization and limited geological interest, some of the claims where exploration was conducted were dropped. Since little or no mineralization was encountered on these drill holes, no surface contamination is possible and no remediation is needed with respect to the radiological aspect.

For Bong, Granite and Jane Grids, several holes were drilled and the results were of varying interest. There may be some surface contamination which has to be checked and remediation for both aspects (radiological and garbage/casing) will be conducted accordingly.

Table 4.5-1 contains a summary of exploration drilling locations throughout the Kiggavik Sissons project.

Table 4.5-1: Uranium Exploration Grid Summary

Grid	Year	Comments
Kiggavik	1977 – 1988	Significant uranium removal (see Section 4.5.1)
Andrew Lake (Southwest)	1989 – 1997	Significant uranium removal (see Section 4.5.2)
End	1989 – 1996	Significant uranium removal (see Section 4.5.3)
Jane	1992,1994,1995	Weak intersections (12m @ 0.53%)
Bong	1995	Weak intersection (32.9 m @ 0.41%)
Caribou	1994	Weak anomalous radioactivity (< 0.1 kg U removal)
Context, Twin, 96-3, 96-4	1997	Barren / no radiometric anomalies
Fox	1996 – 1997	Barren / no radiometric anomalies
B1	1994	Barren / no radiometric anomalies
Granite, Bong, Schultz, Dova, Marjorie, Sandhills, Siamese, Contact, Alpha	various	Barren but some weak radiometric anomalies some claims previously dropped from exploration program

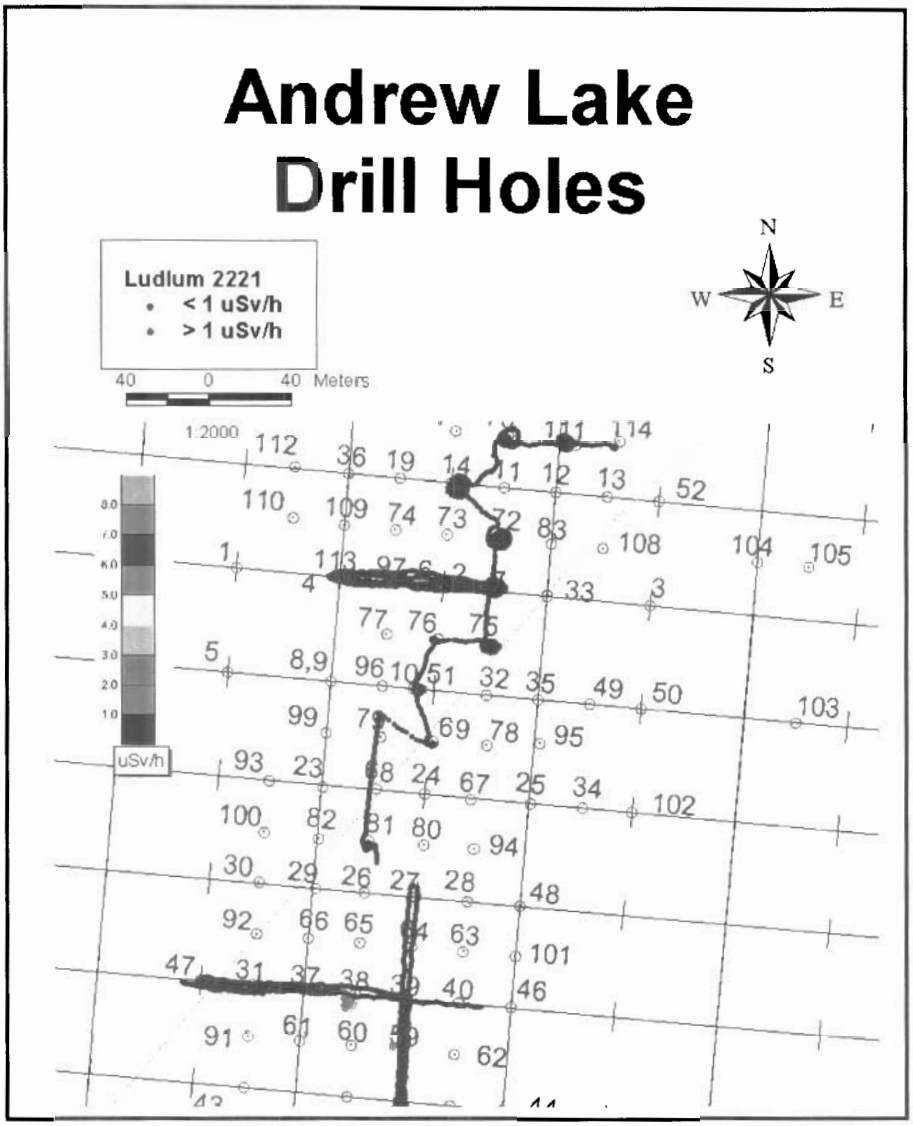


Figure 4.5-1 Andrew Lake Grid

5 ASSESSMENT FOR POTENTIAL CHEMICAL CONTAMINANTS

The preliminary site visit (see attached report in Appendix 2) identified various explosives and hazardous materials which required immediate disposition. Specifically, the following was identified:

- Laboratory Chemicals
  - Nitric and hydrochloric acids
  - Sodium hydroxide
  - Ferric sulphate
  - Potassium dichromate
- Explosives
  - an aluminium chest containing fused detonators
  - a number of unused "Bear Bangers" for scaring bears away from the campsite or the work areas.
- Fuel
  - Jet Fuel B helicopter fuel
  - Stove oil
- Calcium Chloride
- Lead Acid Batteries
- Paint

During the August site visit, the following actions were taken or plans made for the disposition of these materials.

5.1 Neutralization of Hazardous Chemicals

Acids and bases were neutralized using the procedure contained within Appendix 7. The remaining water, which was neutral pH, was disposed at the Kiggavik camp site. The potassium dichromate was neutralized by placing approximately 25 centimetres of sandy soil in the bottom of a 20 litre pail, adding 450 grams of white sugar, spreading the 10 grams of potassium dichromate over the surface and covering with an additional 25 centimetres of soil. The organic content offered by the sugar will ensure that the chromate is converted to the relatively non-toxic and immobile Cr(III) form as opposed to the Cr(VI) form which is known to have potential environmental implications. The pail was labelled "Contaminated Soil August 02" and will be transported from site for future disposal.

5.2 Explosive Materials

The explosive materials were destroyed on August 6/02 by Mr. Gary Bard, an employee of NWT Rock Services who is in possession of a valid blasting certificate. The fuses were cut from the detonators and burned in a 45 gallon drum using wood and cardboard as fuel. Detonators were destroyed in groups of four in the same manner. Upon completion, ashes were inspected for any undestroyed detonators; only two were located and these were subsequently destroyed by burning.

The "Bear Bangers" were also destroyed by burning.

5.3 Fuel

Several 205 litre drums of Jet Fuel "B" helicopter fuel and stove oil remain on site. Some of the helicopter fuel will be utilized on site for future inspections and clean up programs. The drums are sealed and laid on their sides to prevent water entry. Similarly, some stove oil will be utilized on site during camp demolition to assist in burning of buildings and other combustible materials. Some drums will be left for safety purposes. The remaining drums will be transported from site to Baker Lake for future sale or disposal.

5.4 Materials Requiring Future Removal

There are approximately 100 – 25 kg bags of granular calcium chloride stored on tarped pallets at the Andrew site. This material will be transported back to Baker Lake. Potentially, this material could be offered as a gift to the municipal government for use as a dust suppressant on local roads in the community. Other waste hazardous materials, including lead acid batteries, partial cans of paint, alkaline batteries and fuel-contaminated soil will be transported back to Baker Lake for safe disposal.

6 GENERAL ASSESSMENT OF SITE BUILDINGS AND MATERIALS

6.1 Description and Assessment

Figure 6-1.A illustrates the current camp and core shack / core rack arrangements at each the Kiggavik and Andrew Lake sites.

6.1.1 Kiggavik

The buildings at the Kiggavik campsite are constructed of plywood attached to a wooden frame. The roofs are slightly angled and covered with shingles and occasionally with tarps. The floors are plywood over a 2 x 8 joist system. The windows are wooden or aluminum sliders. Most of the doors and windows have been sheeted over with plywood.

A series of wooden walkways have been constructed (to protect the grass from being destroyed when walking) and join most of the buildings. The condition of these boardwalks is variable from fair to poor.

Some loose sheets of plywood and scraps of lumber are scattered throughout the site, and are mostly in poor condition.

The buildings are beginning to age and most show signs of leaking. Most, however, are structurally sound and would require only minor repairs to bring them back to operating condition. Most of the buildings still have the fuel drums needed for heating purpose; some have propane bottles.

1) *Kitchen/dining (#4 on Figure 6.1.A)* – The kitchen is the largest building in the Kiggavik camp site. The structure remains in good condition but has some water damage to the interior of the building. The porch at the back, containing the freezers, is substantially damaged by water.

2) *Core Shack (#10)* – The core shack is the second largest building. The roof shows extensive damage and has partially collapsed. The interior of the building has also suffered extensive water damage. This appears to be beyond repair.

3) *Personal cabins (11 units; #7)* – the majority of these buildings are in good shape structurally, but due to break-ins by weather, man and beast, are in need of a clean-up. Several show minor water damage due to leaks, while others, such as in the south part of the camp, show extensive damage due to long exposure from opened doors.

4) *Office (2 units; # 8) / Equipment (3 units; #3) buildings* – the office and equipment buildings are in structurally sound shape, but the materials inside show signs of water and weather damages.

5) *Showers/Dry (# 6)* – is still in structurally sound shape, with equipment inside. Next door are two small outhouses, not in great shape.

6) *General purpose cabin (# 11)* – is also in good shape

7) *Core Racks (#9)* – the core racks show signs of strain due to the weight of the core and exposure to the weather. None of the racks have yet spilled any core. Most remain boarded up with plywood to minimize the effects of the weather.

8) *Fuel Barrels* – several caches *(#14, #15 & #16 and #3)* of fuel barrels occur around the site. Several of the barrels contain Stove oil for heating purposes, others contain aviation fuel for the helicopter, and a large number are empty. Most of the stacked drums are in good shape.

6.1.2 Andrew Lake

The buildings -- core shack *(# 1 on Figure 6.1.B)* and a general purpose shack "drillers shack" together with the core racks are similar in construction to those at Kiggavik. However, they are newer and therefore generally in better shape. A frame from the core splitting tent is still standing on a plywood platform.

The core racks are mostly sheeted in with plywood with a few exceptions where the wood have been removed by the wind. Signs of strain are only slightly evident. The core shacks are in good condition with only minor water damage.

There are also empty core boxes, and 100 – 25kg bags of granular Calcium Chloride on a wooden platform.

There are several areas with fuel drums around this site. Most are empty and were used as stands to aid with shipping materials back to Baker Lake. Some eight drums containing radioactive cuttings are on a platform.

6.2 Repair / Demolition

Some repairs are in order to prevent the buildings from deteriorating further, while some of the buildings, such as the core shack at Kiggavik camp, have suffered too much damage and should be demolished.

The decision to retain and repair various buildings was based on the following considerations:

a) *The buildings COGEMA wish to keep on each site to facilitate exploration activities should they resume, and also to serve for safety purpose.*
b) *The buildings which would be able to stand safely and securely for the undetermined span of time before exploration resumes.*

6.2.1 *Maintenance and repair* will mean:

- Boarding the building by using available plywood specifically, sheeting the windows and doors.
- Re-shingling and weather proofing, (there are some shingles and tar available at the Kiggavik camp).
- Core racks showing signs of strains will be reinforced and sheeted again. Screws, not nails, will be used. Plywood and posts will come from buildings to be dismantled or from the ones on the ground.
- All the waste, debris, metallic garbage, appliances etc. will be moved to Baker Lake land fill, or if of any interest/salvage value, given to the community.
- Empty fuel drums, empty propane bottles will be moved to Baker Lake.
- Equipment to be kept at site will be moved from buildings to be dismantled into buildings to remain.
- The Kiggavik camp and Andrew Lake site will be left in safe conditions, and some cabins could serve as a "safe haven for prospectors and hunters".

6.2.2 *Demolition* will mean:

- Dismantling cabins, sheds, core racks, platform and wooden planking, unsafe or not any longer needed or unable to withstand more weather damages.
- Using salvaged wooden (plywood, timber) material for making boxes for moving to Baker Lake.
- All wooden materials, if not usable, will be burned.
- Any associated equipment or furniture will be disposed off (moved to Baker Lake for donation or land fill).

6.2.3 *Kiggavik Camp*

During the 2003 summer season:

6.2.3.1 Maintain / Repair

It is intended to maintain/repair:

- *the kitchen/dining cabin,*
- *6 (out of 11) personal cabins,*
- *the 2 office cabins,*
- *the general purpose cabin,*
- *2 (out of 3) out-houses,*
- *1 (out of 2) equipment cabins,*
- *the helicopter landing pad,*
- *the core racks,*

- *the wooden planking (presently existing) between remaining buildings.*

6.2.3.2 Demolition

Pending on time and resources, most of the buildings we do not intend to keep will be dismantled. Equipment inside of them will be stored in remaining buildings or moved to Baker Lake. The wooden material, pending its status, will be either used for maintaining or packaging, or burned on site (when there is snow on the ground and with a water pump nearby). It is intended to demolish:

- *5 (out of 11) personal cabins,*
- *the coreshack,*
- *the equipment building adjacent to the coreshack,*
- *the electric generator cabin,*
- *the shower/dry and, if possible during that season, the related waterline,*
- *the associated wooden planking.*

The radio tower was lowered in July 2002, and metallic elements may be used for generating posts for the fencing of the radioactive core racks at Kiggavik.

6.2.4 Andrew Lake Site

During the 2003 summer season:

6.2.4.1 Maintain / Repair

- *the core shack #1,*
- *the nearby outhouse,*
- *the helicopter landing form,*
- *the core racks (only the core reading less of 1µSv/hr will remain on this site).*

6.2.4.2 Demolition

- *all the tent platforms and the tent frame,*
- *the drillers shed*

6.3 Materials

No exhaustive list has been established but the materials remaining at the sites correspond to equipment needed for and during an exploration program. This ranges from various types of fuel and associated drums (empty or full, in good condition or used) to exploration equipment (tents, etc.) and accommodation gear (crockery, bedding, fridges and stoves), etc.

Pending its nature and status, the material may be packed up selectively in various boxes and moved back to Baker Lake. There it may be traded against labour hours invoiced by contractors in charge of moving the goods back to Baker Lake, or given to the Baker Lake inhabitants, or

disposed of in the landfill. COGEMA may also wish to freight back to Saskatoon some of the exploration equipment. Combustible material will be burned on site if of no further use.

Fig. 6.1.A Kiggavik Camp

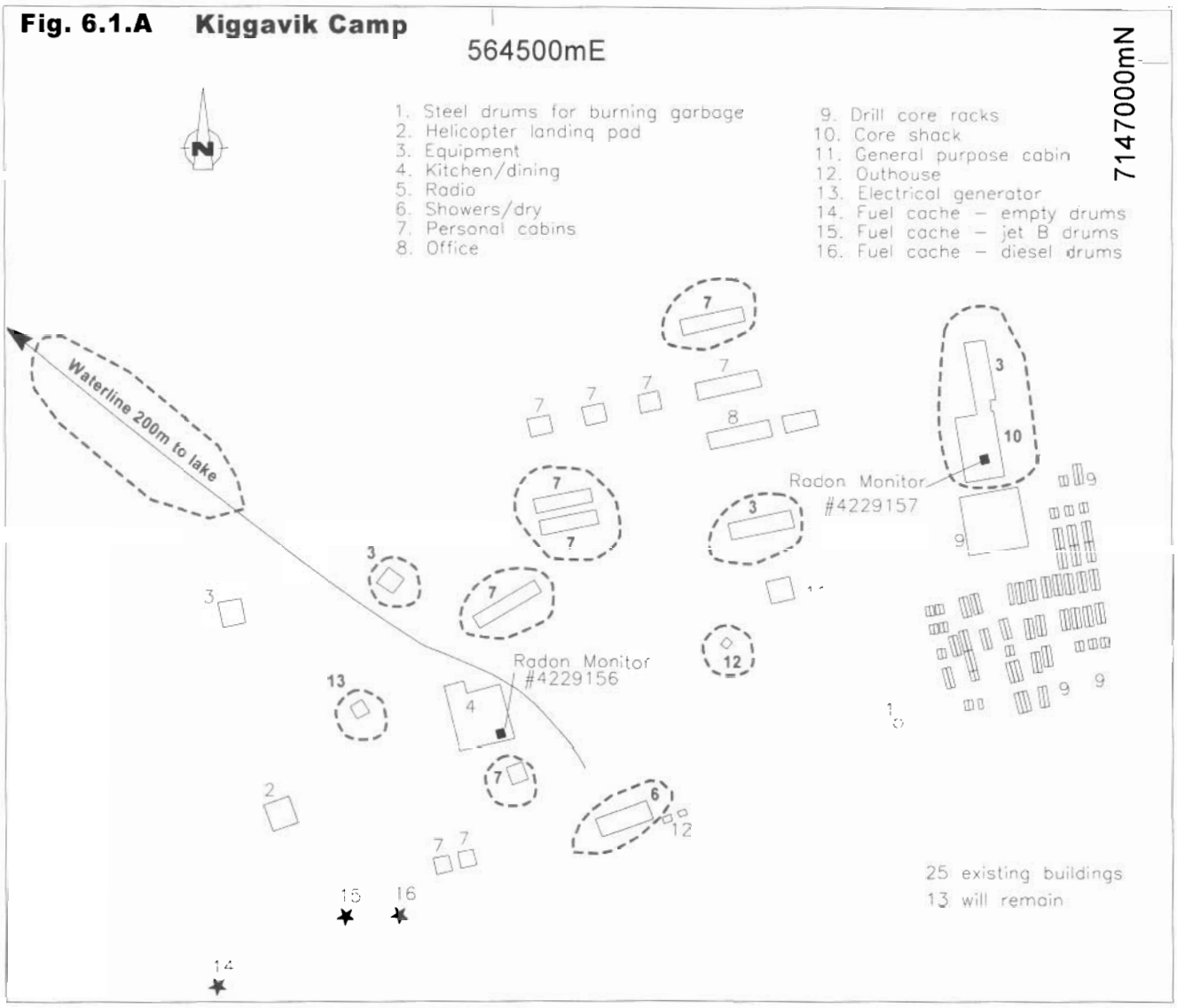
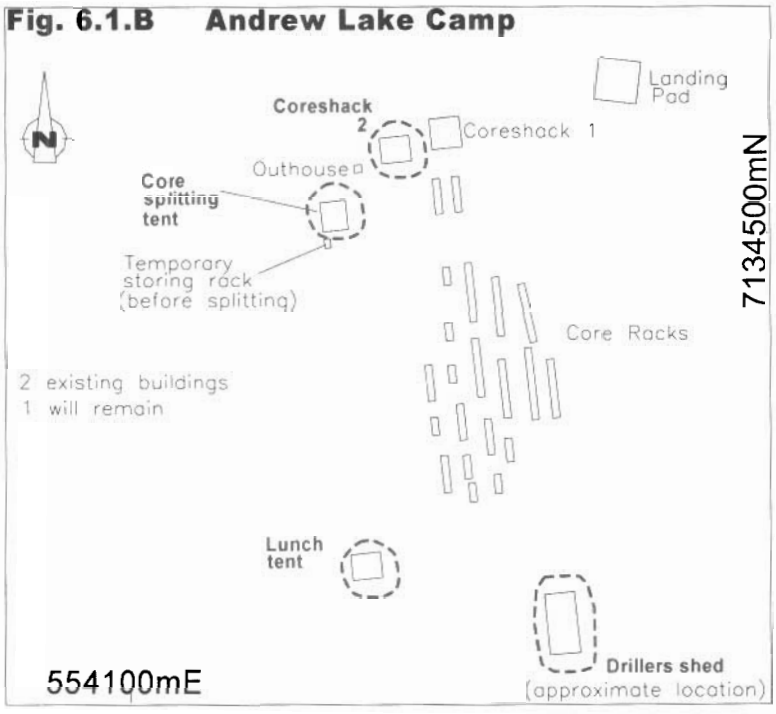


Fig. 6.1.B Andrew Lake Camp



KIGGAVIK / SISSONS AREA
Partial Decommissioning

Legend

To be dismantled

FULL SIZE SCALE (m)

0 100

1:1 500

Fig. 6.1

7 MISCELLANEOUS CLEAN UP ACTIVITIES

In addition to buildings and facilities at each of the exploration locations, there are numerous other issues which require some degree of clean up. Photos contained within Appendix 2 and 5, taken during the July 2002 and August 2002 site inspections, respectively, provide illustrations of many of these features.

7.1 Kiggavik Area

The drilling area is located immediately east of the camp area. The summer 2002 survey showed that elevated gamma readings > 1µSv/hr were not related to drilling activity. Therefore remediation will be not dictated by radiological concerns. Steel casing will be cut off at ground level. Drill steel will be disposed in the two trenches excavated within the grid. These are areas where the ore reserve came very close to surface and radioactivity measurements are naturally elevated. Following placement of all contaminated materials, the trenches will be backfilled using the native material blasted from them. Some of the markers (trigo points) will remain for future reference, as well as the wooden pegs used to mark the grids.

Core boxes which contain radioactive materials exceeding the threshold value (1µSv/hr will be moved and stored in a new separate core compound and then fenced with appropriate signs, including translation in Inutiktut.

All core racks will be repaired and secured as much as possible in the absence of heavy equipment.

Empty drums and propane bottles will be collected and secured for removal to Baker Lake. A few drums of stove oil and Jet Fuel B will remain on site for later use. The elements of the dismantled communication tower will be utilized in the construction of the new core compound. Contaminated soil near the electrical generator building, at the stove oil supply sites behind each cabin and around the fuel cache sites will be collected in drums and moved to the Baker Lake landfill. Miscellaneous combustible debris which has been blown around and adjacent to the camp site will be collected and burnt.

7.2 Andrew Lake Area

The grid survey of the drilling area will be completed. Radioactive cuttings will be identified through a gamma survey and will be collected, placed in drums and transported to the trenches on the Kiggavik site for final disposal. As with the Kiggavik area, any drill steel will be cut off at ground level and transported for trench disposal.

Radioactive core identified in the existing core racks will be separated and transported to the Kiggavik new fenced area for storage.

All remaining empty drums, stove oil and Jet Fuel B will be moved to Kiggavik in preparation for final transport to Baker Lake. Remaining equipment and debris will also be collected, burned where possible or prepared for transport to Baker Lake.

7.3 End Grid

This grid will be completed like the Andrew Lake grid (Ludlum detector + GPS) and any radioactive drill site cleaned similarly, with cuttings put in containers and moved to Kiggavik trenches.

Any waste material will be removed (pails, drums, pieces of equipment) and any protruding steel casing will be cut off at ground level and the steel moved to Kiggavik and then to Baker Lake.

The area surrounding the grid will be flown and debris collected and disposed off conveniently (burning, Kiggavik / Baker Lake).

7.4 Pointer Lake Core Storage

There should not be anything of concern on this site where only wooden debris will have to be disposed by burning.

7.5 Other Locations

The various areas, not described above, and where drilling took place over the years will be flown and inspected. The following actions will be taken as required:

- Protruding steel casing will be cut off at ground level and transported to the Kiggavik trenches for final disposal.
- Radioactive cuttings (highly improbable in most of the cases) will be identified by gamma survey and collected for Kiggavik trench disposal.
- Miscellaneous debris / pieces of equipment will be collected and consolidated at Kiggavik site for eventual transport and disposal at the Baker Lake landfill.
- Some "loose drums" were already sent to the Kiggavik camp in August; there may be some more remaining.

7.6 Conclusions

At the end of the 2003 summer program, the number of buildings should have been considerably reduced (by half), the "equipment" put in boxes and ready to be moved to Baker Lake. It is proposed to leave a few drums of stove oil and Jet B fuel at Sissons/Andrew Lake and at the Kiggavik camp for safety purposes. Radioactive cores will be stored in a single place (at Kiggavik), within a fenced boundary with signs identifying the radioactivity.

Normally, after this partial decommissioning, it should not be necessary to come back to Andrew Lake; this may be different for Kiggavik where the task is much more important.

In any case, the wooden pegs still on the grids will be left. The remaining buildings should not constitute a problem for safety or even aesthetics.

8 SUMMARY OF FUTURE CLEANUP PLANS

8.1 Immediate Clean Up

COGEMA are planning an initial clean up of the sites for the summer of 2003. The following is a description of the work which is intended.

8.1.1 Kiggavik Site

- Separate the core to remove those boxes which contain mineralization yielding a gamma reading of 1 µSv/hr or greater. Relocate these core boxes to a new fenced core rack compound constructed near the existing site and post signs warning of radiological field.
- Repair whenever possible the remaining non-radioactive core racks such that they will remain until final decommissioning.
- Cut off all remaining drill steel within the drill grid at ground level.
- Complete trench covering using the steel pipe cut from protruding drill holes and the native material initially blasted from the trenches.
- Prepare (by stacking and packing) fuel, hazardous materials, equipment, empty drums and other metallic materials for transport to Baker Lake at the end of the upcoming winter when soft-tired tundra trucks can be used. Clean up, organize and secure the equipment to be left on site in the event that further drilling at the sites may be required at some time in the future.
- Reduce the number of buildings at the site by burning those structures (or using otherwise the materials) which will not be required any further.
- Retain a few drums of stove oil within one of the remaining buildings to allow for the final clean up and burning of buildings and wooden structures. Retain a few drums of Jet Fuel B for helicopter use during final decommissioning. Some drums will also be kept for safety purposes.

8.1.2 Andrew Lake Site

- Separate the core to remove those boxes which contain mineralization yielding a gamma reading of 1 µSv/hr or greater. Relocate these core boxes to the new fenced core rack compound constructed at the Kiggavik site.
- Repair the remaining non-radioactive core racks such that they will be secure until final decommissioning.
- Complete the radiological survey within the drilling area and collect contaminated cuttings from drill holes where the radiological assessment indicated gamma readings in excess of 1µSv/hr at 1 metre above the ground surface. Place this material in drums for transport to the Kiggavik trenches where it will be disposed.

- Reduction of the gamma readings to less than 1µSv/hr can be achieved by one of two methods or a combination of the two methods.
    - Remove radioactive cuttings (transfer them into metallic drums which will be disposed within the Kiggavik trenches) until the readings drop below 1µSv/hr.
    - Shovel clean dirt (taken in the vicinity) on top of the elevated collar areas until the readings drop below 1µSv/hr.
- Cut off all remaining drill steel at ground level and dispose of the steel in the Kiggavik trenches with the cuttings.
- Prepare (by stacking and packing) fuel, hazardous materials, equipment, calcium chloride, empty drums and other metallic materials for transport to Baker Lake at the end of the upcoming winter when soft-tired tundra trucks can be used. Retain a drum of stove oil within the core shack to allow for the final burning of the core shack.
- Burn all buildings and wooden structures (or otherwise use the material), with exception of the core shack.

8.1.3 Other Locations

8.1.3.1 End Grid Boreholes

- Complete radiological survey of the grid to identify drill sites with readings >1µSv/hr
- Proceed as for Andrew Lake grid with potential contaminated cuttings, steel casing, debris, etc. to complete the cleanup
- After the above tasks are carried out, no further work will be required in this area.

8.1.3.2 Pointer Lake Core Storage

- The initial survey has confirmed that no core boxes contain core exceeding 1 µSv/hr
- Repair the core racks such that they will be secure until final decommissioning
- Collect and burn all surplus wooden materials

8.1.3.3 Other Locations

- Fly over the areas not listed above (like Granite, Bong etc. see Map 0292-606) and check for abandoned materials and waste. Collect and transport non-burnable waste to Kiggavik camp and then to the Baker Lake landfill.

8.2 Conceptual Decommissioning Plan

The program planned for 2003, as described in the previous section, will complete the majority of outstanding work at the site. However, there will be a few buildings, drill core and some

equipment remaining on the site in the event that a further program may be considered at a later date.

Financial assurances are currently in place with the Kivalliq Inuit Association ($82,780) and Indian and Northern Affairs Canada ($74,720). Copies of these documents are included as Appendix 8. These financial assurances were calculated based on remediation of the site prior to the work to be conducted in 2003 and, after that work is completed, will be far in excess of the funding actually required to complete the clean up. However, COGEMA is prepared to retain these financial assurances until final clean up is complete to ensure the above regulators are suitably indemnified from any future liability with regard to the Kiggavik Sissons Project.

The remaining work which we envision will be required to complete the decommissioning will include:

8.2.1 Kiggavik Site

- Transport radioactive core and cuttings to McClean Lake for long term storage or milling.
- Dispose of non-radioactive core on the ground and dismantle core racks if requested.
- Burn all remaining buildings, core boxes and wooden materials.
- Prepare (by stacking and packing) all remaining metal and non-combustible objects for removal the following winter.

8.2.2 Andrew Lake Site

- Dispose of non-radioactive core on the ground and dismantle core racks if requested.
- Prepare (by stacking and packing) all remaining metal and non-combustible objects for removal the following winter.
- Burn all wooden materials including core boxes and the core shack.

8.2.3 Pointer Lake Core Storage Site

- Dispose of non-radioactive core on the ground and dismantle core racks if requested.
- Burn all core boxes and wooden materials.
- Prepare (by stacking and packing) all remaining metal and non-combustible objects for removal the following winter.

The storage permit from Indian and Northern Affairs Canada has been extended for an additional two year period, expiring September 20, 2004. A copy of this authorization is included as Appendix 9. Negotiations are ongoing with the Kivalliq Inuit Association to extend their licencing period, which currently expires in April 2003, for a similar time period. COGEMA will further assess the situation prior to the expiry of the extended licencing period to decide on a further extension or, alternatively, undertake final site closure.

Disposal of non radioactive core on the ground and dismantling of the core racks will be undertaken if requested. Several provinces of Canada, request that the exploration company properly store the core as to ensure a "book library" for reference for future explorers. The policy of the Nunavut is still to be clarified.