WORK PLAN FOR DETAILED SITE ASSESSMENT, PRELIMINARY WASTE CONSOLIDATION AND REMEDIAL ACTION PLANNING AT THE FORMER CAM-F INTERMEDIATE DEW LINE SITE AT SARCPA LAKE

Prepared by: Environmental Services, Western Region
Real Property Services
Public Works and Government Services Canada

April 2004

1.0 INTRODUCTION

The Department of Indian and Northern Affairs Canada (INAC) wishes to implement a remedial action plan at the abandoned intermediate DEW Line site CAM-F, located at Sarcpa Lake, Nunavut. In order to develop a detailed remedial action plan, additional assessment activities are necessary to quantify the volume of contaminated soil and hazardous materials at the site and to conduct a waste audit on all non-hazardous materials. It has also been recognized as necessary to identify potential gravel and rock borrow sources and a suitable locations for an engineered landfill.

The former DEW Line site was constructed in 1957 and subsequently closed and abandoned in 1963. The site was converted to a scientific research station in 1977 under the auspices of the Science Institute of the Northwest Territories and INAC. In 1985, a hazardous materials removal program was implemented with the removal of hazmat found in equipment and surface contaminants. Assessments completed in 1987/88 and 1994 have confirmed the presence of various hazardous materials and contaminated soil. In 1989, a partial clean up of PCB contaminated walls and floors at the station was carried out to limit the exposure of workers to PCBs. An asbestos abatement program and clean up of Dump A was carried out in 1997.

The future project consists of an evaluation of the existing information regarding hazardous materials and contaminated soil at the site, identification of any information gaps and the implementation of a detailed assessment plan to delineate contaminants. Based on this information a remedial action plan will be developed for the site and implemented in 2005.

2.0 BACKGROUND

Environmental assessment of the CAM-F DEW Line site was initiated in 1986 when DND and Environment Canada visited the site to remove contaminants such as PCBs and POLs and identify areas of buried materials that could pose environmental risks in the future. Their findings identified a number of drum caches with many of the drums still containing product. These were left in-place. Removal of PCB containing equipment was conducted and elevated PCB concentrations were noted in soil samples at several areas. Various sampling and clean up activities have been conducted at the site during the 1990's.

The site was revisited in 1994 by the Environmental Sciences Group of Royal Roads Military College at which time a detailed surface soil sampling program was completed. Their investigations identified soil contamination exceeding Tier I and Tier II DCC criteria near the module train, garage, warehouse, dumps, crashed aircraft and construction camp. However, these investigations did not include assessment of hydrocarbon contamination that has the potential to be a significant source of contamination at the site. Analysis of paint, barrel contents and asbestos has also been conducted.

3.0 OBJECTIVES

The objectives of this project include:

- Review all previous information gathered for the site regarding on-site landfills, physical debris, contaminated soils, and hazardous materials;
- Conduct detailed site assessment activities to:
    - Quantify the volume of contaminated soil at the site. This will include soil contaminated with heavy metals, PCBs, and petroleum hydrocarbons.
    - Quantify the volume of hazardous materials at the site, including asbestos containing materials and paint containing PCBs and/or lead.
    - Quantify the volume of liquid waste that can be incinerated on-site (hydrocarbons) or requires southern disposal (PCB-containing oil, chlorinated or metal-containing hydrocarbons).
    - Identify potential locations for an engineered landfill for the disposal of non-hazardous waste.
    - Assess landfill condition and determine if leachate is being released to Sarcpa Lake
    - Design and install temporary containment system to capture leachate from landfill, if necessary
    - Identify borrow sources to supply enough granular material for the construction of the landfill by way of a full geotechnical evaluation.
    - Complete a human health and ecological risk assessment at the site. This will likely include the collection of flora, fauna, and sediment samples.
    - Evaluate the condition of the runway.
- Initiate drum consolidation and crushing program at the site.
- Removal of 164 drums of PCB contaminated soil, 1 drum of PCB oil and a small quantity of an unknown hazardous substance (suspected to be a solvent)
- General site clean up activities
- Prepare a detailed design for site remediation and restoration activities.

4.0 SCOPE OF WORK

The scope of work includes, but is not limited to the following tasks:

PROJECT COORDINATION

Project coordination between INAC and PWGSC will be crucial to the success of this project. Roles and responsibilities must be clear and communications lines mapped out and maintained.

As mentioned, communication is crucial to the success of the project and will be the cornerstone to success. In order to ensure this happens three distinct activities will be maintained throughout the project.

1. Weekly teleconferences will held between the INAC Project leader and the PWGSC Project Manager. Although meetings may not be possible every week it is important to be diligent in trying to achieve this. PWGSC will produce a brief summary from each call.
2. Monthly Progress/achievement reports will be produced each month by PWGSC no later that the 5th of the following month beginning in May 2004. The reports will outline progress, deficiencies and budget issues.
3. Quarterly meetings between INAC and PWGSC will be held. Locations will rotated between Edmonton and Ottawa (other locations may be substituted, as required). Other parties may be invited as required.

PLANNING AND DESIGN

A detailed review of all previous site information will be conducted in order to determine any information gaps and identify what additional site information is required for the preparation of a remediation specification. Applicable previous site information includes the assessments completed in 1985 and 1993.

Based on the review of the site information, community consultation will be initiated to introduce the objectives of this year's site activities to the communities in the surrounding area. It is important to involve the communities at the inception of the project in order to establish a working group and have them form an essential part of the project team. As part of the community consultation, INAC and PWGSC project managers will meet with members of the community to obtain a local perspective on the current use of the facilities at the site and the availability of heavy equipment and labourers from the community. The community consultation component of this project will continue throughout the duration of the project to ensure that the community is informed about the activities, results, and plans regarding the site, and are active participants in the RAP development. An effort will be made to also meet with regulators in Iqaluit during each trip to Hall Beach to provide updates of the project status and planning. The provision for an air charter to take key community members/stakeholders and regulators to the site during the 2004 field season has been built into the work program.

A preliminary site visit was conducted in mid-March 2004 to survey the terrain to the site along the Cat train route used in the past. Previous reports have characterized the terrain at the site as rugged with rocky soil and outcrops. The ground and lake was snow covered during this preliminary trip. The site visit was essential to allow the project team to determine what tasks can be completed this year, what equipment will be necessary to complete the work and logistical issues associated with stocking and supporting the camp. This information will be critical for the preparation of the tender document that will specify the camp and equipment requirements for the site assessment work this summer. Meeting with the community members, QIA and H&TO was an equally important element to the site visit to initiate the structuring of a working group for this project.

Interviews with personnel who have previous experience at the Sarcpa Lake Intermediate DewLine site will be a necessary in order to obtain valuable information regarding previous site activity. Various community members have been identified as having considerable knowledge of what occurred at Sarcpa when the site was operational. Mr. John Pollen conducted previous site assessment work at Sarcpa Lake and he will be utilized for review services of future assessment work plans, regulatory submissions and the 2004 assessment results.

Once the detailed scope of work has been finalized, permit applications will be prepared. Permits that will likely be required will include a Land Use Permit, a Water Use Permit, and a permit for all site assessment activities. As part of the permit package, an assessment as defined by CEAA will be completed regarding the proposed activities.

The final component of the planning phase will be the preparation of the tender document for the supply of a camp, heavy machinery, and labourers for support services this year during all site activities. An aboriginal set aside contract will be obtained for the support services in 2004. It will also be necessary to prepare various terms of references for the procurement of engineering services. External engineering services will be retained to complete the assessment activities proposed for the site. A quantitative human health and ecological risk assessment will be conducted and may be used to establish site specific risk based criteria that should dictate what the remedial program for CAM-F will look like. The assessment team will also include geotechnical experts, site surveyors, and PWGSC and DIAND representatives. It is anticipated that camp size will be in the order of 15 to 20 people and will be staffed from mid-July to mid-August.

FIELD PROGRAM

CAMP CONSTRUCTION

The field program will commence in late May and will include the mobilization of support equipment from Hall Beach to Sarcpa Lake. In early July, mobilization of any other necessary smaller pieces of equipment and supplies will be completed. This will be supported by fixed wing aircraft. The camp will be constructed in mid-July when the assessment activities are to commence.

ASSESSMENT ACTIVITIES

Assessment of Existing Landfills

Two landfills have been identified at the site. Dump A is located east of the POL tanks and its depth has been previously estimated to be 6 meters. In 1985 PCB capacitors were removed and activities from 1994 to 1997 included the removal and containerization of all CEPA and some Tier II impacted soil. Waste on the surface was separated into hazardous and non-hazardous materials. Following the 1997 excavation activities it was estimated that 300 m^3 of Tier II soil and 130 m^3 of Tier I remains in the dump. Dump B is located north of the POL tanks and depth of material rarely exceeds 1 meter with minimal cover. It contains heavy equipment, wooden beams, barrels, electrical equipment, air

ducts, beds, shelves, snow fencing, tanks, batteries, etc. There exists Tier I impacted soils and 110 bags of asbestos containing materials were removed in 1997.

Assessment activities associated with the existing landfills will include:

- Delineation of the landfill boundaries.
- Identification and quantification, if necessary, of hazardous materials in the landfill including contaminated soil.
- Determining if the landfill is releasing deleterious substances into the surrounding environment.

If it appears that contaminant is being released from the dump area to the environment a temporary containment strategy will be designed and implemented in 2004. This containment will have a 1 year design life as the final site closure and clean up plan is to be implemented during the summer of 2005.

Contaminated Soil Delineation
Areas of soils contaminated with heavy metals, PCBs, and/or petroleum hydrocarbons have been identified at the module train area, garage area, warehouse area, dumps, construction camp and crashed airplane site in previous reports. Further soil sampling is required to delineate the areal and vertical limits of the contamination on-site. During the landfill assessment work it will be determined if contamination is being released from the landfill area to Sarcpa Lake.

Hazardous Materials Inventory
A hazardous materials inventory will be completed at each of the structures remaining at the site. The inventory will identify and quantify materials which will require specialized disposal such as asbestos-containing materials, paint containing lead and/or PCBs, and PCB-containing equipment. Also included in this activity will be sampling of barrels containing liquid. Based on the barrel sampling program, estimates of the volume of liquid which can be incinerated on-site, shipped south for disposal, or disposed of on-site will be produced.

Drum Assessment
There are approximately 7000 drums at the site. Some have been previously assessed to determine if they are empty or still contain a petroleum liquid. Some of the drums contain unknown liquid and solid wastes. A full assessment will be conducted to determine the type of material within each barrel. Weights and type of solid wastes will be documented for the barrels that contain debris. This will be performed by investigating a percentage of the barrels that contain solid wastes. All barrels that contain unknown liquids will be sampled and the sample submitted to an accredited laboratory that can identify the liquid material type.

Assessment of New Landfill Location and Borrow Sources
It is anticipated that the comprehensive remediation activities planned for this site will potentially generate a substantial volume of hazardous and non-hazardous waste. The

construction of an engineered landfill at the site for the disposal of the waste is an option that may be implemented. Investigations are required to confirm if this is a viable option. Specifically, it needs to be determined if there is an appropriate location with adequate space for the volume of waste requiring disposal and if there is sufficient granular material from borrow sources to construct the landfill. A site survey will be conducted to tie in all structures, borrow sources, landfill areas and assessed locations. This survey will be useful in creating a complete drawing of the entire site including all buildings, landfills, sampling locations, impacted areas, borrow sources, etc.

Site Specific Risk Assessment

A site specific risk assessment will be completed at the site this year to quantify the risk to human and ecological receptors at the site from the identified contamination. The results of the risk assessment may establish the level of effort required to reduce site environmental liability to an acceptable level. PWGSC – Environmental Services recommends that a site specific risk based approach be taken for all DewLine and military sites to be reclaimed in the future. It will be INAC's task to determine what clean up protocol will be implemented.

Sarcpa Lake Assessment

A sampling program will be conducted to assess the condition of lake bottom sediments in Sarcpa Lake. Approximately 40 sediment samples will be collected from the Sarcpa Lake bottom and analyzed for PCBs, hydrocarbons and total metals. It will also be necessary to obtain background samples from areas of the lake that are believed to be not affected by previous site activities. An electromagnetic survey and an underwater video camera will be utilized to determine if debris has been dumped into the lake in previous years. Options will be explored to conduct the EM survey during the July 2004 site assessment activities, however this activity may be more easily conducted on the winter ice.

Airstrip Evaluation

Previous assessment reports from the site have identified that the 1100 meter runway is in fair condition, however can be quite soft during the summer months. The condition of this airstrip needs to be confirmed. The investigations completed at the site this year will address what measures are necessary to bring the runway to a working condition. The status of the runway will have a major impact on the design of the remediation plan for 2005.

PCB DRUM REMOVAL

A qualified hazardous material abatement contractor will be retained to handle, transport and dispose of the 164 drums of PCB impacted soil that are currently being stored in the warehouse on site. These soils were removed from the area adjacent to Dump A from 1994 to 1999. It has been recognized that the safest and most cost effective option for transporting the drums from Sarcpa Lake to Hall Beach will be by air.

An option considered for the disposal of the drums involved moving them off site in early June 2004 once a contract is obtained for the 2004 field support services. The contractor could haul the drums over the land and lake prior to the spring melt and store them in Hall Beach until the sea lift arrives in early September. This activity brings upon the risk of dumping a load of PCB soil into the lake in the event that the contractor breaks through the ice. The more desired alternative is to fly the drums out to minimize this risk. Another advantage of this option is that the transportation could be timed properly to meet the sea lift in Hall Beach, thus eliminating the need for an alternate temporary PCB storage facility. It will be the hazardous material contractor's responsibility to determine how and where the soils are disposed of. The contractor will be responsible for all waste manifests and health and safety for the associated work items.

In addition to the drums containing PCB soils, there have been a few containers previously identified as containing hazardous materials. Specifically it has been identified that a drum containing PCB oil and a small 4 liter container of solvent is located in the warehouse. Removal and disposal of these items can be included in the PCB drum removal contract, if necessary.

WASTE CONSOLIDATION

Approximately 7,000 drums have been identified at various locations within the site; many of these are reported to be empty. Using local Inuit labourers, the dry empty barrels strewn around the site will be collected and returned to a central location for crushing. Barrels that contain liquid or are adjacent to a waterway will be left in-place and included in the comprehensive remediation program to be implemented in 2005. Any drums found with debris within will be assessed. The weight of debris within the drums will be estimated and a survey of the contents will be conducted.

The benefit of initiating this activity in 2004 relates primarily to the effect it will have on the surrounding communities. The specific benefits of this task include:

- generate local employment opportunities for Inuit.
- Allowing Inuit labourers to job-shadow during the assessment activities and provide them with a better understanding of assessment activities.
- Allowing the local communities to take an active role in cleaning up the site which will facilitate cooperation between INAC and the community groups.

OPERATIONAL ISSUES

There have been various work items that have been identified as necessary tasks to bring the site to regulatory compliance and reduce the associated liability that is inherent of such a site. Such tasks will be completed during the 2004 summer work program along with others that are deemed necessary in the immediate future. A warehouse floor plan drawing that indicates the exact size and type of PCB storage facility that is currently being used and the location of all doorways will be developed. The drawing will indicate

the exact location of all PCB soil containing drums and their quantity. The assessment work conducted will include an estimate of each barrel's weight. It has been identified that a number of pallets exist in front of the warehouse overhead door. These pallets create a physical and fire hazard and will moved this summer. Any additional minor work items or operational issues identified as necessary tasks in the near future may be incorporated into the work program in 2004.

USE OF LOCAL INUIT LABOUR

Any opportunity to use local labour will be included into this year's program. It has been identified that locals can participate in many of the 2004 activities such as general clean up, site assessment, job shadowing during geotechnical evaluation and risk assessment work and barrel consolidation and crushing. It will be requested that 6 labourers be hired by the general contractor supplying the camp, equipment and support services for site activities in 2004.

DETAILED DESIGN FOR SITE REMEDIATION

Based on the results and reports generated from the assessment activities a comprehensive site remediation work plan will be developed for the site. The detailed remediation design will reduce the environmental liabilities present at the site. This plan will incorporate other key factors such as INAC policies, community concerns, clean up criteria and risk management techniques. It is anticipated that this detailed work plan and project description will be finalized in late November. This should allow sufficient time to consult with the local communities, obtain all necessary regulatory approvals and obtain a contract for the work to commence in 2005.

In order to properly identify environmental liabilities at the site, it will be necessary to finalize remediation criteria. These criteria may be site-specific risk-based criteria developed from the risk assessment activities or they may be more general criteria such those defined in the *General Protocol for DEW Line Clean Up*. This has not yet been determined by INAC however an approach must be chosen prior to finalizing the detailed clean up plan. Once the remediation criteria have been established, the environmental liabilities can be quantified. Based on the volumes of hazardous and non-hazardous waste at the site, PWGSC can evaluate disposal options at the site. These options include the construction of an engineered landfill for hazardous and/or non-hazardous solid waste and shipment of hazardous waste south for disposal. These options will be evaluated based on the value they provide to the Crown, the fiscal resources available to the project, and the degree that they reduce the environmental liabilities at the site.

During remediation planning, representatives from the surrounding communities will be involved in order to utilize their knowledge of the site and determine the local support services available. It is imperative that the final plan meets their requirements and they are included from project planning to final site closure and future monitoring. This may include training of local labourers during the project in order to establish their buy in and

involvement for the entire project. Through the community representatives, PWGSC and INAC will be able to assess the level of community acceptance for the use of site-specific risk-based criteria at the site.

It is imperative that the successful contractor has adequate time to coordinate the mobilization of supplies to the site in 2005. In order to mobilize all equipment required for the work in Sarcpa Lake it will be necessary to utilize the sea lift that leaves Montreal in early August 2005.

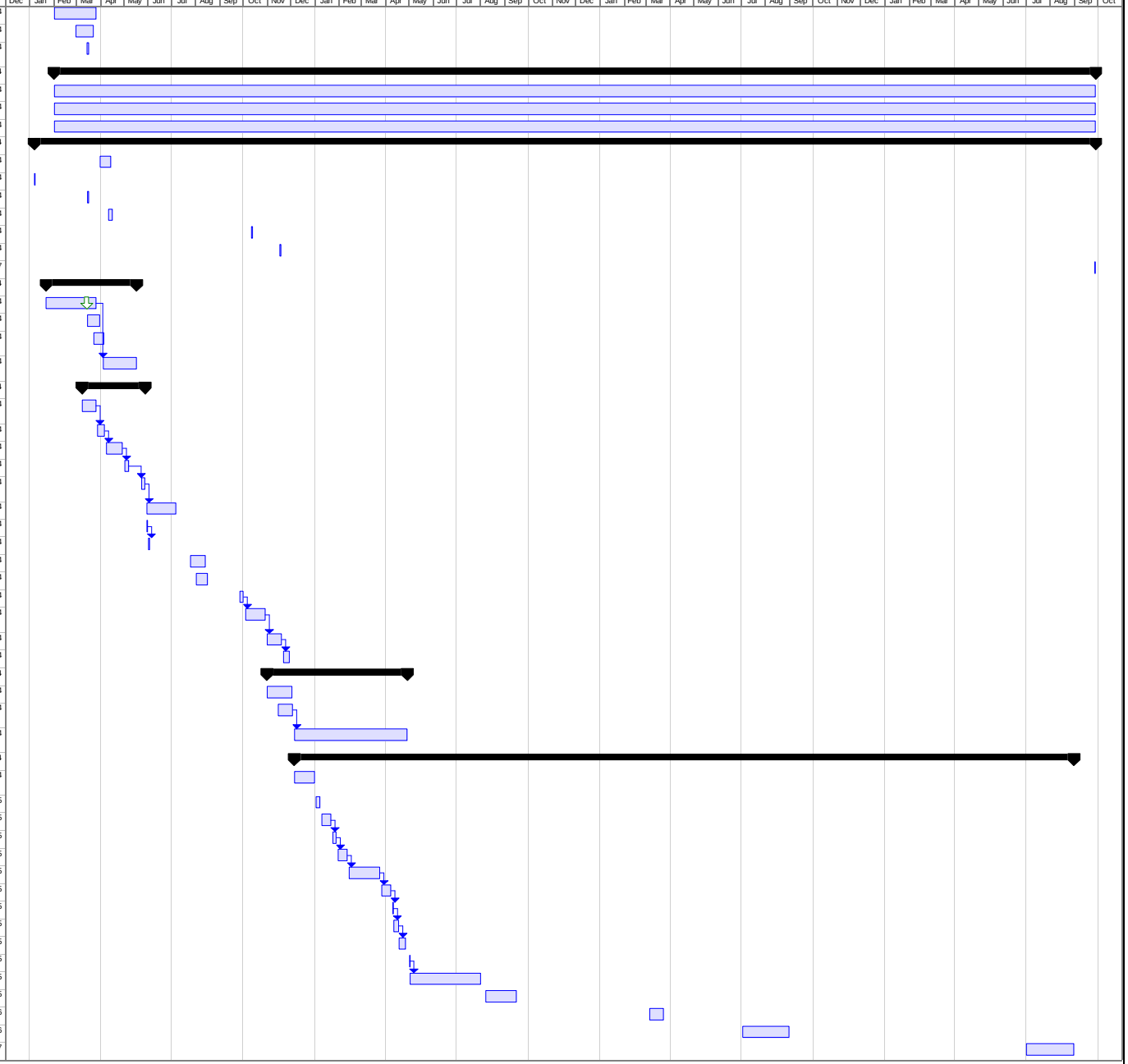
The detailed specification for the entire site clean up is currently at 75% completion. PWGSC – Environmental Services have developed a generic specification suitable for the clean up activities to be performed at Sarcpa Lake and it only needs to be modified following the collection of more site specific details. Once the tender document has been finalized and accepted it will be posted on MERX to obtain a qualified contractor for the work. The attached gantt chart displays the anticipated schedule with associated milestones.

5.0 SCHEDULE

A Gantt chart depicting the 2004 project schedule is provided as Figure 1.

Remediation of CAM-F (Sarcpa Lake) Former Military Station

ID	Task Name	Notes	Duration	Start
1	Review previous reports	PW	41 days	Mon 2/2/04
2	Program Options Review & Selection	PW	18 days	Mon 3/1/04
3	Site Visit #1 - Preliminary site inspection and winter access evaluation	PW/DIAND	3 days	Mon 3/15/04
4	**Project Coordination**	**DIAND**	**956 days**	**Mon 2/2/04**
5	Weekly Conference Calls	DIAND	956 days	Mon 2/2/04
6	Monthly Progress Reports	DIAND	956 days	Mon 2/2/04
7	Quarterly Meetings	DIAND	956 days	Mon 2/2/04
8	**Community Consultations**	**DIAND**	**973 days**	**Thu 1/8/04**
9	Establish Working Groups	DIAND	10 days	Thu 4/1/04
10	Meeting #1 - Project Intro to Communities	DIAND	1 day	Thu 1/8/04
11	Meeting #2 - QIA and H&TO	DIAND	2 days	Tue 3/16/04
12	Meeting #3 - Project detais & Org Structure	DIAND	5 days	Mon 4/12/04
13	Meeting #4 - Assessment Results	DIAND	2 days	Tue 10/12/04
14	Meeting #5 - Final Work Plan Delivery	DIAND	2 days	Wed 11/17/04
15	Closeout meeting	DIAND	2 days	Thu 9/27/07
16	**Regulatory Approvals - Assessment Activities**	**PW**	**83 days**	**Fri 1/23/04**
17	Preperation (investigation)	PW	47 days	Fri 1/23/04
18	Finalize project description	PW	12 days	Tue 3/16/04
19	Prepare and submit land use and water use applications	PW/DIAND	9 days	Wed 3/24/04
20	Project review by NIWB/CEAA/DFO/DOE/Land Use Board	PW	31 days	Mon 4/5/04
21	**Equipment Supply Contract**	**PW**	**60 days**	**Tue 3/9/04**
22	Prepare Equipment & Camp Supply Spec #1 for July Site Assessment	PW	15 days	Tue 3/9/04
23	French Translation for Spec #1	PW	7 days	Mon 3/29/04
24	Tender Period Spec #1	PW	15 days	Fri 4/9/04
25	Award Contract #1	PW	5 days	Mon 5/3/04
26	Mobilize Equipment and Camp from Hall Beach to Sarcpa Lake	PW	5 days	Mon 5/24/04
27	Obtain assessment and HazMat Removal contracts	PW	28 days	Mon 5/31/04
28	Establish Criteria for site restoration	DIAND	1 day	Mon 5/31/04
29	Meeting - DIAND/PW review and work plan refinement	PW/DIAND	2 days	Wed 6/2/04
30	Additional site assessment activities	PW	15 days	Mon 7/26/04
31	Laboratory Analyses	PW	11 days	Mon 8/2/04
32	Obtain all reporting	PW	5 days	Mon 9/27/04
33	Pepare and submit draft work plan for entire site clean up to DIAND	PW	20 days	Mon 10/4/04
34	Review and Approval of work plan by DIAND and QIA	DIAND	15 days	Mon 11/1/04
35	Finalize work plan and project description	PW	6 days	Mon 11/22/04
36	**Regulatory Approvals - Site Construction**	**PW**	**130 days**	**Mon 11/1/04**
37	Complete an Environmental Impact Assessment	PW	24 days	Mon 11/1/04
38	Prepare & submit land/water use applications and CEAA to Agency	PW	15 days	Mon 11/15/04
39	Project review by Nunavut WB/LB/NIRB/Federal Res. Authorities	PW	105 days	Mon 12/6/04
40	**Construction Contract**	**PW**	**715 days**	**Mon 12/6/04**
41	Prepare Construction Spec #2 for Entire Clean-up Program	PW	20 days	Mon 12/6/04
42	Approval of Specification	PW	5 days	Mon 1/3/05
43	Prepare and submit Requisition, RMP, PAAA	PW	10 days	Mon 1/10/05
44	Procurement Plan Review and Approval	PW	5 days	Mon 1/24/05
45	Prepare Tender Documents and Post on Merx	PW	10 days	Mon 1/31/05
46	Tender Period Spec #2	PW	30 days	Mon 2/14/05
47	Tender close and evaluation	PW	10 days	Mon 3/28/05
48	Recommend Award	PW	1 day	Mon 4/11/05
49	Minister Approval to Award	PW	5 days	Tue 4/12/05
50	Obtain Documents from Contractor	PW	7 days	Tue 4/19/05
51	Contract Award	PW	1 day	Mon 5/2/05
52	Prepare equipment	PW	65 days	Tue 5/3/05
53	Transport equipment from Montreal to Hall Beach	PW	30 days	Mon 8/8/05
54	Mobilize equipment from Hall Beach to Sarcpa Lake	PW	14 days	Mon 3/6/06
55	Summer 2006 Construction Season #1	PW	44 days	Mon 7/3/06
56	Summer 2007 Construction Season #2	PW	45 days	Mon 7/2/07



Schedule 1: Proposed 2004 Schedule o

Task | Progress | Summary | External Tasks | Deadline

Split | Milestone | Project Summary | External Milestone