SITE RESTORATION OF SARCPA LAKE – WORK PLAN

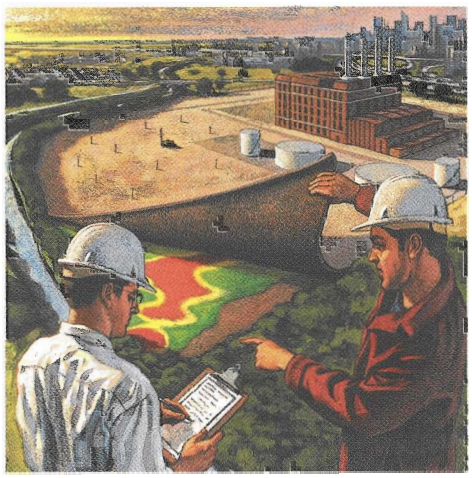
CAM-F Distant Early Warning (DEW) Line Site, Nunavut

Final Version

(O/Ref.: TP5454) (Y/Ref.: 413334)

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

December 2005



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PART 1 - WORK METHODOLOGY PLAN

1.1 SCOPE OF WORK

Biogenie S.R.D.C. Inc.'s (hereinafter called "Biogenie") understanding of the scope of work is the following:

- Demolition of buildings and other structures.
- Construction of a non-hazardous waste landfill.
- Construction of a secure disposal facility.
- Construction of a temporary storage area for the on-site storage of hazardous material.
- Collection of waste from building structures, the dump site and scattered areas:
  - sorting waste;
  - collecting non-hazardous waste and disposal in the non-hazardous landfill.
- Secure containerization of hazardous waste for future disposal.
- Excavation of contaminated and hazardous soil.
- Backfilling and re-grading of excavations, borrow areas and disturbed areas to leave site in as natural of a state as possible.
- Disposal of contaminated soil, as per the scenarios detailed in Table I hereafter.

Table I: Disposal Scenarios for Contaminated Soil

Contamination Profile	Disposal Scenarios		
	Non-Hazardous Waste Landfill	Secure Disposal Facility	Secure Containerization for Future Disposal
Tier I	√		
Tier II		√	
Hazardous			√
PHC (F1-F2)*		√	
PHC (F3-F4)*	√		

*PHC: Petroleum hydrocarbons (Fractions 1 to 4)

- With regards to maximizing the benefits for local Inuit communities, the scope of work is the following:
  - Holding community meetings at the beginning and end of each construction season to inform residents about the nature of the project, its progress and employment opportunities.
  - Training programs to instruct workers as to specific project requirements, including heavy equipment operations, truck driving and maintenance, asbestos abatement, surveying safe work practices, first-aid, CPR, etc.
  - Holding Worker Orientation Seminars (WOS) to inform workers about the nature of the work and specific challenges associated with it, as well as health and safety and environmental protection procedures.
  - Enforcing health and safety and environmental protection procedures on the job site as well as constant supervision and training of workers, emphasizing continuous improvement.
  - Any other measure that is deemed beneficial to the social and economic growth of local Inuit communities.

1.2 PROPOSED METHODOLOGY

This section describes the work methodology which Biogenie will use for the project. Milestones to be achieved are described in the work schedule presented in Appendix A. This section provides additional information regarding some of the project's key activities.

1.2.1 Community Meetings

Before every mobilization to the site and at the end of each working season, community meetings will be held in Hall Beach and Igloolik. These meetings will be used to update the communities on key issues associated with the project, employment opportunities, potential upcoming contracts for local Inuit firms, health, safety and environmental issues as well as the general presentation of the project.

Last July representatives from the Igloolik community were invited to the site visit organized by INAC and PWGSC with both the Camp and the Site Remediation Contractors. The Hamlet delegated representatives, Mr. Celestino Uyarak, deputy mayor and Mr. Joe Immaroituk, council member, as well as 2 wildlife monitors. The group spent 4 hours on site and discussions on their knowledge of the area were greatly welcome and appreciated. The Hamlet representatives were

able to visualize and better understand the remediation project as they are not as familiar with remediation projects as their neighbours from Hall Beach where a similar project is ongoing.

On a second trip, in late August, during a site investigation by the archaeologists, Mr. Matthew Akavak, Lands Officer of the Qiiqtani Inuit Association (QIA) in Iqaluit was invited to the site for a few hours, and a similar invitation was made to the Hall Beach Mayor who had to decline due to previous obligations. A wildlife monitor from the community was also brought on site. On that same day, the QIA representative was able to have a look from the air at the route chosen for the Winter Cat-Train.

Biogenie and Mikim's representative met with the Hall Beach Hamlet Council on August 29, 2005, to discuss issues with regards to the equipment staging within the community limits over the winter. A brief discussion followed about the project, its duration, employment and subcontracting opportunities, etc. The Hamlet Council expressed its strong support to Biogenie and Mikim, and to the project.

1.2.2 Worker Orientation Seminar

Prior to site mobilization and prior to any work being conducted, a WOS will be held and the site-specific health and safety instructions and environmental protection procedures will be presented. All personnel will participate in the WOS. The seminar will provide workers, the Engineer, and the Engineer's representatives with the following information/training:

- Biogenie's project organization and work methods.
- Equipment to be used.
- Project schedule.
- Project rules.
- Personnel turnover.
- How to identify substances of concern at the site and understand the measures to be taken in case of an accidental spill into the environment.
- How to properly use protective gear and emergency response equipment.

Wildlife Monitors will also actively participate in the WOS to review bear and wildlife hazards.

Additional training will also be provided to the workers according to their respective task to be performed. As such, equipment operation, handling of hazardous waste, transportation of dangerous goods, and administration are examples of other task-specific training that will supplement the WOS.

1.2.3 Equipment Mobilization

The equipment was mobilized via sealift to a temporary storage area in Hall Beach. The local authorities indicated a safe acceptable storage area where heavy equipment and camp buildings were placed and prepared for their transportation to the CAM-F site. A list of the equipment mobilized in Hall Beach is provided in Appendix B.

1.2.3.1 CAT-Train

A CAT-Train will be used to transport the material in March and April 2006. The overland route from the storage area in Hall Beach to CAM-F is being developed based on *The Environmental Guidelines for the Construction, Maintenance and Closure of Winter Roads in the Northwest Territories*. Figure 1 in Appendix C presents the selected route to Sarcpa Lake. Figure 2 in Appendix C shows the topography between Hall Beach and Sarcpa Lake.

Prior to moving any equipment, snowmobiles and/or Bombardiers will be used to define the last details of the route and determine ice and snow conditions using augers, a ground penetrating radar (GPR) and a GPS.

The equipment will be hauled mainly using the tractor, the challenger and two dozers. Other powered equipment such as trucks, a loader and excavators are expected to reach Sarcpa Lake on their own.

1.2.3.2 Site Mobilization

Prior to on-site mobilization of Biogenie personnel, the following three activities scheduled for June 2006 must take place:

- The 2006 Community Meetings
- Camp erection by the Camp Contractor
- WOS to select employees

Biogenie personnel will be flying by commercial airlines to Iqaluit or Hall Beach, where a chartered aircraft will take them to CAM-F. The airstrip may be improved during the 2006 work season to allow planes other than Twin-Otters to access the site such as a 748, a Skyvan or Dornier. Such improvements consist of compaction to increase the bearing capacity and eliminate the presence of loose rocks; some areas may require re-grading and or addition of Type 5 granular material. In the early stage of the 2006 work season, it is anticipated that two flights per week will be necessary for camp re-supply, sample transfer, etc.

Figure 3 in Appendix D provides a site overview as well as approximate locations of various site characteristics and structures (existing and to be built).

1.2.4 Field Work

This section addresses the methodology that will be used to complete the major items of the scope of work.

1.2.4.1 Demolition of Buildings and Structures

This section describes the methodology that will be used to demolish the buildings and structures, including the removal of hazardous material.

Before demolition work starts, a Demolition Methodology Plan will have been submitted for approval by the Engineer and, if required, local authorities having jurisdiction. To ensure that the

work is being carried out according to health and safety standards, and in an environmentally sound manner, the demolition work will be sequenced in specific tasks.

- ***Removal of Hazardous Material***

Hazardous material will require abatement or removal prior to the demolition of the structures. Several types of hazardous waste have been identified in the buildings and other structures. They are:

- PCB-amended paint
- Lead-amended paint
- Asbestos-containing insulation material
- Miscellaneous material, such as creosote-treated timbers, batteries, used oil, ballasts, etc.

- ***PCB and Lead-amended Paint***

Prior to dismantling structures, PCB-amended paint (PAP) and lead–amended paint (LAP) that can be removed by scarification or scraping will be placed in polyethylene bags prior to being deposited into intermediate containers. Personnel removing PAP and LAP material will wear adequate Personal Protective Equipment (PPE) in accordance with the Health and Safety Program (HASP).

Concrete surfaces coated with PAP or LAP in concentrations exceeding criteria, or showing evidence of PCB oil spillage, will be removed by scarification to the depth and aerial dimensions indicated in the contract, or as directed by the Engineer to minimize waste volumes for off-site disposal. Hazardous waste material will be placed into intermediate containers compliant with the requirements of the *Transportation of Dangerous Goods Act and Regulations* (hereinafter called the "*TGD Act and Regulations*") and as per the Scope of Work.

Dismantled amended painted material with concentrations exceeding lead or PCB criteria will be sized to fit within the appropriate containers. Material will be securely placed to prevent movement during normal transport conditions. Barge containers equipped with drip trays and

additional bracing will be filled with larger contaminated demolition material. Weight will be distributed evenly over the floor of the container so that the center of gravity is close to the mid-length and below the half-height of the container. Container openings will be sealed. A photographic record of the interior of completed containers, as well as the corresponding inventory, will be provided to the Engineer upon completion of the work.

- ***Asbestos-containing Insulation Material***

Prior to the removal of asbestos-containing insulation material, an Asbestos Abatement Plan (AAP) will be presented to the Engineer. This AAP will address, but will not be limited to, the following items:

- Procedure for the handling and disposal of asbestos
- Asbestos transportation plan
- Handling and disposal of asbestos-covered material with PCB-amended paint
- Instructions and PPE provided to employees
- Layout of proposed enclosures
- Health and safety plans
- Record keeping and reporting methods
- Regulatory compliance
- Response plan to hazardous situations

Notifications, including a written schedule, will be provided to the Engineer prior to the commencement of work. Training will be provided with regards to the use of protective equipment, safe handling and disposal of asbestos, and health education information.

Depending on the type of asbestos, it may be necessary to remove visible dust using a high-efficiency particulate air (HEPA) vacuum. Floors, walls, and openings will be covered or sealed-off with polyethylene sheeting and sealed with tape. The material to be removed will be wetted prior to disturbance. Water will be collected and pumped through a 5-micrometre bag filter before being discharged on land.

Appropriate signage will be displayed in areas where access to asbestos-contaminated areas is possible.

If required, personnel decontamination facilities will be made available; they will be comprised of an equipment room, a shower room and a clean room. Asbestos-abatement employees will follow appropriate decontamination procedures when exiting work areas. Separate enclosures will be constructed to allow for equipment decontamination facilities which will be comprised of a decontamination area, a holding area and a transfer area.

- ***Miscellaneous Waste***

Other types of hazardous waste will be packaged and containerized with respect to the *TDG Act and Regulations*, depending on the type of material to be transported. Batteries will be packed in sealed leak-proof containers with suitable absorbent material. Hazardous liquids, including solvents, sludge, and petroleum distillates, will be containerized according to the *TDG Act and Regulations*.

- ***Demolition of Buildings and Structures***

Following the removal of hazardous material, the remains of the buildings and structures will be demolished.

The first step will consist of hand-removing pieces that can potentially become airborne when massive demolition commences (polyethylene sheeting, mineral wool, etc.). The massive demolition will then be done using an excavator.

Workers will assist demolition activities by cutting larger steel pieces and picking up smaller debris prior to the haulage of waste to the Non-Hazardous Waste Landfill.

At the end of the demolition work, small scattered debris will be hand-collected and disposed of in the appropriate facility.

1.2.4.2 *Granular Fill Production*

Granular fill will be produced using the borrow sources identified in Figure 3 in Appendix D. The top organic layer and boulders will first be removed to access the usable material.

The requested types of granular fill will likely require screening and/or mixing of native material. Screening will be done using a vibrating screen equipped with interchangeable grids, making it adaptable to required types of material. Mixing will be done with an excavator, which will form a single pile out of two or more piles of screened or native material, of known granular gradation.

A preparation method, in the form of a "recipe", will be prepared for each type of granular material. The recipe will vary depending on the quality of each source of raw material. The method will involve the following:

- Borrow source to be used
- Screening requirements
- Mixing requirements

The material will be prepared in distinct batches, depending on the type needed at the time of production. Once activities will be completed in a borrow area, reshaping will prevent water from ponding and return the site to as natural of a state as possible.

Borrow Area 4, located on the eastern side of Sarcpa Lake, will need to be accessed shortly after the 2006 mobilization on-site. In order to finalize the construction of the Secure Disposal Facility, Type 5 granular fill will most likely be required from this borrow area. A small barge and a tugboat will be used to transport equipment across the lake. A bulldozer and a loader will be used along with the screener to prepare Type 5 material. Screened material will then be piled onto the barge with the loader, and transferred into the tandem trucks, across the lake, with the excavator. At all times during the loading/unloading activities, Biogenie will ensure that no sediments are released into watercourse. Refer to Section 3.5 for environmental protection associated with barging activities and borrow area close to a water body.

1.2.4.3 *Grading and Materials Placement*

The granular fill will be hauled with tandem trucks, and spread with a bulldozer as it is unloaded. To meet the required density for spread granular fill, the use of a compactor and the addition of water could be necessary. The exact usage rate of this equipment for compaction purposes will be adjusted according to density measurements taken on-site.

1.2.4.4 *Construction of the Non-Hazardous Waste Landfill*

The construction of the Non-Hazardous Waste Landfill will begin with the grading of the surface and removal of boulders, if any. The construction of the key trench and the berms will follow. The berms will be constructed by placing, with a dozer, Type 2 granular fill in lifts not exceeding 300 mm.

A grade laser will be used to ensure that slopes on each side of the berms are compliant with contract specifications.

1.2.4.5 *Construction of the Secure Disposal Facility*

The construction of the Secure Disposal Facility will also begin with the grading of the surface and the removal of boulders, if any. The construction of the berm will follow by placing Type 4 granular fill with a dozer. The base of the Secure Disposal Facility and the inner side of the berm will be constructed using Type 2 granular fill. Geotextile will then be placed to cover the base of the Secure Disposal Facility and the inner and top portions of the berm. A geomembrane will then be positioned and welded on top of the first geotextile, followed by another geotextile. Once the liners are in place, they will be covered by Type 5 granular fill that will cover both the base of the Secure Disposal Facility and the inner portion of the berm.

Geotextile overlaps will be either heat tracked or glued prior to placement of granular fill. The geomembrane will be installed by an approved geomembrane installer under the constant

supervision of the Field Installation Supervisor. Seaming will be performed under the direction of the Master Seamer.

Constant monitoring by the surveyor team and the use of a grade laser will ensure that construction is compliant with the contract plans and specifications.

1.2.4.6 Waste Collection

The Waste Specialist will assess any debris or drum before it is picked up. Drums containing solids will be directed to the Waste Processing Area where they will be sampled, and contents will be properly disposed of. Drums containing liquid will be sampled and upon results, similar and compatible products will be consolidated. Empty drums will be sent to the waste processing area to be cleaned before being crushed and landfilled.

Where empty drums, old heavy equipment or debris are found in large quantities, an excavator and loader will be used in conjunction with dump trucks. If large pieces need to be cut, workers with demolition saws or acetylene torches will assist the loading team. Fire extinguishers and water supply will be provided to any cutting site prior to the beginning of work.

Where scattered waste can be found on the surface, waste will be collected by hand and disposed of in the appropriate facility.

Waste will be collected under the constant supervision of a skilled Technician specialized in waste sorting. Should any evidence of hazardous waste be observed (visual or olfactory) or suspected in any reasonable way by the Technician, work will be moved to another area and the Engineer will be notified of the situation.

Waste that is deemed hazardous by the Engineer will be placed in a proper leak-proof container and hauled to the on-site processing area of the Hazardous Waste Landfill.

Solid Waste located on the eastern side of Sarcpa Lake will be collected as per the above and transported across the lake by barge. It will then be transferred to the processing area located in the Hazardous Waste Material Landfill.

1.2.4.7 Set-up of a Waste Processing Area

As shown on Figures 4 and 5 in Appendix D, the Waste Processing Area will be established inside the Non-hazardous Waste Landfill It is an area where waste can be spread for inspection or distinctively piled awaiting analytical results, or where waste will be steam-cleaned when necessary. An oil resistant liner will be used to prevent cross-contamination of the area. A sump will be installed at the lowest point, where wash water and seepage liquids will be pumped. Absorbent booms will be used to collect petroleum products.

A mobile water treatment unit will be used to treat water prior to discharge. Water will be treated by bag, sand and activated-carbon filters. Should any free-phase petroleum product be found in the retention tank, it will be containerized in drums.

Water will be treated by batch. One retention tank will be used to accumulate water to be treated and two storage tanks will be used for treated water. Once the first storage tank becomes full, treated water will be analyzed to confirm attainment of the treatment objectives; in the meantime, the second storage tank will be used, and so on. Each sample will be analyzed for applicable chemical parameters at a Canadian Association for Environmental Laboratories (CAEAL) approved laboratory in a short turnaround time. Should the results comply with the discharge criteria, and upon approval by the Engineer, the water will be discharged. Otherwise, the water will be re-circulated through the system and re-sampled.

1.2.4.8 Barrel Handling

All barrels will be handled as per the DEW Line Cleanup Protocol for barrels. This document is provided in Appendix E.

- ***Disposal of Absorbent***

Used oil absorbent material will be tested to determine appropriate disposal methods. Absorbent material that meets the following criteria will be incinerated on-site using the camp incinerator:

- Polychlorinated biphenyls (PCBs): < 2 mg/kg
- Chlorine < 1,000 mg/kg
- Cadmium < 2 mg/kg
- Chromium < 10 mg/kg
- Lead < 100 mg/kg

Used absorbent will be stored in sea-cans for sampling and temporary storage. It is anticipated that one sample per sea-can will be collected and sent for analysis. Absorbents that do not meet the above-mentioned criteria will be containerized according to the *TDG Act and Regulations* and sent south for proper handling and disposal.

1.2.4.9 *Set-up of an On-site Temporary Storage Area*

A Temporary Storage Area will be set up at the end of the airstrip allowing easy subsequent access to the off-site transportation equipment, and whereupon the containers can be stored on a flat, level and compacted surface thus allowing the weight of the containers to be evenly distributed. This area will be free of pond water, it will be sufficiently compact so as to prevent the containers from settling into the soil, and it will be located at least 100 m from any body of water The location of the temporary storage area is shown on Figure 4 in Appendix D.

Hazardous waste will be stored in this area using appropriate packaging containers in accordance with the *TDG Act and Regulations*. Appropriate signage and protection will also be installed.

1.2.4.10 *Excavation of Contaminated Soil*

Contaminated soil will be excavated under the constant supervision of a Technician. Excavation work will be done area by area, so as to avoid mixing contamination types and levels. Available

information (results from previous studies, visual observations, photo-ionization detector (PID) readings, etc.) will be used to segregate soil. Excavation will be done using a bucket equipped with a blade to form a smooth surface that will ease sampling operations. When possible and applicable, excavation sides will be sloped (2:1) to prevent sloughing. Depending on the nature and level of contamination, soil will be disposed of as per the aforementioned Table I.

The contaminated soil area will be surveyed prior to and upon completion of the excavation work operations. Comparison of the surface levels following these two surveys will provide the volume of material excavated, and therefore the pay-quantity. Excavation of contaminated soil will start after the area has been clearly identified by the surveyor and once the Non-Hazardous Waste Landfill and the Secure Disposal Facility have been constructed. The work will then begin with the removal of debris, snow, ice and boulders, and with the redirection of surface run-off around the area to be excavated.

The excavation of contaminated soil will start at one end of the identified area and progress towards the perimeter. The soil will be excavated according to the depth detailed in the Public Works and Government Services Canada (PWGSC) specifications. If anticipated, clean soil must be excavated to reach contaminated soil; clean soil will be piled aside for testing and then managed according to the analytical results provided by the Engineer.

Under saturated ground conditions, special precautions will be taken to slope the excavations to prevent sloughing or unstable ground conditions. Soil will only be removed from within the specified limits indicated on the contract drawings.

As the excavation work progresses, the Engineer will be informed of the locations of the areas available for confirmatory sampling. According to the analytical results and the Engineer’s instructions, further excavation or backfilling with granular fill will be initiated.

1.2.4.11 Hazardous Contaminated Soil Excavation

The excavation of anticipated hazardous soil will begin once it has been delineated and after the implementation of a restricted zone and a contamination reduction zone. Proper signage will be in place. Equipment, containers, material and personnel will undergo a decontamination procedure before exiting the area.

The anticipated hazardous contaminated soil shall be excavated using an excavator and trucks using the following methodology:

- Surveying of Dump A (as identified on the contract drawings).
- Excavation of sections under the constant supervision of the Hazardous Waste Specialist. The excavation shall be done in thin layers to get a clear assessment of the waste and to minimize volatile organic compound (VOC) concentrations in the immediate vicinity.
- Immediate containerization of hazardous contaminated soil in secure containers.
- Transportation of the containers to the Temporary Storage Area.

The excavation will continue until bedrock or permafrost is reached, or until no more waste is visible and native material has been reached. The Engineer will be notified that the excavation work has been completed.

1.2.4.12 Non-Hazardous Waste Landfill Operation

Non-hazardous waste will be placed in the designated areas in uniform, horizontal lifts between and against the berms. Each waste lift shall have a maximum thickness of 500 mm and such that all voids within the waste can be filled with intermediate cover.

Demolition material, including barrels to be landfilled, will be crushed or cut to minimize displacement and lifting operations and to satisfy the overall dimension requirements. Structural steel members, timbers, etc. will be placed on the base of the landfill or on the base of an intermediate cover layer so that the material lay on a compacted, flat surface.

Hollow components such as tanks will be cut to allow nesting of materials. The underside of the nested material will be supported with intermediate cover to minimize displacement and lifting of the material. Demolition debris will be crushed using heavy equipment prior to spreading the intermediate cover.

Tier I-F3/F4 or PHC (F3-F4) contaminated soil or Type 6 granular fill will be used as intermediate cover to a maximum loose thickness of 150 mm over each layer of non-hazardous material and compacted with the random action of tracked equipment. Type 6 granular fill will be used only when all available Tier I / F3F4 contaminated soil has been used.

The final cover will consist of Type 2 granular fill and will be constructed to the specified thickness and grades indicated on the drawings.

1.2.4.13 Contaminated Soil Containerization

Hazardous soil identified in the contract specifications will be containerized in 3.1-m steel containers as it is being excavated.

1.2.4.14 Secure Disposal Facility Operation

Tier II contaminated soil will be placed in the designated Secure Disposal Facility in uniform, horizontal lifts between and against the berms. Two soil lifts with a maximum thickness of 300 mm will be placed in the Secure Disposal Facility. An intermediate cover consisting of 150 mm of Type 6 granular fill will be placed between the two lifts.

Final cover will consist of 300 mm of Type 2 granular fill placed directly atop the Tier II soil. A 150–mm layer of Type 5 granular fill will then be deposited. The liners will be installed (geomembrane between two geotextiles) and covered by 1.7 m of Type 2 granular fill.

1.2.4.15 *Instrumentation*

Instrumentation (monitoring wells, survey control monuments, and ground temperature cables with data loggers) will be installed by qualified personnel.

Three monitoring wells will be installed near the Non-Hazardous Waste Landfill, and three more adjacent to the Secure Disposal Facility. The Engineer will be notified prior to the drilling program to allow scheduling of inspection. Locations and depths of monitoring wells will comply to contract specifications or as directed by the Engineer. Monitoring wells will be installed in accordance with the contract specifications. Temporary hole casing material will be provided to prevent sloughing of holes.

One ground temperature cable will be installed at each corner of the Secure Disposal Facility. Each cable will have its own data logger. The equipment will comply to contract specifications and the installation will be as per the drawings.

1.2.4.16 *Road Maintenance*

Upon arrival on-site, roads will be assessed and repaired as required. Additional roads may be built to access the various areas requiring remediation. These roads will be maintained as required throughout the duration of the project to prevent rutting or gouging.

1.2.4.17 *Final Demobilization*

Final demobilization is scheduled for the winter of 2007-2008 and will again be performed by CAT-Train. Equipment will be returned to the temporary storage facility located in Hall Beach. Hazardous material in containers will be stored at the location identified by the Engineer and will remain at this location until final pick-up.

PART 2 - FUEL MANAGEMENT PLAN

2.1 FUEL QUANTITIES & PROCUREMENT

It is estimated that 216,000 L of Arctic fuel will be needed to carry out the remediation work; of this quantity, a volume of 75,000 L is allocated to camp operations.

Arrangements have already been made with the Government of Nunavut's Petroleum Product Division to purchase Arctic fuel from their facility in Hall Beach (refer to the confirmation letter issued July 26, 2005, in Appendix F).

Only all-terrain vehicles (ATVs), small tools, and possibly a few gasoline-powered generators will require gasoline. In fact, it is estimated that only 2,500 L will be needed.

2.2 FUEL STORAGE FACILITY

As illustrated in Figure 6 (Appendix G), the fuel storage facility will be located downwind from the Camp in order to prevent fuel odours in the Camp area. The fuel storage location will enable the camp generators and incinerator to be connected directly to the ISO tank containers without fuel transfer. In addition, this location will also be easily accessible for refuelling the equipment and is adjacent to the location where most of the work will be performed. This location significantly limits fuel transportation to a minimum, therefore reducing the risk of spillage.

The fuel containment cell will have a capacity of 253,000 L and will consist of a 0.8-m high berm constructed as per Figure 7 (Appendix G). A PVC oil-resistant geomembrane "Solmax 230 OR" will be installed between 2 "Texel 7614" geotextiles to ensure containment and protection. At each end of the ISO tankers, additional layers of geotextile, topped with 2 sheets of ½-inch plywood, will assure geomembrane integrity. The same arrangement will be constructed at the refuelling access ramp. A temporary fence will be installed around the fuel storage facility (refer to Figure 7 and Figure 8 in Appendix G for details).

2.3 FUEL TRANSPORT & STORAGE EQUIPMENT

Fuel will be transported and stored in 12 CSC-approved ISO tank containers. Immediately before leaving Hall Beach, the ISO tank containers will be filled at the tank farm. No other fuel transfer will be necessary as the same ISO tank containers will be used for storage once at the site and a spare tank will be set aside to be used in the event of a leak

Upon their arrival at the CAM-F site, the ISO tank containers will be deposited on a pad already identified and staked, located on a unused part of the airstrip To ensure containment and protection until the work season, individual, temporary fuel containment cells will be built around each Iso Tanker using a "Solmax 230 OR" PVC oil-resistant geomembrane installed between two (2) "Texel 7614" geotextiles. Additional layers of geotextile, topped with two (2) sheets of ½-inch plywood, will assure the geomembrane's integrity. Berms will be built using barrels and every possible precaution will be taken to ensure that the containers are stored on flat, even ground, and not on snow-packed ditches or slopes.

Gasoline will be transported to the site in a ULC-approved 2,000-gallon tank and properly stored in the fuel storage facility.

Oil and lubricants will be stored in an ISO barge container equipped with a catch basin containing absorbent material to confine any accidental spillage. This container will also be located within the fuel storage containment area.

Fuel and other hazardous material will be stored at least 6 m from the generators' container to minimize the risk of fire or explosion, while hazardous material will be stored at least 100 m from any water body.

2.4 FUEL-POWERED EQUIPMENT MONITORING

Fossil fuel burning equipment will be visually inspected weekly and during refuelling operations. If leaks are observed, the equipment will immediately be repaired. Pumps, hoses, and connections will be inspected as per the supplier's maintenance recommendations. Equipment will be maintained by the on-site mechanic and records will be kept in the daily reports.

PART 3 - ENVIRONMENTAL PROTECTION PLAN

This section addresses the environmental protection procedures that will be implemented.

3.1 CROSS-CONTAMINATION PREVENTION

Cross-contamination may occur during the excavation and transportation of contaminated soil due to the generation of airborne particles, contaminated soil adhering to equipment, or personnel leaving the contaminated area, and liquids or free-phase petroleum product released into the environment. To prevent such cross-contamination, Biogenie has put in place a number of mitigation measures.

Whenever possible, the excavation work will be performed in such way that no trucks will travel over contaminated soil. This measure could include the construction of a temporary roadway using clean soil. If this measure is not applicable, only one entrance to the contaminated area will be identified and a contamination reduction zone will be implemented.

Equipment will be decontaminated before it is moved from the contaminated area to another location. Decontamination of heavy equipment will include the removal of chunks and particles of soil prior to its mobilization to the next contaminated soil area. Special attention will be given to truck boxes and tires as well as excavator buckets and tracks.

During excavation operations, dust will be abated using a water spray (when required). Extra precaution will be taken during dust abatement activities in the contaminated area to limit run-off water. Small volumes of water will be sprayed frequently.

3.2 FREE-PHASE PETROLEUM PRODUCT AND WATER MANAGEMENT

Prior to the excavation work, surface water in the work areas will be drained using existing drainage patterns. During the excavation work, groundwater, water run-off, or wash water having been in contact with contaminated soil will be pumped, stored, and sampled prior to being treated or released into the environment.

A liquid-sludge vacuum unit will be used for maintaining soil excavations free of standing water. Contact water will be stored in watertight containers to allow sludge to settle. If required, oils and greases will be skimmed. Treated water will be sampled on a regular basis to ensure discharge meets the Wastewater Discharge Criteria. Should water require treatment, it will be re-circulated into the treatment unit.

Should free-phase petroleum product be encountered during excavation activities, it will be collected using absorbent booms and/or the liquid-sludge vacuum unit. Used absorbent booms and filter bags will be managed according to Section 1.2.4.8. Used activated carbon and sand will be returned to the supplier.

3.3 ENVIRONMENTAL PROTECTION AND FUEL MANAGEMENT

A 950-L capacity ULC-approved mobile fuel tank will be used for refuelling heavy machinery. This mobile tank as well as small gasoline-powered equipment will be refuelled in the containment cell using an access ramp.

Refuelling and fuel transfer, if necessary, will be done only by qualified personnel.

For the refuelling of heavy equipment, generators, pumps, and tools, drip pans will be used to prevent spills, when required. An automatic stop-fill valve will be used. Absorbent pads will be available at all times.

Under the *Occupational Health and Safety Act,* Workplace Hazardous Material Information System (WHMIS) regulations will apply to the handling and storage of hazardous material.

Relevant Material Safety Data Sheets (MSDS) will be kept current and available on-site. Containers and pipelines will be properly labelled following the WHMIS guidelines.

3.4 WILDLIFE MONITORING AND PROTECTION

Full-time Wildlife Monitors with firearms, ammunition, mobile communication devices, and ATVs will be provided during site operations to ensure the safety of employees, the Engineer, and the Engineer's support staff. One or two Wildlife Monitors will be on duty during working hours, depending on the work area to be covered. It is expected that one Wildlife Monitor will be patrolling at all times around the camp facilities. Part of this specification is expected to be covered under Potential Additional Work.

Work areas are away from major nesting areas and caribou or muskox migration paths. The closest water body, Sarcpa Lake, is located approximately 2 km southeast of the camp. Roads will be constructed away from water bodies, nesting areas, and migration paths. Work near water bodies will be scheduled outside of the spawning period or between July 15th and September 1st

3.5 IN-WATER WORK

Some scattered barrels and steel debris may need to be recovered from streams or water bodies around the site. Only barrels or debris visible in shallow waters, presenting a hazard for small boat navigation will be recovered. As those barrels and debris were dispersed by wind or were part of some flotation devices used by the site occupants, it is not anticipated to find anything other than water and sediments in the barrels.

The work will be governed by an *Environmental Protection Plan* for *Barrel and Steel Debris Recovery from Watershed*, prepared by PWSGC for INAC presented to Department of Fisheries and Oceans (DFO).

Works in the streams or water bodies will be conducted in such a way as to minimise the disturbance of the shorelines and the dispersion of suspended solids. To do so, the following procedures will be applied:

- In the streams or on shorelines, barrels and debris will be hand picked or pulled by an ATV. No heavy equipment will enter or get within 15 m from the stream. Prior to any work, a silt curtain will be installed downstream from the work zone. The curtain will be removed only when no visible evidence of suspended solids remain.
- In larger water bodies, barrels and debris will be lifted aboard the barge or the small boat using a hand operated crane. Prior to any work a silt curtain supported by a floating boom will be installed around the work area. The curtain will be removed only when no visible evidence of suspended solids remain.

Access to Borrow Area 4 will be required to get granular material and scattered debris. Some form of rock docks or access are still in place on both sides of the lake and are planned to be used in conjunction with metal ramps to load and unload the barge. To ensure that no sediments are spilled into the watercourse during barging, Biogenie will take the following precautionary measures:

- The barge will be equipped with sides to make sure no material falls off.
- Weather conditions will be closely monitored to prevent wind dispersion of sediments.

To ensure that no sediments are released into the watercourse during fill production operations, Biogenie will take the following precautionary measures:

- A 15-metre buffer zone from the shoreline will be left undisturbed where the borrow areas are adjacent to any water body.
- Silt traps and/or silt fences will be installed downstream of the work area.
- Berms or ditches will be constructed to limit run-off water entering excavation areas.

3.6 WATER USE

It is estimated that a total of approximately 500,000 L of water will be required for drum cleaning, granular compaction, dust control, and other miscellaneous use. Water will be pumped from Sarcpa Lake and into known volume tanks. Water volumes will be recorded and provided to the Engineer daily.

To prevent capture of fish during pumping, the suction intake will be equipped with a screen. This in accordance with the freshwater intake end-of-pipe fish screen guideline. Biogenie will use the same water supply installation as the camp contractor, which is detailed in the construction camp work plan (see Figure 3 in the Construction Camp Work Plan).

3.7 HERITAGE RESOURCES

Should Biogenie workers encounter any archaeological resources during remediation work, the following steps will be taken:

- The article will be left intact and in place, unless there is a risk of damage.
- A visible boundary will be marked and the area will be avoided.
- The site supervisor and all personnel working in the immediate area will be advised of its existence.

The discovery will be reported to the appropriate agencies.

PART 4 - SPILL CONTINGENCY PLAN

This section outlines the specific measures to be taken in the event of a contingency situation such as a fuel or chemical spill. This plan has been developed to ensure that efficient and environmentally-safe measures will be taken in a contingency situation and that the actions prescribed hereafter meet all regulatory requirements in terms of reporting. Figure 9 in Appendix H provides a plan detailing the locations of the hazardous storage area and emergency equipment devices available on-site for the protection of employees and the environment.

The spill contingency course of action will be posted in various strategic locations on-site and will be part of the WOS. The following information will be included:

- Organization of response procedures.
- Lines of authority and communications to follow in a contingency situation.
- Specific response procedures to various contingency situations.
- Location of an emergency meeting point.
- Location of medical equipment and facilities.
- Location of spill response and protective equipment (Appendix H).
- Location and identification of potential hazardous material on-site.
- Procedures for reporting an incident.
- Specific response procedures to various contingency situations.

4.1 FUEL AND HAZARDOUS MATERIAL SPILL CONTINGENCY PLAN

The purpose of the fuel and hazardous spill contingency plan is to minimize impact on the environment and human health in case of a liquid or solid hazardous material spill by implementing an efficient response plan adapted to various potential hazardous materials encountered on the CAM-F DEW line site.

Various chemical products will be used during the CAM-F site remediation project. Biogenie has taken every possible precaution to minimize the likelihood and limit the potential impact of hazardous material spills. With the exception of the large volume of diesel and gasoline, which will be protected by lined containment, most hazardous products will be stored and used in small quantities.

It should be noted that hazardous material will be transported in compliance with the *TDG Act and Regulations*.

The greatest risk, in terms of likelihood of occurrence, and volume of potential spilled material, is that associated with POL distribution during site activities. All necessary precautions will be taken to prevent and minimize the likelihood of spills, and the misplacement or loss of hazardous materials.

Every precaution will also be taken to prevent and minimize the likelihood of a spill. During winter fuel transportation, spill kits, pumps and a spare tank will be available to transfer products in the event of a spill or leak. Visual inspection will be performed periodically, and winter roads will be maintained in good condition to ensure safe transportation.

However, should a spill occur, emphasis will first be placed on human health. Any person detecting a spill shall take every safety precaution and wear adapted protective gear prior to approaching the spill area.

In the event of a spill, the person in charge shall:

- Isolate or eliminate all sources of ignition and identify the spilled material, if possible.
- Warn people and evacuate the area, if necessary.
- Report the following to the Site Superintendent:
  - the location of the spill;
  - the known or suspected time of the spill;
  - the substance spilled;
  - the estimated volume spilled;
  - the cause of the spill, if possible;
  - the flow direction of the spill.

- Ensure adequate use of spill response equipment.
- Apply emergency response procedures as specified in Appendix I.
- Document all events and measures taken.

Depending on the physical location of the spill, specific supplemental precautions must be taken with regards to the spill response procedures.

➢ ***On Land***

- Prevent dispersion in drainage system and ditch.
- Contain material with sorbent booms, dyke of snow or earth.
- Remove small spills with sorbent pads.

➢ ***Muskeg***

- Ensure integrity of marsh or vegetation.
- Remove free-phase product with pumps and skimmer and low pressure point equipment.
- Minimize damage caused by equipment.

➢ ***Snow and Ice***

- Prevent dispersion into waterways by containment with snow or other material.
- If necessary, pump water surface to recover diesel under ice.
- Remove minor spills with sorbent pads.

➢ ***On Water***

- Contain spill as close to release point as possible.
- Use sorbent booms to contain free-phase product.
- Use skimmer or sorbent pads to recover free-phase product.
- Do not deploy personnel or equipment on wetlands.

4.2 FINAL SPILL REPORT

Spills or accidents will immediately be reported to Biogenie's Site Superintendent. A written spill report will be submitted to the Engineer within 24 hours of the incident. Any spills causing damage to the environment will immediately be reported. If more than 70 L of liquids or solids are spilled into the environment, the appropriate authority will automatically be notified by Biogenie's Site Superintendent.

Following a spill intervention, a final report describing actions taken, confirming the volume of the spill, and addressing future monitoring requirements will be submitted to the Engineer, including a sketched layout and photographs of the spill area. The spill report form is included in Appendix J.

4.3 TRAINING

Only trained personnel will handle fuel and other hazardous material. Training will be provided to workers on how to handle fuel or other substances using available site-specific equipment. Proper usage and handling of hazardous material shall focus on employee training and compliance with WHMIS.

The initial spill response procedure and reporting will be part of the WOS. Refresher training will be given during weekly Health and Safety meetings. Designated employees identified as the spill response team will be trained in the OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course.

Employees will take note of spill response material and safety equipment. Its adequate use for maximum efficiency and its various storage locations on-site are provided on Figure 9 in Appendix H. Table II identifies the location and contents of each spill kit.

Table II: Spill Kit Description and Locations

Spill Kit	Location of spill kit	Contents
Liquid spill (4) (petroleum products, sludge, contaminated water)	Fuel storage area Camp area POL storage container Refuelling equipment Cat-train fuel hauling equipment	• Four bags (10 kg each) of loose absorbent material (3M Powersorb™, vermiculite, or equivalent) • Four booms containing absorbent material (3M Powersorb™ or equivalent) • Twelve pads of absorbent material (3M Powersorb™ or equivalent) • Five heavy-duty disposable bags • Two sets of protective clothing and equipment including chemical resistant gloves, a half-face respirator and cartridges, goggles, disposable coveralls (Tyvek™ or equivalent) • A container for storing the above

4.4 KEY CONTACT LIST

In the event of a spill, the Site Superintendent will contact the 24-hour Spill Report Line and provide them with all relevant information.

For any other emergency situation requiring contact with relevant authorities, a contact list, as shown in Appendix K, will be posted at various strategic locations within the camp and the office.

PART 5 - EMERGENCY RESPONSE PLAN

5.1 INTRODUCTION

Biogenie has identified a number of measures to be taken in case of an environmental or health and safety emergency.

Since Sarcpa Lake is in a remote northern location, response time for emergency response authorities is expected to be lengthy. This Emergency Response Plan (ERP) was prepared in order to minimize or eliminate human health effects and/or damage to the environment should any foreseeable emergency situations arise. The ERP was developed in accordance with CSA Z731 *Emergency Planning for Industry, A National Standard of Canada*.

The ERP includes:

- The roles and responsibilities of the Project Team.
- A list of possible on or off-site emergency situations associated with the project.
- A description of the training that will be provided to workers.
- Emergency response procedures, including the notification, reporting and communication procedures.
- Procedures for emergency site evacuation.

5.2 ROLES AND RESPONSIBILITIES

This section describes the roles and responsibilities of the personnel and subcontractors involved in the site remediation of the CAM-F DEW Line Site in Sarcpa Lake, Nunavut.

5.2.1 PWGSC Representatives

The PWGSC Project Manager, Site Engineer, and Engineer's representatives will be informed of any emergency situation that may arise during the course of the project. Should an emergency situation necessitate the involvement of any authority for a specific requirement (*e.g.,* site evacuation of personnel), the communication line to this specific authority will be maintained by the Project Manager or Engineer.

5.2.2 Incident Commander

All emergency situations will be reported to Biogenie's Site Superintendent who will, in turn, report them to the Engineer as well as the relevant government agency. Response procedures will be immediately implemented to limit environmental and health and safety impacts.

In the case of a medical emergency, the paramedic will report to the Site Superintendent, the Project Director, and the Engineer. The medic will also coordinate off-site evacuation of the injured employee.

The Site Superintendent or his representative will act as Fire Captain in the case of an emergency fire situation. He will designate a gathering area upwind of the fire, appoint personnel to extinguish the fire and/or remove a source tank, collect runoff water, and contact the Nunavut Fire Department as described in the Emergency Contact List (see Section 4.2.4 of this document).

5.2.3 Employees

All emergency situations will have to be identified and reported by site workers to the Biogenie team representatives. Communication with all team members will be maintained during the response procedure.

5.2.4 Emergency Contact List

The ERP also includes an Emergency Contact List with names of equipment suppliers, emergency carriers, hospitals, health care and environmental agencies as well as project personnel. The list will also include contact information of companies working in the surrounding area that may be of help in the event of an emergency situation. This list will be posted in front of each telephone on-site along with specific emergency procedures to be followed in specific situations such as aggressive wildlife encounters, medical emergency or fire. The Emergency Contact List is presented in Section 10 the site HASP.

5.3 IDENTIFIED SCENARIOS

The potential emergency situations identified for the project include chemical spills, fires, tugboat accidents, vehicle accidents, medical emergencies, and the presence of aggressive wildlife within the camp or working area.

Spillage of a large volume of fuel from storage tanks, or during fuel transfer from shore to land is also addressed in this ERP. Table III provides details of the potential emergency situations identified for the project.

Table III: Possible Emergency Situations Identified for the Project

Emergency Event	Description
Liquid or solid spill	Uncontrolled release of gases (acetylene, oxygen, propane, Argoshield)
	Spill of flammable liquids (acetone, hexane, gasoline, diesel fuel, fuel oil, kerosene)
	Spill of other petroleum products (hydraulic oil, motor oil, grease, etc.)
	Breakdown of storage tank or fuel containment facility
Fire	Fuel or equipment fire
Boat accident	Punctured hull, boat rollover
Vehicle accident	Accident involving pick-up truck, heavy equipment, ATVs, etc.
Medical emergency	Injury, aggravated medical condition, death
Presence of aggressive wildlife	Polar bears

5.4 TRAINING

As detailed in the site HASP, all personnel from the Biogenie team will receive first-aid and fire extinguisher training. Site Supervisors from the Biogenie team will have received the 40-hour OSHA HAZWOPER training, first-aid and fire extinguisher training.

In addition to this training, all site personnel will participate in the WOS. This course will allow workers to identify substances of concern on the site, as well as the available protective gear and emergency response equipment. The Wildlife Monitor will also be part of the WOS to review bear hazards.

During the course of the project, emergency response procedures will be revised during the weekly health and safety meetings.

5.5 EMERGENCY RESPONSE PROCEDURES

Emergency response procedures have been elaborated for each identified scenario. The ERP includes a detailed site and facility description with maps of the work areas, locations of buildings, locations of emergency response equipment and protective gear, and locations of non-hazardous and hazardous material on-site. These maps are provided in Appendices D and H. They will be posted on-site, in all offices.

5.5.1 Solid or Liquid Spills

Accidental spills may take the form of solid, liquid or gaseous releases into the environment. Because of the presence of different substances on-site, an inventory was taken of all substances that may have adverse effects on the environment. This inventory, available in the site HASP, will be updated when required.

To help respond to a chemical spill of the substances present on-site, a list of adequate protective gear and basic emergency response measures have been prepared in the site HASP.

The HASP master document provides Material Safety Data Sheets (MSDS) for every substance on-site.

Section 4 of this document provides the Spill Contingency Plan produced for this project.

5.5.2 Vehicle Accident

All operators will be qualified to use machinery. In the event of an accident, it will be recorded on Biogenie's Declaration of Industrial Accident Form 1450-FO17 of the site HASP and submitted to the Engineer. The training records and qualifications of field personnel will be kept in the HASP master document.

5.5.3 Medical Emergency

Medical emergencies may take the form of a work-related injury or an aggravated medical condition. In the event of such an emergency, the work in the affected area will stop. The emergency response/treatment personnel and the nearest supervisor will converge to the area and employees not involved in the response will move to a safe location. The incident will be evaluated by the emergency personnel, which will implement the necessary measures to be taken.

In case of a serious accident, the Site Superintendent or HSO/paramedic will immediately be contacted through the mobile radio unit. The HSO/paramedic will administer first-aid if necessary. Transportation to the nearest hospital will be arranged if necessary. The route to medical care is established to ensure that any injured person can receive medical care as quickly as possible.

5.5.3.1 Response Procedures and Reporting

The Worker Injury Emergency Response Procedures are presented in schematic form in Appendix L.

5.5.3.2 On-Site Medical Services

An adequate number of staff and local employees will possess valid first-aid certification to comply with the *Nunavut Safety Act Regulations*. Also, an on-site paramedic will be present throughout the project to direct emergency medical services. Several first-aid kits as well as sick quarters will be on-site and their locations are illustrated on the Evacuation and Equipment Plan (Appendix H).

5.5.4 Wildlife Encounter

In case of a wildlife encounter that presents a potential hazard, the following actions will be taken:

- Use of a vehicle, noise maker and, if necessary, a firearm to frighten the animal.
- Wildlife officers will be contacted to alert them of the problem.
- The animal will be shot only if it directly threatens human life. Shooting should only be considered as a last resort.
- If a bear is to be shot, the task will be assigned to a competent person.
- The animal's death will be reported to the wildlife officer, and the carcass will be disposed of upon instructions from the wildlife officer.

Biogenie will ensure that wildlife will not be subjected to any unnecessary disturbances or harassment during the course of work.