2.4 CAMP OPERATION

It is anticipated that the camp will be in operation from July 2006 to September 2006, and again from June 2007 until its final shutdown in September 2007. The camp will be winterized from October 2006 until June 2007 and will be demobilized in the winter of 2007-2008. The main operations of the camp are as follows:

- To provide food and drinking water to all personnel on-site;
- To provide lodging and recreation to all personnel;
- To provide first-aid and medical assistance and facility;
- To provide janitorial and cleaning services;
- To manage all waste;
- To provide communication links;
- To provide electricity and heating.

2.4.1 Meals

It is anticipated that approximately 57 kg of food per person per week will be required. This number includes disposables such as paper towels, napkins, etc.

Mikim's suppliers will be ordering food and ensuring transfer and transportation of goods from Iqaluit to CAM-F through the Construction Contractor's chartered aircraft. Non-perishable food and goods will be stored in the kitchen area, while perishable food (meat, fruits, vegetables, and dairy products), purchased on a weekly basis, will be stored in the refrigerators and freezers.

Meals will be served 3 times per day. Casual meals or forth meals will be made available upon request. Lunch boxes, Mug Ups, apples, oranges and other fruits, fresh salads and dairy products (mainly whole milk) will be made available daily.

2.4.2 Drinking Water

Samples collected in July 2005 indicate that water from Sarcpa Lake meets *Health Canada Guidelines for Canadian Drinking Water Quality* (CDWQ). Bottled drinking water will be provided to personnel until the water treatment system is functional and 2 sets of analytical results for treated water meet with the guidelines. Drinking water will be treated using the treatment process described below.

The treatment process consists of a 5,100-gallon tank complete with piping integration system for tank filling. The outlet side has a sediment and carbon in-line filter system and a UV filter than can filter 7-14 usgpm. It is also equipped with 2 ½ hp 115v jet pumps and 2 pressure tanks of approximately 40 gallons each. If treatment is not required, the piping and pressuring system will still be used.

Using a 2-inch water pump, water will be pumped from Sarcpa Lake into a 10,000 L portable water tank sitting on a flatbed trailer. The portable tank will then be hauled to the camp for water transfer into the water treatment/processing system. The suction intake will be equipped with a screen to prevent the capture of fish during pumping.

It is estimated that a total volume of 225 L per person per day will be required. The total volume of 10,000 L/day for all camp operations will be processed through the treatment/processing system.

2.4.2.1 Water Quality Monitoring Plan

During camp erection (June 2006) and camp re-opening (June 2007), water will be sampled for the following laboratory analyses: metals, benzene, toluene, ethylbenzene and xylenes (BTEX), chlorinated phenols, fluoride, nitrite and nitrate, pH, sulfates, turbidity, BOD, total coliforms, fecal coliforms , polychlorinated byphenyls (PCBs) and TSS.

Periodic sampling of potable drinking water on-site will be carried out during the course of the project in order to ensure the health of all site personnel. Parameters that will be monitored during these sampling events include bacteria and TSS. Samples will be collected at the source (Sarcpa Lake) and after treatment/processing (in the Camp).

The results of the July 2005 sampling were compared to the 1999 CDWQ and are presented in Appendix B.

2.4.2.2 Water Volume Monitoring

Water will be hauled from Sarcpa Lake to the camp using a 10,000 L tank sitting on a flatbed trailer. Records of these trips will be kept. Logs will include date, time, estimated volume pumped, and name of employee affected to the operation.

2.4.3 Personnel Lodging

It is anticipated that approximately 45 people will be involved in the project. Mikim intends to provide a total of 24 double-occupancy rooms in addition to the 3 single occupancy units intended for the Engineer, the sick quarters, and the medic. Each occupant will be provided with the linens and beddings specified in the contract.

2.4.4 Medical Assistance

A Medic qualified to administer emergency and survival first aid will be assigned. In the case of an emergency requiring transportation to the closest medical facilities, the emergency response plan will be called for. This plan will be provided to the Engineer for approval prior to the commencement of work. More details regarding health and safety are provided in the Health and Safety plan.

2.4.5 Laundry, Janitorial and Cleaning

Sheets and pillow cases will be laundered on a regular basis in order to provide weekly supply of clean linens to all occupants. Building floors will be cleaned daily. Washrooms will be cleaned and sanitized on a daily basis.

2.4.6 Wastewater

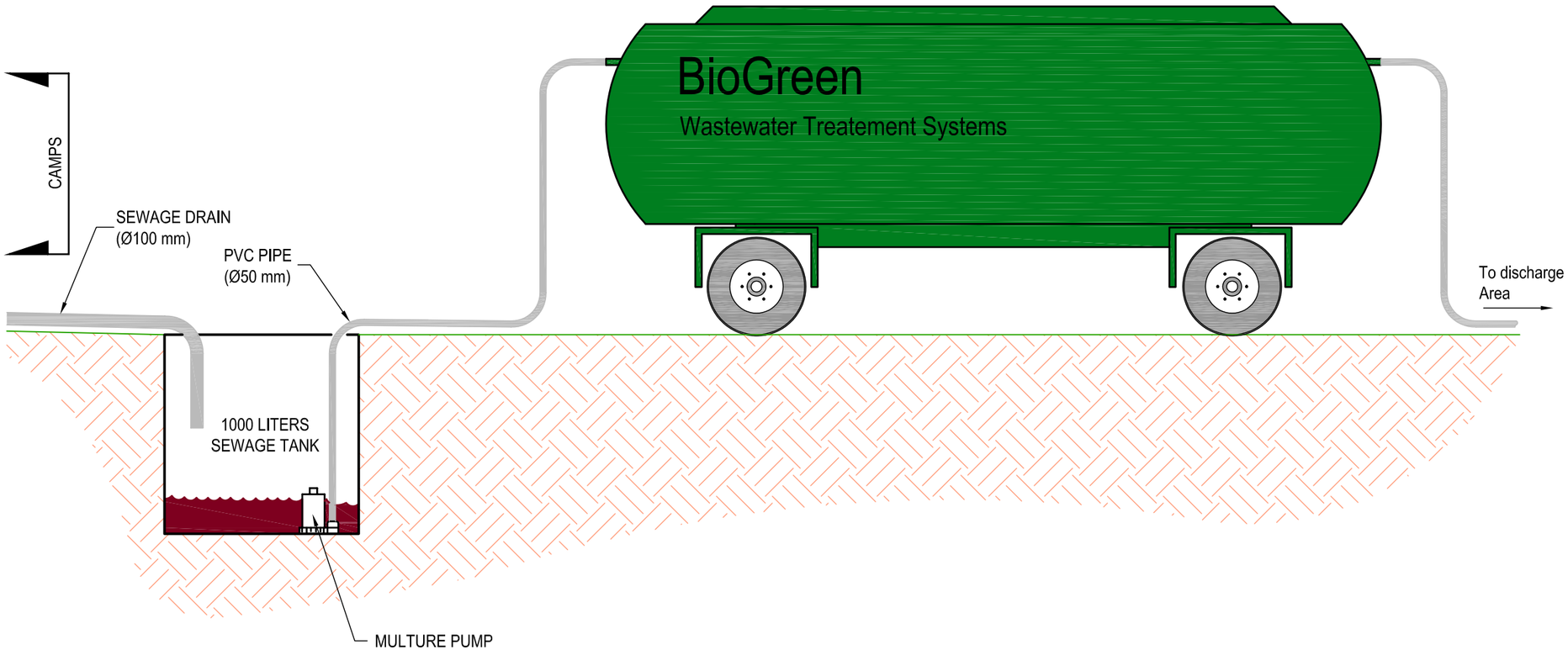
The following sections provide details regarding the wastewater treatment unit to be used during camp operations. Details regarding the proposed wastewater management plan during camp erection are also provided.

2.4.6.1 Camp Wastewater Management

All wastewater is to be recuperated into a 1,000 L sewage tank. A multure pump then ensures that only small organic waste is transferred into the BioGreen treatment unit. Figure 3 provides a general layout of this process.

The unit is designed to discharge wastewater with BOD and TSS concentrations of 20 mg/L, which is well below the maximum concentration allowable for discharge as defined in the contract specifications.

During the first week of camp operations, the effluent may be discharged into a sump having a capacity of approximately 100 m^3 (more than one week of wastewater production). Samples are to be collected and analyzed to ensure that all required parameters meet the concentrations provided in the specifications. Upon confirmation that all parameters meet the required concentrations, the effluent will be directly discharged on land at a distance of at least 100 m from the camp, 50 m from a drainage path, 100 m from the lake, and downwind from the camp. See Figure 1 for the proposed discharge location. Figure 3 provides details regarding the wastewater management system.



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NO.	VERSION	DATE	BY	VERIF.	APPR.

Public Works and Government Services Canada

CAM-F SARCPA LAKE
CONSTRUCTION CAMP

SARCPA LAKE, NUNAVUT

CONSTRUCTION LAYOUT -
WASTEWATER MANAGEMENT SYSTEM

SITE REMEDIATION SOLUTIONS

Biogenie S.R.D.C. Inc.
1140 Levis Street, Lachenaie, Quebec, CANADA, J6W 5S6
Tel.: (450) 961-3535 Fax: (450) 961-0220

Biogénie

UNIT OF MEASURE	SCALE:	DATE (month–year):
METRE	NO SCALE	JUIN 2005
DRAWN BY:	VERIFIED BY:	APPROVED BY:
A. JACQUES	G. ROBERT	S. LABERGE
PROJECT: ZY5453-001	DRAWING NO: ZY5453_001_E1_115_4	PAGE NAME CP

FIGURE 3

2.4.6.2 Camp Wastewater Treatment System

A portable wastewater treatment system will be used to process all wastewater generated during camp operations. The Biogreen system was used during the remediation of the Saglek radar station, in Labrador. The system is also currently used in several hamlets of the Labrador coast and proves efficient and reliable.

The BioGreen wastewater treatment system consists of 3 main zones:

- A settling zone;
- A fermentation zone (anaerobic); and
- An aeration zone (aerobic).

Figure 4 provides a flow chart of the Biogreen System. Appendix D provides additional details regarding the treatment process and a certification letter.

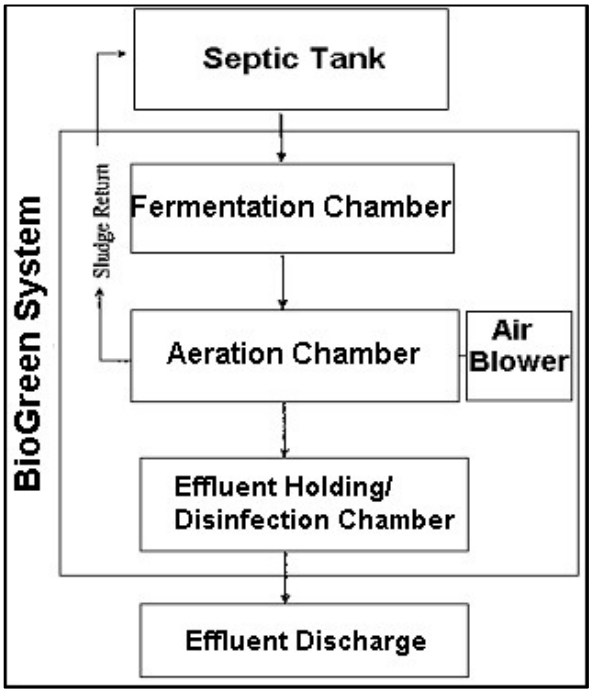

Figure 4: Flow Chart of the Bio-Green Wastewater Treatment System.

Solids Settling Zone

The settling zone allows for the physical removal of solids and grease from the incoming wastewater. There are 2 chambers in the system for removal of solids. Heavy organic matter is settled out in this chamber, with the lighter grease forming a scum layer on the water surface. The lighter solids, which pass through the first settling chamber, are removed in the second settling chamber.

Fermentation Zone

From the settling zone, the wastewater enters the fermentation chamber from the bottom of the tank to allow the wastewater to flow up through the contact media. No oxygen is added to this chamber, and thus biogrowth is very slow. A partial breakdown of the wastewater occurs in this chamber, where the large organic molecules are broken down into smaller dissolved organic molecules. These smaller organic molecules are more readily utilized by the aerobic section of the BioGreen System.

A flow controller, located between the fermentation chambers and the aerobic section, regulates the flow of wastewater to the aerobic section. The controller works through simple hydraulics with the water flowing through an orifice, the size of which regulates the wastewater flow to the aerobic section.

The use of the flow controller reduces shock loading effects to the BioGreen system compared to suspended growth treatment systems.

Aeration Zone

In the middle of each aeration chamber is a draft tube into which air is injected, inducing an upward water current, circulating the water through the entire tank. The circulation of the water through the chamber eliminates the need for a separate device for mixing. The relatively small amount of air injected into the system provides the main reduction in the BOD in the system. The blower for the aerobic treatment section is the only mechanical part in the process.

The system contains 2 aeration chambers. The first chamber reduces the majority of the BOD loading, while subsequent BOD removal occurs as the wastewater flows through the second aeration chamber.

Excess biogrowth in the aeration chambers is removed with the use of a backwash and sludge return system, both of which are operated using the same blower that provides the air to the aeration tanks. The sludge return system uses an air lift to return the excess biogrowth from the bottom of the aeration chambers to the first settling chamber.

Finally, the effluent holding tank removes any suspended solids which might pass through the second aeration chamber. The effluent is then discharged. To minimize energy consumption, the system is designed to use gravitational flow for transporting wastewater through the various chambers of the unit.

2.4.6.3 Discharge Criteria

A set of criteria were provided in the contract specifications. Wastewater treatment targets are therefore as listed in Table II below:

Table II : **Wastewater Treatment Targets**

Parameter	Maximum Allowable Concentration
Oil and Grease	None Visible
pH	6 to 9
TSS	180 mg/L
BOD	120 mg/L
Fecal Coliforms	10,000 CFU/dL

2.4.6.4 Contingency Measures

Contingency measures in the event that the allowable concentrations are not met include the following:

- Addition of a disinfection system immediately after the effluent holding chamber;
- Construction of a lined sump;
- Construction of the lagoons as identified in the specifications.

2.4.6.5 Temporary Wastewater Management During Camp Installation

During camp erection, wastewater will be collected in 1,000 L tote tanks. Once the Biogreen wastewater treatment unit is operative, all this wastewater will be pumped into the unit for further treatment.

2.4.7 Solid Waste Management

Two categories of waste will be generated by camp operations. Solid waste will be composed of putrescible (vegetables, meats, fruits, dairy products, etc.) and non-putrescible waste (cans, paper, wood, etc.). All burnable solid waste will be incinerated, while the rest will be disposed of in the Non-Hazardous Waste Landfill. It is anticipated that approximately 150 kg/day of solid waste, will be generated at the camp.

The incinerator will be used to destroy all combustible solid waste; it consists of a dual-chamber incinerator with a burning capacity of up to 700 kg of waste per batch. Burning temperature is up to 1,650ºC. All toxic gas are destroyed in the second chamber. Diesel fuel is fed directly to the incinerator using a flex-line connected to a diesel tank. More details on the incinerator are provided in Appendix E.

No hazardous solid waste will be generated during camp operations. Cinders will be buried in the site landfill to be constructed by the remediation contractor. Used oils from the generators will be collected in barrels and sent south to be disposed of adequately. Sludge from the waste water treatment plant will remain in the plant to be sent south for adequate disposal. Any other waste (including laboratory waste) that might be generated during camp operations and that could not be incinerated or disposed of on-site will be adequately containerized and sent south for proper disposal.

2.4.7.1 Communication Links

Communication requirements can be separated into 2 sections: on-site and off-site communications. On-site communication will be achieved using mobile radios connected to a repeating station, providing a 10-km range. Four mobile communication radios with charging units will be provided to the Engineer. These radios will allow direct communication between the Engineer, the Engineer's support staff, the Construction Contractor, and the camp.

Off-site communications will be made possible by a satellite service providing phone, fax and internet connections. Phones and faxes, as described in the contract, will be provided in the Engineer's office.

2.4.7.2 Power Generation

The power house unit consists of 2 generator sets (Volvo TAD1240GE) each rated at 300 kW. The units are prime rated for 270 kW and are housed in a noise attenuated 40' ISO marine container complete with all required louvers for intake and exhaust. Monitoring, alarms and shutdown controllers are included in the power house module. Stepdown transformers supply the various complexes and supporting equipment.

2.4.8 Camp Security

A set of camp rules will be developed and provided to the Engineer for approval prior to commencing any work on-site. Once approved, these rules will be provided to all camp occupants upon their arrival.

Access to the camp will be limited to personnel or visitors approved by the Engineer, who will have to agree, in writing, to follow camp rules.

A wildlife monitor will provide surveillance around the camp to protect personnel between 7:00 p.m. to 7:00 a.m. During the camp erection phase (as long as soft-side camps are used), a Wildlife Monitor will be on duty 24 hours per day to insure personnel safety.

An alarmed trip wire will ensure a security perimeter around the camp. This system will provide warning of wildlife intrusions. If a wildlife intrusion is detected by the trip wire, the wildlife monitor will immediately assess the situation and take appropriate action. The presence of a bear will be reported to the Engineer.

Fire safety is of prime importance at the construction camp. Personnel will be trained for firefighting and the following fire protection equipment will be available on the camp in strategic areas:

- 2 self-contained breathing apparatus (SCBA);
- 2 spare SCBA tanks;
- 2 bunker suits;
- 2 fire axes;
- 2 × 20 lbs ABC fire extinguishers;
- 20 × 10 lbs ABC fire extinguishers;
- 8 × 1 ½" × 100' fire hoses with nozzles;
- 1 fire pump;
- 1 bull horn;
- 2 first-aid kits.

Each trailer will be equipped with smoke detectors and fire extinguishers. The evacuation plan and assembly point will be posted and notified to all camp occupants

2.4.9 Wildlife Consideration

The camp location is away from major nesting areas and should not be located near any caribou or muskox migration paths. The closest water body, Sarcpa Lake, is located approximately 2 km southeast of the camp. The Camp location and operation should therefore have no effect on fish spawning activities and grounds.

2.4.10 Camp Winterization

The camp will require winterization at the end of the first work season and decommissioning prior to final demobilization. Ensuring that equipment and material left on-site during the winter is secure is important. Failure to properly winterize equipment in storage areas could lead to breakage. A proper winterization of fuel storage tanks and/or pipelines will prevent spills, which could affect terrestrial, freshwater or marine environments. Likewise, failure to secure the project infrastructures poses a risk of vandalism and subsequent concerns for human and environmental health and safety.

Seasonal demobilization will consist of the following:

- All work areas will be assessed and cleaned;
- All tanks, piping, and hoses will be emptied;
- All waste will be incinerated or containerized;
- All windows and doors will be barricaded.

2.4.11 Camp Demobilization

Final camp demobilization, scheduled for the end of the last work season, will consist of the following:

- All work areas will be assessed and cleaned;

- All temporary infrastructures placed on-site for the undertaking (*i.e.*, any new accommodation facilities, temporary fuel/hazardous material storage tanks and the treatment facility) will be removed from the site;
- All work, staging (lay down) maintenance and accommodations areas will be remediated;
- All pipelines and hoses will be emptied and removed from the site;
- All remaining waste will be either incinerated or buried in the Non-Hazardous Waste Landfill;
- All equipment and material associated with the Contractor's work will be removed from the site.

With the help of some of the Construction Contractor's personnel and machinery, the camp structures and infrastructures will be dismantled.

APPENDIX A

Major Equipment Inventory

CAM-F Construction Camp
Sarcpa Lake, Nunavut

Equipment Inventory

Description	Size/Power	Quantity	Age/Mileage	Condition
Trailers	3.7 m x 18.7 m	3	< 10 yrs	Good
Trailers	3 m x 15.2 m	13	< 10 yrs	Good
Volvo Generator (or equivalent)	300 kW	2	< 10 yrs	Good
Water Treatment Plant	40' container	1	< 10 yrs	Good
Wastewater Treatment Plant	40' fifth wheel	1	< 10 yrs	Good
Fuel Storage Tank	2,000 gal	1	< 10 yrs	Good
ISO Marine containers	20'	2	< 10 yrs	Good
Incinerator	3.65 m x 1.52 m (transport)	1	< 1 yr	New
Water Tank	10,000 L	1	< 1 yr	New