Century Environmental Services
a WOLSELEY company

PO Box 76
Group 200, RR#2
34 Roy Roche Drive
Winnipeg, MB R3C 2E6
Bus: (204) 633-7213
Fax: (204) 694-7228
Toll Free: (888) 466-6658
www.century-environmental.com

April 10, 2006



Wardrop
400-386 Broadway Avenue
Winnipeg, MB
Ph: 204-988-0523
Fax: 204-957-5389

**ATTN: Larry Cleven, M.Sc., P.Eng. Manager, Community Infrastructure**

**RE: HIGH LAKE AND SAND LAKE MINE, NUNAVUT WASTEWATER TREATMENT PLANTS**

## 1.0 PROPOSAL AND PRICE

Biodisk Corp is pleased to present our proposal for the design, manufacture, and supervision of commissioning of a complete modularized **rotating biological contactor** sewage treatment plant designed for High Lake and Sand Lake Mine.

Biodisk has included all that you require to meet environmental authority requirements and site conditions. The design has proven field experience and the advantages of design have been proven many times at similar sites across North America.

### 1.1 Design Characteristics and Effluent Requirement

The Biodisk is a small flow wastewater treatment system that uses a rotating biological contactor (RBC) as the form of aeration. There are 19 different sizes that have been used across North America and around the world for their sewage treatment. Little John has been selected based on the requirements at the site of High Lake and Sand Lake Mine.

**The Biodisk units have been designed for the following characteristics**

| | |
|---|---|
| Design influent $BOD^5$ | 300 mg/l |
| Design influent SS | 300 mg/l |
| Outdoors temperature | -40 to 25$^0$C |
| Indoor temperature | 10 to 25$^0$ C |
| Location | Outdoors |
| Operating | 24hr/365d |

**This unit has been provided to meet the following required effluent**

| | |
|---|---|
| $BOD^5$ | 40mg/l |
| SS | 60mg/l |
| Fecal Coliform | 10,000 CFU/ 100 ml |
| Oil and Grease | < 5 mg/L |
| PH | 6-9 |

### 1.3 Little John Price

**Two (2) portable Little John wastewater treatment plants** designed to meet the discharge requirements. The Little John will treat normal domestic wastewater from 166 persons to secondary quality. If the daily flow is reduced to 100 persons, the Little John will produce a tertiary quality effluent. It is housed in a 20 foot ISO insulated container and is described in the attached information. Normal domestic wastewater is considered to be 220 mg/l BOD with a per capita contribution of 270 liters.

It has been indicated that the camp may start at 17,500 l/d and increase to 42,000 l/d or from 50 to 140 persons. The specified waste strength is 300 mg/l BOD with a per capita contribution of 300 liters. The Little John will handle the variable loadings and meet the required effluent quality.

**Little John Price.....$184,500.00/each**

**Two (2) Little John Total Price.....$369,800.00**

**1.4 Site Supervision and Start up** has not been included or necessary. The Biodisk has an on off switch only. There are no tests or process adjustments that need to be performed by the operator. The proposed Biodisk is a simple system with no auxiliary equipment except for the UV and effluent pumps. The biomass development does not require any operator intervention. Assembly has been done at our shop.

### 1.5 Terms and Conditions:

The above quoted prices are FOB Winnipeg. All applicable taxes are not included and will be extra.

Drawings for approval will be provided within one week after award of contract. Engineering and production of approval drawing will not start until an engineering fee of 35% of the quoted price has been received.

Fabrication of the approved equipment will be completed within 10 to 12 weeks after approval. Delivery time is subject to shop loads at the time of purchase. We will work with you to meet the required time frame for shipping. Equipment will not be shipped until the balance of 65% has been received.

## 2.0 TECHNICAL REQUIREMENTS SUMMARY

### 2.1 Process Requirements

The following general process requirements have been met:

- Each sewage treatment plant package is comprised of an independent train, with all required tanks, bioreactor and sludge storage. Each plant is equipped with flow measurement, UV, controls and insulated housing.
- The Biodisk with the RBC process is noted for its ability to handle variable hydraulic and organic loadings without upset.
- The process design is complete with all necessary equipment and controls.
- The flow through the Biodisk is by gravity. Proper design of the influent pumping station eliminates plant surges.
- The Biodisk is designed to hold sludge for 6 to 9 months for convenient and occasional disposal.

### 2.2 Process Design

The RBC process is the heart of the Biodisk and was originally designed as a single family dwelling wastewater treatment plant. A single dwelling treatment plant must be quiet, odour free, meet environmental requirements, and be simple and easy to operate. The RBC process does not need supervision. The biology will develop as the loading is increased. The system must also be capable of operating with 0 to 100% of design flow without process interruption. The system does not need head works or sludge handling technology. Biosolids are stored for up to one year and can be removed as required.

.

### 2.3 Proposed Equipment

Each Biodisk system has a primary clarifier, four staged RBC, final clarifier, control room, heating and RBC cover. All are insulated to – 40 degrees C.

It is understood that the High Lake and Sand Lake Mine are remote site with difficult logistics. The proposed Little John has been designed for this specific situation. We have designed the complete system to be shipped in two pieces. Three pieces of handrail will be bolted on at site.

The Biozone, cover, checker plate, hatches and heaters have been installed at our shop. The total height of the assembled unit can be shipped on a lowboy trailer without special consideration. The total height including the trailer is less then 13'. The drive and heaters will be wired in the shop. A junction box will be provided for easy field electrical connection. The three pieces of handrails for the walkway along the Biozone will be packed in the final clarifier for shipping and filed assembly.

The control room will be shipped as a separate piece on the same truck. The control room will have the UV, flow meter, lights, heater and controls all installed at our shop. At site the control room will be paced over the final clarifier.

The installation of the effluent pumps will complete the field assembly. Effluent pumps are suspended by a chain. A hatch in the control room floor has been provided for easy installation. Pump electrical supply and the four floats will be wired to the buzz bar in the control panel.

The operator has a safe and clean working environment. The RBC drive and the RBC heater are Class 1, Zone 2 rated.

The Biodisk has sufficient capacity to store sludge for 6 to 9 months. This sludge storage is part of the Biodisk process. Stored sludge is a source of heat and adds to

the stability of the biological process. Sludge can be disposed of at convenient time to the solid waste disposal and other environmentally friendly locations.

## 3.0 BIODISK ADVANTAGES TO THE OWNER

- The Biodisk design has been used in many applications,
- The process requires a small foot print
- The installed HP is low at 2 hp
- The Biodisk process includes a primary settlement tank
- The process accommodates variable loadings
- The Bioscrub is used to eliminate head works odour
- Low operator intervention
- Long-term biosolids storage
- Multi-staged process
- The design incorporates a primary clarifier
- Totally enclosed system
- Huge biomass inventory
- Segregated biomass development
- Very low noise level
- Life-cycle costs of a Biodisk facility are substantially less than comparable treatment processes
- Quick process start-up times

Expanded text on the advantages of the Biodisk and other pertinent information can be seen at www.Biodisk.ca

## 4.0 REQUESTED INFORMATION

### 4.1 Cost of Operation

**1. Low power requirement**

The Biodisk has a very low power requirement and does not need additional pumps, compressors or additional equipment. The low installed power requirements are further reduced because of the low stand by generation capacity.

Power for both option one and two are 2 horse power. Installed motor hp is for start up only. When in normal operation, the motor will draw 60% of the installed hp.

**2. Small foot print**

The small foot print does not have the same cost to heat and maintain as larger facilities. The Biodisk is completely enclosed without open ponds.

**3. Sludge handling**

Sludge handling requirements are limited to once or twice per year. The sludge volume is reduced by up to 75% during operating. It can be handled at convenient times without daily or weekly handling requirements.

There are no MLSS sludge age or other tests that the operator must perform. The biomass is self-regulating and directly proportioned to the influent BOD.

**4. Assembly and Shipment**

The shaft, cover, and auxiliary components must be reassembled. All parts are shop assembled and repacked for shipment in as large a piece as feasible. Installation time is limited by good design.

## 4.2 Ease of Operation

The Biodisk does not need any operator intervention. There are no required controls or adjustments by the operator. The most demanding requirement is the greasing of the bearings every three months. The operator does not need any process skills. Operation contract requires only four visits per year.

Some of the same features of the Biodisk that are mentioned above are also applicable to the ease of operation including no process testing, yearly sludge removal, no chemical addition, limited maintenance and no pumps that all limit operator attention.

The Biodisk has a primary clarifier. Fats, oils and grease (FOG) will form a scum on the top surface of the tank. The scum is removed once or twice a year at the same time the sludge is removed. Keeping the FOG in the primary prevents the formation of unsightly hair balls.

## 4.3 Ease of Repair

We have been manufacturing RBC since 1974. Only the strong survives. Biodisk does no anticipate any problems with the shaft or disk banks. The design has been proven over time and all other components can be repaired by local trades. At many sites, the Biodisk is maintained and operated by low skilled labour.

In the case of a plant upset, the biology will self correct within several days. The biomass can not be washed out of the process. The Biodisk will self correct from organic or hydraulic shocks within 24 hours without operator intervention.

## 5.0 FUTURE EXPANSION

The Biodisk can be expanded with the addition of more shafts. It is normal to duplicate or match the existing equipment for an expansion. The Biodisk with small foot print is easier to ship assembled and cost less to heat and maintain. The foot print of the proposed equipment is on the attached drawing.

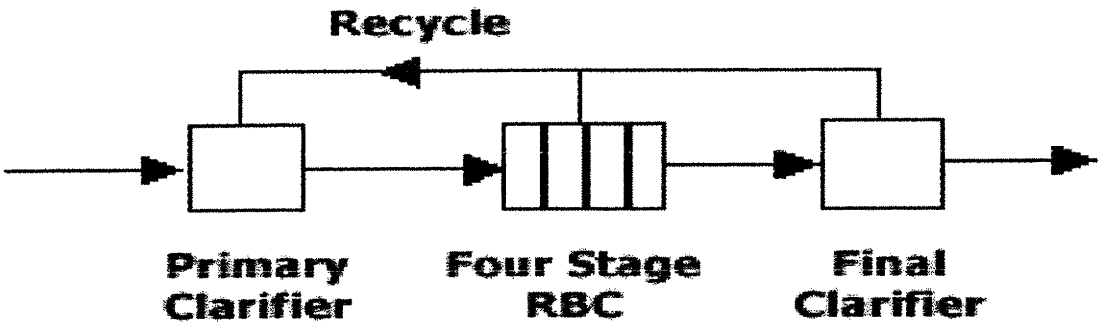
## 6.0 CHEMICAL USE AND SLUDGE GENERATION

There are no chemical requirements.

The sludge generation is up to 75% less than a suspended growth system. Sludge handling is limited to every nine months or longer. The sludge is not a waste in the process. In fact, it is used as a form of heat. Stared sludge is like a compost heap and is exothermic. Stored sludge provides a food source during no flow or low flow conditions

The fourth stage of the Biodisk is equipped with a recycle system. The recycle has many benefits including the introduction of 5 to 8 mg/l of dissolved oxygen (DO). DO in the primary reduces sludge volumes and allows the biological process to start in the primary tank.

## 7.0 PROCESS FLOW DIAGRAM




The Biodisk process requires a primary clarifier. The primary allows FOG to float, store sludge for 9 months, add heat and promote process stability.

## 8.0 ULTRAVIOLET DISINFECTION

Most of recent installations use UV disinfection. Biodisk Corp. has included it in the above option.

Trust that our proposal will meet your needs. We will be happy to answer any additional questions that may arise.

I trust that our proposal will meet your needs. I will be happy to answer any additional question that may arise. You can contact me at (204) 633-7213 and I look forward to talking with you

Yours truly,

**CENTURY ENVIRONMENTAL SERVICES**

Terry Bourassa
Sales Representative

TB/sb/I:\Century Environmental\Terry Bourassa\Quotes\2006