May 2003

Registration of Undertaking for Environmental Assessment

Remediation of Soils Containing Dry Cleaning Fluids*

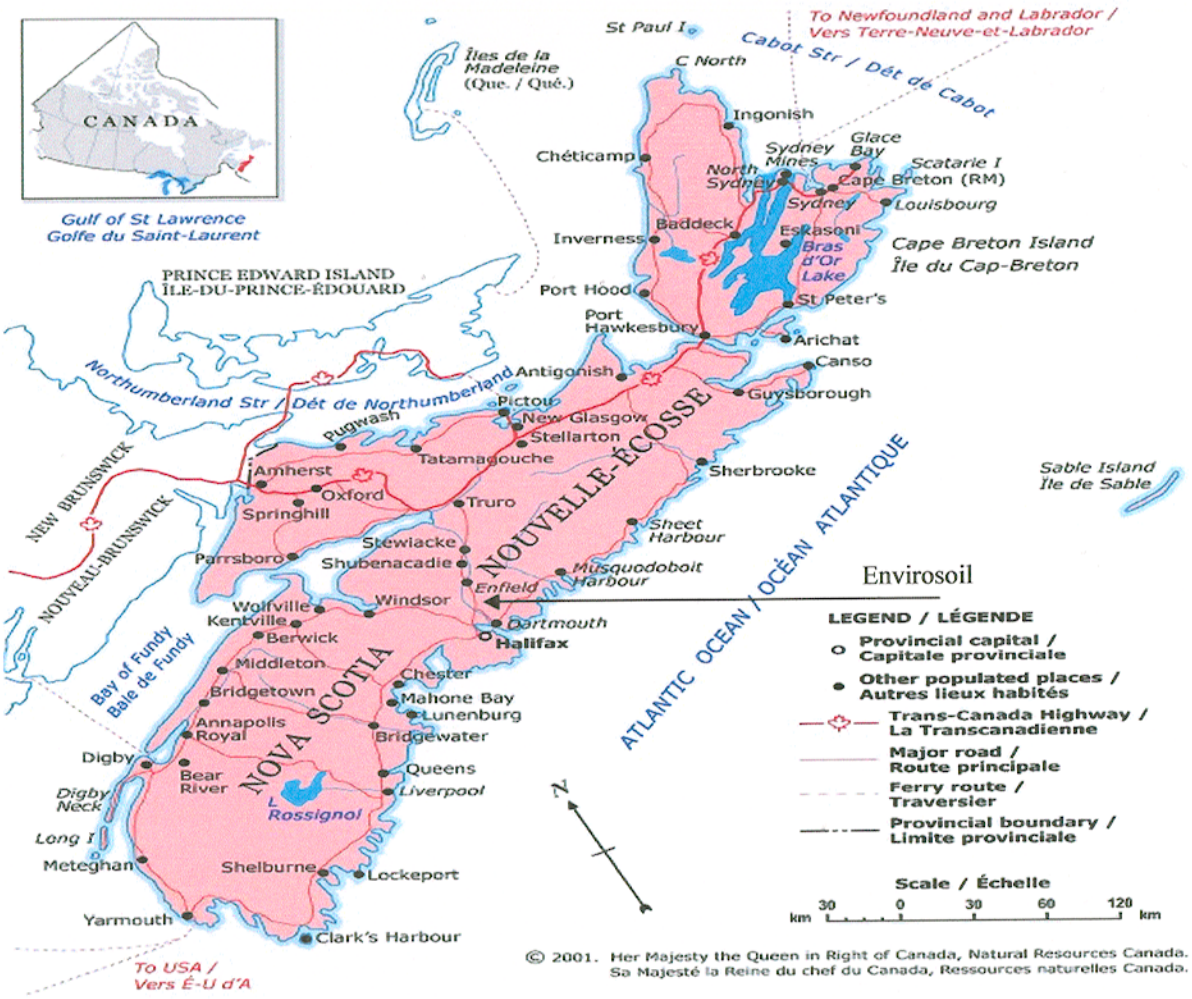
Submitted To:
Nova Scotia Department of Environment & Labour
PO Box 2107
Halifax, NS B3J 1M6

Proponent:
Envirosoil Limited
PO Box 48100
Bedford, NS B3A 3Z2

NOTE:
A copy of this document is available at:
www.gov.ns.ca/enla/ess/ea/

* **Note:** The principal component of dry cleaning fluids is perchloretheylene (PERC). PERC is also used in other common products. The various uses of PERC are as follows: 50% as a chemical intermediate, 25% as a dry cleaning/textile processing agent, 10% as an automotive aerosol, 10% as a metal cleaning and degreasing agent, and 5% miscellaneous.

Envirosoil's primary efforts will be directed at former dry cleaning sites where soils have been contaminated with PERC.


CANADA
Gulf of St Lawrence
Golfe du Saint-Laurent
PRINCE EDWARD ISLAND
ÎLE-DU-PRINCE-ÉDOUARD
NEW BRUNSWICK
NOUVEAU-BRUNSWICK
NOVA SCOTIA
NOUVELLE-ÉCOSSE
Îles de la Madeleine (Que. / Qué.)
St Paul I
C North
To Newfoundland and Labrador / Vers Terre-Neuve-et-Labrador
Cabot Str / Détroit de Cabot
Ingonish
Chéticamp
Sydney Mines
Glace Bay
North Sydney
Scatarie I
Cape Breton (RM)
Sydney
Louisbourg
Inverness
Baddeck
Eskasoni
Bras d'Or Lake
Cape Breton Island
Île du Cap-Breton
Port Hood
St Peter's
Port Hawkesbury
Arichat
Canso
Antigonish
Guysborough
Pictou
New Glasgow
Stellarton
Pugwash
Northumberland Str / Détroit de Northumberland
Tatamagouche
Amherst
Oxford
Springhill
Truro
Sherbrooke
Sheet Harbour
Sable Island
Île de Sable
Stewiacke
Parrsboro
Shubenacadie
Enfield
Musquodoboit Harbour
Windsor
Wolfville
Kentville
Berwick
Dartmouth
Halifax
Middleton
Chester
Bridgetown
Mahone Bay
Lunenburg
Annapolis Royal
Bridgewater
Digby
Bear River
Queens
Liverpool
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Meteghan
Shelburne
Lockeport
Yarmouth
Clark's Harbour
To USA / Vers É-U d'A
Bay of Fundy
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ATLANTIC OCEAN / OCÉAN ATLANTIQUE
Envirosoil
LEGEND / LÉGENDE
Provincial capital / Capitale provinciale
Other populated places / Autres lieux habités
Trans-Canada Highway / La Transcanadienne
Major road / Route principale
Ferry route / Traversier
Provincial boundary / Limite provinciale
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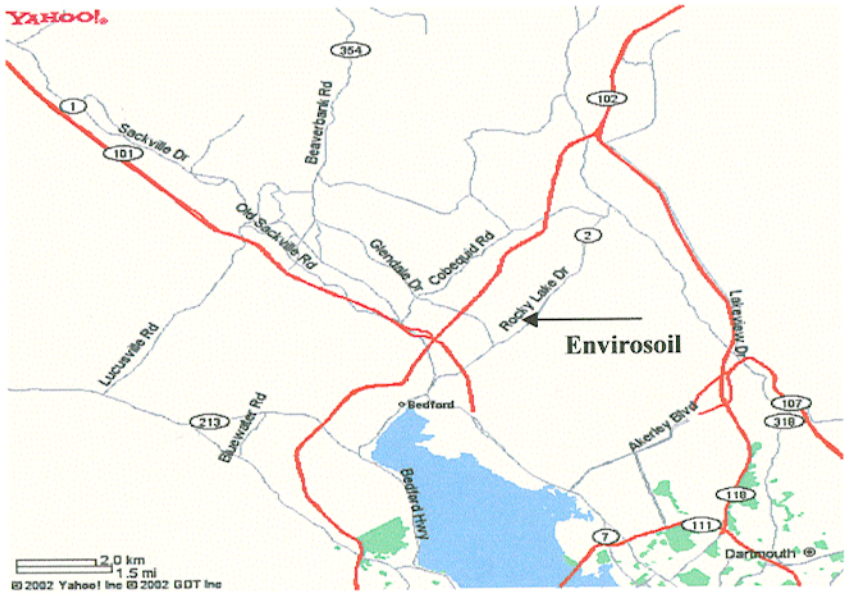
Sa Majesté la Reine du chef du Canada, Ressources naturelles Canada.


YAHOO!
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1
Sackville Dr
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Beaverbank Rd
102
Old Sackville Rd
Glendale Dr
Cobequid Rd
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Rocky Lake Dr
Lacewood Dr
Envirosoil
Lucasville Rd
213
Bedford
Bluewater Rd
Bedford Hwy
Akerley Blvd
107
318
118
111
7
Dartmouth
2.0 km
1.5 mi
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Table of Contents

Appendices

Section 1.0

Introduction

Section 1.0 Introduction

1.1 Introduction

Envirosoil Limited, Waverley, Nova Scotia first began soil bio-remediation operations in 1992. Since that time, the requirement for soil remediation has changed as has the market condition and supplier response.

This Registration Document represents a step forward in Envirosoil's efforts to respond to a changing market condition. Further, this Registration Document also reflects a new challenge that is being placed before companies that remediate soil in this province. The challenge is to improve technologies to remediate local sites that previously necessitated exporting contaminated soils to landfills or facilities in Ontario or Quebec.

Since its inception over ten years ago, the company has undergone a number of changes. These represent improvements in processes as well as changes to the types of soils that are being remediated.

First starting as a bio-remediation facility, the company in 1995 acquired advanced technical equipment to treat contaminated soils. This equipment was the Low Temperature Thermal Desorption (LTTD) unit. The benefits of this equipment were multi-fold but, most particularly, it provided a much higher reliability and consistency of output for treatment of soils in need of remediation. Further, the range of contaminated soils that could be treated was able to be broadened…again under more reliable and consistent conditions.

Operating in Waverley, Nova Scotia directly across from the Bedford Industrial Park, the company has for the past several years been treating soils contaminated with Total Petroleum Hydrocarbons (TPH's). The term TPH refers to such products as; gasoline, diesels and related petroleum. Additionally, the company treats soils contaminated with Polycyclic Aromatic Hydrocarbons or PAH's. These refer to such products as heavy petroleum (bunker) and creosote. Drilling muds used in the offshore oil and gas industry are also treated at Envirosoil.

The company now wishes to treat soils contaminated with dry cleaning fluids and related products. This is the purpose of this Registration of an Undertaking for Environmental Assessment.

Increasingly Envirosoil is being required to treat soil contaminated with dry cleaning fluids and related products. This requirement is coming from various parts of the province. There are several issues at hand with respect to this situation. Sites that are contaminated with these substances are either being abandoned by owners or these soils

are being sent to Ontario or Quebec for incineration or landfill. Because of the expense of this last option, local sites are often being left abandoned. This creates either risk for the local communities, the lowering of local property values, or a disincentive for land development at the site or abutting areas. Further, sites may be managed to monitor movements of contaminants (which may limit site uses) or may go unreported due to fear of expensive assessment and remediation.

The additional factor is that exporting contaminated soils out of the province is meeting with increasing negative reaction from the public and elected persons. As an example, Halifax Regional Municipality HRM recently instituted a 'flow control' bi-law. This means that solid waste can no longer be exported out of the HRM. It must be handled within the border of HRM.

Envirosoil Limited has undertaken a considerable amount of work in the preparation of this Registration Document. This includes technical work related to the specification and operating conditions for the LTTD equipment such that it can successfully treat soils impacted with dry cleaning fluids and related products. Operating conditions related to the storage of such soils has also been planned for in preparation for this document. As well, a considerable amount of consultation has taken place with the local community including elected and civic leaders.

Envirosoil has been receptive to comments made during these consultations. Of note, the company has adopted the suggestion of a Community Liaison Committee (CLC). This is a valuable means for local community representatives to review the performance of the LTTD as it relates to treatment of soils contaminated with dry cleaning fluids.

In sum, Envirosoil believes that an approval to operate the existing LTTD equipment to treat these contaminated soils serves an important environmental requirement in the province. Also the operations of the equipment will be done in a manner that will best include the input of the surrounding civic areas. This is through the CLC process.

1.2 Registration

Name of Undertaking:	Remediation of Soils Containing Dry Cleaning Fluids (and related products)
Location of Undertaking:	Rocky Lake Quarry, Rocky Lake Road, Waverley, Nova Scotia
Proponent:	Envirosoil Limited
Project manger:	Dan Monk
Head Office:	PO Box 48100 Bedford, NS B4A 3Z2
Contact Methods:	Tel: (902) 835-3381 Fax: (902) 835-7300 Email: dmonk@dexter.ca

Authorized Signing Officer
Dick Tiller, P.Eng., General Manager

May 1/03
Date

Contact person for the purpose of environmental registration.

Contact: Mr. Peter C. Dwyer
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5171 George Street, Suite 300
Halifax, NS B3J 1M6
Tel: (902) 492-0008
Fax: (902) 492-0128
Email: pdwyer@williamalexander.ca

1.3 Project Consultants & Document Preparation

- William Alexander & Associates Limited
  - → Management and permitting process
  - → Document preparation
  - → Consultation and communication
  - → Regulatory interface

- Jacques Whitford Environmental Limited
  - → Environmental setting
  - → Monitoring and mitigation programs
  - → Emissions and related criteria

1.4 Applicable Legislation

Envirosoil is required to register this project as a Class I Undertaking pursuant to the Nova Scotia Environment Act and Environmental Assessment Regulations. Other relevant provincial regulations include the Activities Designation Regulations which requires an Industrial Approval from NSDEL for the operation as well as the Nova Scotia Occupational Health and Safety Act (1996).

1.5 Public Funding

Public sector funds are not being sought with respect to this undertaking.

1.6 Approvals for Undertaking

The following are additional approvals required for this undertaking:

- → Amendment to existing operating permit (see Appendix L) under Activities Designation Regulations, Division 4.

Section 2.0

Proponent Information

Section 2.0 Proponent Information

2.1 Proponent Background

The following are corporate details of Envirosoil Limited

Incorporation:	Province of Nova Scotia
Date of Incorporation:	December 1991
Years of Continuous Operation:	12 years
Approximate Number of Employees:	3 full time, 8 part time
Certifications:	December 2002 ISO 14001+9001
Location of Operations & Market:	Atlantic Canada
Usual Period of Operations:	May to November
Principle Equipment:	Astec Industries LTTD Unit
Awards and Recognitions:	Nova Scotia Export Achievement Award for Shell Brunei Project, 2000
Professional Affiliations:	Nova Scotia Environmental Industries Association New Brunswick Environmental Industries Association Offshore/Onshore Technology Association Nova Scotia Newfoundland Offshore Industries Association

The following are the corporate details of Envirosoil's parent company:

Name:	The Municipal Group of Companies Limited
Date of Inception:	1963
Years of Continuous Operation:	40
Approximate Number of Employees:	1,000
Principal Businesses:	Quarrying, Solid Waste Management, Trucking, Road Paving, Construction
Location of Operations & Market	Atlantic Canada
Awards and Recognitions:	Lieutenant Governors Award; Design/Build of Otter Lake Solid Waste Management Facility, 2001
Professional Affiliations:	Construction Association (Nova Scotia & New Brunswick) Road Builders Association (Nova Scotia & New Brunswick) Construction Safety Association (Various Safety Awards)

2.2 Permitting History

In the mid and late 1980's, proper treatment of contaminated soils became an issue with regulators, land use planners, developers and the public. As a consequence, there was demand for the treatment and/or disposal of these soils.

Aside from trucking to other provinces for landfilling or incineration, the treatment processes available were bio-remediation or Low Temperature Thermal Desorption Process (LTTD).

In 1992, Envirosoil Limited applied for and received a permit to provide bio-remediation services for contaminated soils. At this time, the permit was for Total Petroleum Hydrocarbons (TPH's) referring to soils impacted with gasoline, diesels, and related hydro-carbons.

The Envirosoil site, located in the 3,600 acre facility of Municipal Group of Companies, designed a handling facility for storage of incoming TPH contaminated soils. This includes clay lined storage pads, ground and service water monitoring stations, storm water detention and aeration and water treatment facility lagoon. These design features were approved by the Department of Environment.

Market conditions, in the form of a general increase in demand for services as well as the varying types of contaminated soils necessitated consideration of other treatment processes by Envirosoil Limited. Additionally, the varying successes of the bio-remediation process added to the requirement for Envirosoil to examine new methods.

Bio-remediation is mostly dependant on warm temperatures and dry conditions and granular soils in order to forward the remediation process. Climate in Nova Scotia was found to be marginally adequate. Thus, output of end product in the form of remediated soil was unpredictable. Additionally, the demand was increasing to treat soils of higher concentration of TPH as well as the additional demand to treat soils impacted with Polycyclic Aromatic Hydrocarbons (PAH's). Bunker, creosote and coal tar contain high concentrations of PAH's.

In 1995, Envirosoil applied for and received permission to operate their newly acquired Low Temperature Thermal Desorption (LTTD) unit. This unit was acquired in response to the aforementioned changes in market demand as well as concerns about the commercial effectiveness of the earlier adopted bio-remediation process.

Following successful testing of the equipment, the company was granted an amendment to its original permit to carry out activities using a LTTD process for remediation of contaminated soils with TPH's. In early 1997, following a test evaluation, the company was granted an approval to treat low levels of PAH's. More recently, the company has been granted approval to treat offshore drilling muds.

At the same time, the Department of Environment and Labour (NSDEL) has modified some of its polices with respect to the treatment of certain contaminated soils. In particular the policy relating to PAH'S has been modified (April 2002) thus allowing the company to treat soils contaminated with higher levels of this substance. Also, application procedures have changed for review of proposals to treat soils contaminated with, for example, perchloroethylene (PERC). (See Appendix A.)

The registration document reflects the new requirement and procedures to seek approval to treat PERC.

Section 3.0

Project Description & Undertaking

Section 3.0 Project Description & Undertaking

3.1 Nature of Undertaking

This document reflects Envirosoil interest in treating soils impacted with perchloroethylene (PERC). The treatment process would be by Low Temperature Thermal Desorption (LTTD). As detailed in the following section, the equipment would be adjusted and modified to suit the particulars of the treatment required for PERC.

In submitting this Registration Document, Envirosoil believes that there are a number of compelling considerations behind a decision to treat PERC at the facilities of the company. These are as follows

- *Civic and Regional Requirement:* Within Halifax Regional Municipality HRM, there are a number of PERC contaminated sites. Similarly, there are a number of other such sites within the province. At the moment, there are no facilities to treat such contaminated soils within the province or in fact, the Atlantic Region. The option available is for shipment out of the province to landfills or incinerators in Quebec or Ontario. Faced with the very significant trucking and tipping fees, the option often chosen is to leave contaminated sites abandoned. Recent legislation within the Provinces of Quebec and Ontario will make it increasingly difficult for the export out of the province. This compounds the situation by making more attractive the abandon site option. In some cases, contaminated soils are 'managed' at site.
- *Prevalence of PERC Contaminated Sites:* The American Association of Dry Cleaners has recently estimated that 92% of land sites previously used by dry cleaners are contaminated with PERC. While there may become variance in Canada, the situation is likely somewhat the same. If this is the case, within the Province of Nova Scotia we are likely to see the identification of a number of contaminated sites. Already, there are a number of such sites that are recognized as abandoned.
- *Community Involvement:* Envirosoil has been conducting its operations in Waverley, Nova Scotia on an incident free basis for more than ten years. Its parent company, the Municipal Group of Companies operates with a Community Liaison Committee (CLC) with respect to some of its quarry operations…again in the same site area as Envirosoil. Envirosoil is proposing to establish a Community Liaison Committee (CLC) with respect to the PERC aspect of its operation. In earlier discussions with elected and civic leaders of the general area, the CLC has been identified as a useful means of building community understanding of the PERC operation at Envirosoil. Further, this will serve as a means for the community to provide advice to Envirosoil on this aspect of their operation.

In sum, this undertaking reflects an increased need for the local region to remediate its own contaminated soils. This is without resorting to the export-out-of-the-region option, this in itself shortly to become not available. And this option reflects increasingly public pressure in Ontario and Quebec for regions to deal with their own waste. Additionally, this undertaking reflects the availability to provide the most technologically advanced solution to this important challenge. This would be by a company that has more than ten years experience in remediation contaminated soils, seven of these years using the LTTD process.

3.2 Description of Facilities & Equipment: (See Appendix M: Facilities)

3.2.1 *Site Excavation & Transport:* All sites, which are suspected to be impacted with PERC due to historical property usage, are tested for impacts before excavation or removal from the impacted site. Prior to any soil leaving an impacted site the site professional will provide the testing to the approved facility to confirm the material is acceptable for receipt. Once the approved facility has approved receipt of the soil, the soil is excavated and loaded into tandem and trailer trucks for transport to an approved facility for disposal. Before the soil leaves the impacted site a soil manifest (record of origin) is completed by the onsite professional. The manifest accompanies the load to the facility and is approved upon delivery to the facility.

The transportation services are the responsibility of the transport company and all requirements for safe, effective transport lies with the transport company. Typically, no special transport conditions are required, with the exception of tarping of the load to prevent soil from being blown off the load or poly lining of the truck box to prevent spilling of impacted soil from the tailgate. This is the responsibility of the trucking company and site professional.

Receipt at an Approved Facility: All soil received at the approved facility is weighted to track the volume of material being delivered. The soil manifest is reviewed by facility personnel to confirm the origin of the material. The soil is then stock piled at the facility to await treatment.

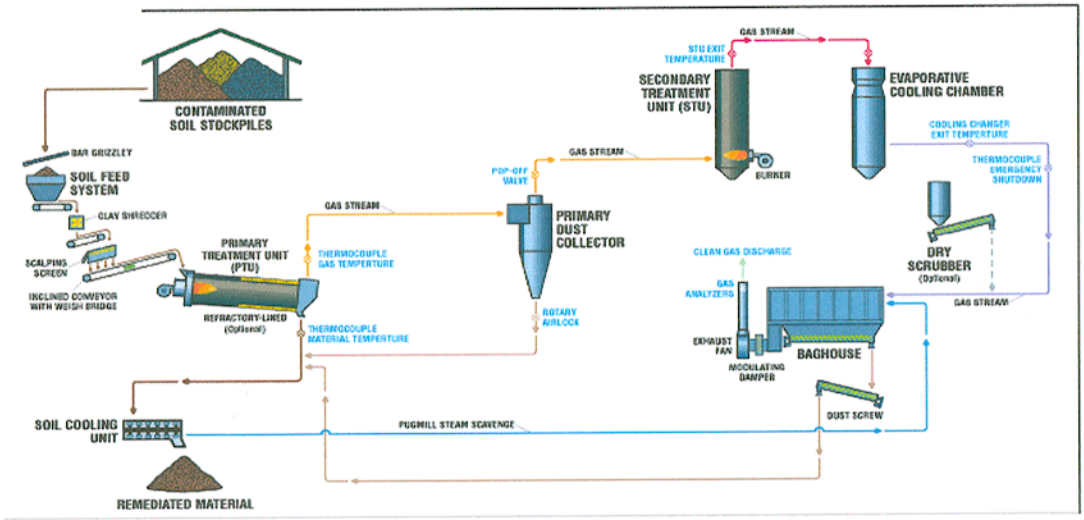
The stock piling procedure is completed using an excavator, which can pile the material into approximately 6 m (20 ft) high piles. Using the excavator bucket the side slopes of the piles are slicked or smoothed allowing the pile to be effectively sealed against moisture infiltration and erosion from precipitation or wind. The use of tarps to cover the piles is not an effective approach as wind and excessive handling of the tarps cause more of a concern then a benefit.

Primarily, PERC impacts are found in clays, which are easily stockpiled and compact well to form an effective barrier to moisture infiltration and erosion. Onsite water management and facility monitoring is completed to confirm stock pile management procedures are effective.

The storage capacity of the facility related to PERC impacted soil may be specified in the amended approval. Currently the facility has a capacity of 150,000 tonnes of soil. It is expected that the potential volumes of PERC impacted soil in Nova Scotia could approach 10,000 tonnes annually. Others regions, outside Nova Scotia, have not been evaluated.

Pretreatment: In order to treat soil via Low Temperature Thermal Desorption (LTTD), the soil must first be screened to remove rock greater than 2" diameter. During the screening process all impacted soil is removed from the surface of the rocks leaving the rocks free of contamination. Once the rock has been cleaned via the screening process, the rock is monitored and routinely sampled, to ensure all impacted soil is removed. The clean rock is then used for various quarry restoration projects. The 2" minus material is restock piled in preparation for thermal treatment.

Thermal Treatment: See flow diagram of the LTTD unit for location of the individual LTTD components as they are outlined hereunder.



1. Feed System: The purpose of the feed system is to provide a consistent and homogeneous soil feed to the thermal unit. The system is designed to allow for easy change of feed rates as required or can be stopped in the event that the process requires shutdown. Soil is fed into the thermal unit via 950 Cat Loader. The feed system consists of two hoppers with variable speed conveyor belts to feed the soil to the Primary Treatment Unit (PTU).

Safety features include a shut off mechanism to stop soil feed in the event of temperature drop or other mechanical problem.

2. Primary Treatment Unit (PTU): The purpose of the PTU is to heat the soil to the point which the contaminants change phase from a liquid to a gas and are removed from the soil as they vaporize. The PTU consists of a flighted rotating drum, which is directly heated by a EC 75 Burner. As the soil enters the drum it is heated to 900 degrees Fahrenheit. The flighting within the drum allows for consistent heating of the soil and removal of contaminants. The boiling point of the contaminants is known and consistent, therefore consistent operation of the PTU at proven temperatures ensures effective soil treatment.

   Soil temperature is confirmed using a soil temperature probe, which continuously monitors soil discharge temperatures.

   The treated soil is then discharged from the PTU into a Pugmill for rehydrating and cooling. As the soil is discharged from the Pugmill it is sampled and tested at an approved laboratory to ensure the soil has been effectively treated prior to use as quarry restoration material.

3. Secondary Treatment Unit (STU): The purpose of the STU is to heat the contaminants that have been removed from the soil, to the point of destruction. As the contaminants are vaporized from the soil in the PTU they are drawn, via an induced draft fan, into the STU. As the contaminated gas stream enters the STU it is heated to 1800 degrees Fahrenheit by a second EC75 burner, at the same time as the gas stream is being heated, air (oxygen) is also being added to the process. The physical heating of the contaminants allows the bonds of carbon, hydrogen and chlorine to be broken. The addition of oxygen, which is controlled to ensure 3% excess, drives the carbon to form Carbon Dioxide and the hydrogen to form water. The chlorine remains free until it is treated at the dry scrubber.

   The temperature of the STU is continuously monitored using three (3) temperature probes located at the exit to the STU. The oxygen is monitored using a gas analyzer to confirm operation with greater than 3% oxygen at the exit to the STU.

   In the event that the STU or Dry Scrubber goes offline or STU drops below specified treatment temperatures during operation the soil feed is shut off until proper operating conditions are restored.

   Given the operating conditions and feed rates during proper operating conditions, a maximum of 3-3.5 tonnes of soil could be located in the PTU at any given time. If the STU or Dry Scrubber goes off line during treatment the limited contaminant in the PTU would be directed to the STU and then treated

for particulate prior to release into the atmosphere. It is important to note that the STU is a refractory lined unit, which does not loose temperature instantly.

Emissions are monitored continuously during operations, as per our facility operating approval and any additional monitoring would be subject to an amended approval.

4. Evaporative Cooling Chamber (ECC): The purpose of the ECC is to cool the treated gas stream before it enters the baghouse for removal of particulate (dust). The ECC is composed of a vertical chamber fitted with water nozzles, which inject a mist of water into the gas stream and this allows the temperature to drop from 1800 degrees Fahrenheit to 450 degrees Fahrenheit. All water added for cooling is converted to steam and maintained as steam until released to the atmosphere after treatment through the baghouse.

   The temperature at the exit of the ECC is monitored continuously via a temperature probe located in the ductwork between the ECC and the baghouse.

5. Dry Scrubber: The purpose of a dry scrubber is to add lime to the cooled gas stream to neutralize the chlorine which was freed during the destruction process in the STU. Lime is continuously metered into the ductwork between the ECC and the baghouse based on requirements established during demonstration testing. As the Lime (CaO) is added to the gas stream the Calcium and Chlorine combine to form Calcium Chlorine which will form part of the treated soil matrix and the oxygen is freed and released to the atmosphere. The dry scrubber unit is installed prior to operation of the LTTD unit for PERC treatments.

6. Baghouse: The purpose of the baghouse is to filter particulate from the gas stream before release to the atmosphere. The baghouse is equipped with 1216 filter bags.

   The entire system is operated under a negative pressure imposed by an induced draft fan (ID Fan), which promotes an air flow through the PTU, STU, ECC, and baghouse. The emissions are monitored to confirm compliance with the facility approval.

Treated Soil Disposal: Once soil has been treated via the LTTD, samples collected during the treatment are sent to an approved laboratory to confirm effective treatment to CCME Residential criteria, using the EPA 624 Scan, which will cover all chlorinated compounds. Once treatment has been confirmed the soil is removed from the site and placed in the quarry to be used for quarry restoration.

Testing, Monitoring, Reporting: Source emissions testing is conducted as an integral part of the facility approval and is completed by an independent consultant and reported to Nova Scotia Department of Environment and Labour (NSDEL).

Note: A demonstration test on a spiked volume of impacted soil (to further demonstrate the LTTD treatment capacity) could be a condition of the facility approval.

Quarterly and annual reports are prepared and presented to NSDEL for all ground water and surface water monitoring, soil testing for soil received, and overall operating conditions of the facility.

3.3 *Operating Schedules, Construction Considerations, Expected Volumes*

Envirosoil operates on a year-round basis. It maintains full time office with accessibility on a 24 hour basis. While the company is open to evaluating and receiving contaminated soils on a year round basis its principal equipment, the LTTD, unit operates on a seasonal basis.

The normal season of operation for the LTTD unit is May through to November. During the operating season, the equipment is operating 24 hours a day, seven days a week. Soils that are either frozen, too cold or too moist make for an inefficient operating condition for the LTTD unit. Extra energy and handling would be required. In the future, the company may operate on a year round basis. This may require the addition of soil storage sheds.

In the case of the proposed treatment of PERC, the intent would be to follow the company normal season of operation (approximate May to November).

In terms of additional construction required at the site for the treatment of PERC, the existing facilities would be adequate. If approved the company would likely commence PERC treatments by early summer of 2003.

Expected volumes, depending on market conditions would be up to approximately 10,000 tonnes per year of to-be treated PERC contaminated soils.

3.4 *Employment & Contractor Benefits*

Envirosoil Limited and it parent company, the Municipal Group of Companies, are Nova Scotia registered and incorporate companies. The head offices of both these operations are located in Waverley, Nova Scotia. The majority of employees of the two firms come from within the boundaries of Halifax Regional Municipality HRM. Municipal taxes of the two firms would accrue to the HRM.