

Nova Scotia Department of Environment & Labour

TERMS AND CONDITIONS OF APPROVAL

Project: Envirosoil Limited
Oily Soil Treatment Facility
315 Rocky Lake Drive
Bedford, Halifax Regional Municipality, N.S.

Approval No: 2002-026440 (Amendment #4 of Approval #92-004)

File No: 33000-31-/BED- 026440

Reference Documents:

- Application dated April 23, 2002 and attachments
- All previous documentation on this process contained in file 11-92-008 and 92100-30-/BED-29.

TERMS AND CONDITIONS:

This Approval authorizes the Approval Holder to store, treat and dispose of petroleum hydrocarbon, barium based drilling mud waste ("drill mud waste") and polycyclic aromatic hydrocarbon ("PAH") contaminated soil subject to the following terms and conditions:

1. Definitions

- "Regional Manager" means the Manager of the appropriate Regional Office of the Nova Scotia Department of Environment and Labour or his/her designate.
- The "Minister" is the Minister of the Nova Scotia Department of Environment & Labour and the "Department" is the Nova Scotia Department of Environment & Labour.

2. SCOPE OF APPROVAL

- Reference "Jacques Whitford Drawing 8370-7-1, January 16, 2001, Envirosoil Ltd., Soil Recycling Facility, Site Plan and Monitor Well Locations."
This approval (the "Approval") relates to Envirosoil Limited (the "Approval Holder") and their oily soil treatment facility (the "Facility") to store, treat and dispose of barium based drill mud waste, petroleum hydrocarbon, creosote, coal and polycyclic aromatic hydrocarbon contaminated soils at 315 Rocky Lake Drive within the property of the quarry operated by Municipal Enterprises Limited (the "Site").

- (b) This Approval relates to the application of low temperature thermal desorption technology (the "LTTD unit") for barium based drill mud waste and petroleum and PAH impacted soils only.
- (c) For the purpose of this Approval, PAH impacted soils which are acceptable for treatment are as defined in the "Policy for the Handling and Treatment of Petroleum Hydrocarbon Contaminated Soils Impacted with Polycyclic Aromatic Hydrocarbons(PAH's)", April 6, 2002 and subsequent revisions.
- (d) Soils containing contaminants which would cause them to be classified as waste dangerous goods as defined in the *Dangerous Goods Management Regulation* are not to be treated at this Facility, with the exception of those soils specifically exempted by the "Policy for the Handling and Treatment of Petroleum Hydrocarbon Contaminated Soils Impacted with Polycyclic Aromatic Hydrocarbons(PAH's)".
- (e) Approval # 2002-026440 replaces Approval # 92-004 (Amendment #3) dated April 1999 which is now null and void.

3. GENERAL TERMS AND CONDITIONS:

- (a) The Approval Holder shall operate it's Facility in accordance with provisions of the:
 - i) *Environment Act*, S.N.S. 1994-95, C.1;(the "Act")
 - ii) Regulations pursuant to the above Act;and
 - iii) Any future amendments to the Act and regulations;
- (b) The Minister reserves the right to modify, amend, or add terms and condition to this approval at anytime.
- (c) Pursuant to the *Approvals Procedure Regulations*, this Approval is not transferable without the written consent of the Minister.
- (d) (i) Subject to subsection 58(2)(b) and (4) of the Act, if the Minister determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister may cancel or suspend the Approval until such time as the Minister is satisfied that all terms and conditions have been met.
 - (ii) Notwithstanding (i) any non-compliance with this Approval is subject to the penalty provisions of the Act.
- (e) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

(f) The Approval Holder shall notify the Nova Scotia Department of the Environment prior to any proposed extensions or modifications of the Facility, including process changes or waste disposal practices which are not granted under this Approval. Extensions or modifications to the Facility may be subject to the *Environmental Assessment Regulations*.

(g) (i) All monitoring results or other reports submitted to the Department under this Approval and for the specified Site shall be sent to the following address:

Nova Scotia Department of Environment & Labour
Central Regional Office
1595 Bedford Highway
Mezzanine Level, Suite 224
Bedford, Nova Scotia
B4A 3Y4
Phone (902) 424-7773
Fax (902) 424-0597

(ii) All monitoring results shall be submitted on a quarterly basis unless otherwise specified by the Department.

(h) All samples required to be collected and analysed under this Approval shall be collected by the Approval Holder and analysed in accordance with recognized standard procedures.

(i) All samples required by this Approval shall be analysed by a laboratory that is:

i) Accredited by the Standards Council of Canada

ii) Accredited by another agency recognized by the Nova Scotia Department of Environment and Labour to be equivalent to the Standards Council of Canada

iii) Maintaining an acceptable standard in a proficiency testing program conducted by the Canadian Association for Environmental Analytical Laboratories for all parameters being reported

iv) Maintaining an acceptable standard in a proficiency or performance testing in another program considered acceptable to the Nova Scotia Department of Environment and Labour for all parameters being reported.

- (j) Any non-compliance with limits established by this Approval shall be reported, forthwith to the Central Regional Office of the Nova Scotia Department of Environment & Labour.
- (k) Pursuant to Section 60 of the *Act*, the Approval Holder shall submit to the Minister any new and relevant information respecting any adverse effect that actually results or may, potentially result from activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.
- (l) Nothing in this Approval grants the Approval Holder the authority to contravene any other existing federal, provincial or municipal legislation including any municipal bylaws and zoning restrictions.
- (m) The Approval Holder shall retain a copy of the terms and conditions of this Approval on Site during the periods of operation and reclamation of the Facility, the Site and its associated works.
- (n) This Approval shall remain in effect for a period of ten (10) years from the date of signing unless otherwise amended, revoked or renewed within this period.

4. LIABILITY INSURANCE

The Approval Holder shall maintain Third Party Environmental Liability Insurance of at least \$1,000,000 to cover clean up costs in the event of contamination caused by the operation of this Facility. The coverage shall name the Department as an insured and the issuing agency must provide notice to the Department 30 days prior to cancellation of the policy.

5. ACCEPTANCE CRITERIA

- (a) (i) Soils shall only be accepted at the Site with appropriate documentation and analytical characterization. Minimum analysis shall include total benzene, toluene, ethylbenzene and xylene (BTEX), total petroleum hydrocarbons (TPH) and benzene. Analysis for PAH parameters listed in Table 1 shall be conducted on all soils which indicate that a specific PAH is detectable through the required BTEX\TPH analysis.
- (ii) Analysis previously carried out at the source as a result of environmental investigations shall constitute compliance with condition 5(a)(i). This condition is exempted for situations involving contamination from domestic petroleum hydrocarbon fuel oil spillage.

- (b) (i) The Approval Holder shall not accept drill mud waste or soils contaminated with petroleum hydrocarbon or PAH which also contain inorganic metal contaminants exceeding the most recent "Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines" Industrial Criteria for soil.
 - (ii) With the exception of condition 5(b)(i), the Approval Holder shall not accept drill mud waste or soils contaminated with petroleum hydrocarbon or PAH which also contain other contaminants exceeding the most recent "Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines" Residential/Parkland Criteria for soil.
 - (iii) All drill mud waste and soils with contaminants exceeding those identified in Conditions 5(b)(i) and (ii) shall be reported to the Department for review prior to acceptance at the Site. The Regional or District Manager may approve the treatment of soils and subsequent disposal on a case by case basis. Leachate testing of soils for specific parameters may be required to determine acceptance and disposal/reuse requirements.
 - (iv) Exemption to condition 5(b)(i) is extended to the parameter of barium when it is associated with barium sulphate in the drill mud waste.
 - (v) Soils which can be reasonably suspected of containing contaminants such as inorganic, halogenated or chlorinated compounds shall be analysed for specific contaminants consistent with condition 5(b)(i) and (ii) prior to acceptance for treatment at the Facility.
- (c) Only soils which are generated in Nova Scotia or within the immediate offshore area of the Province of Nova Scotia shall be treated at the Facility under the conditions of this Approval, unless otherwise approved by the Regional Manager or District Manager.

6. SOIL DELIVERY

- (a) Soil shall be accepted during normal working hours and every load shall be fully documented with the following information:
 - (i) Date and time of arrival
 - (ii) Name and address of source
 - (iii) Quantity (weight and volume)
 - (iv) Name of transport company
 - (v) Truck registration number
 - (vi) Name and license of truck owner
 - (vii) Proof of analysis
 - (viii) Name of contact approving shipment at source

- (b) The above condition may be exempted for emergency situations. The Facility may accept contaminated soil from emergency response incidents with prior authorization from the Department without the need for prior sampling or testing. This material shall be stored in a separate stockpile at the Site until analysis of soil can be completed.

7. SOUND LEVELS

- (a) Sound levels measured at the Site property boundaries shall not exceed the following equivalent sound levels (Leq):

65dBA (0700-1900 hours) Day
60dBA (1900-2300 hours) Evening
55dBA (2300-0700 hours) Night

- (b) Monitoring of sound levels shall be conducted at the request of the Regional Office.

8. AIR EMISSIONS

Fugitive Dust Emissions

- (a) Fugitive dust emissions shall not exceed the following limits at the Site property boundaries:

Annual Geometric Mean	70 $\mu\text{g}/\text{m}^3$
Daily Average (24 hr.)	120 $\mu\text{g}/\text{m}^3$

- (b) The generation of fugitive dust emissions from the Site will be suppressed by the application of water sprays, or the application of other suitable dust suppressants approved by the Regional Office. The use of waste or used oil is not permitted.
- (c) Monitoring of fugitive dust emissions shall be conducted at the request of the Regional Office.

Ambient Air

- (d) The Approval Holder shall ensure that air emissions from the Facility do not contribute to an exceedance of the maximum permissible ground level concentrations specified in Schedule "A" of the *Air Quality Regulations*.
- (e) Where the Approval Holder is contributing to exceedances of the Schedule "A" concentrations, the Approval Holder shall be required to implement a corrective action plan which may include ambient air monitoring or air modelling.

- (f) The Approval Holder shall be required to monitor ambient air ground level concentrations or complete air modelling for selected contaminants at the request of the Department. Monitoring and air modelling procedures shall meet the approval of the Department. Ambient air ground level monitoring or air modelling may be requested if results of stack testing or continuous emissions monitoring indicate a potential non-compliance with the terms and conditions of this Approval.

Stack Emissions

- (g) The LTTD unit shall be stack tested for compliance with the emission criteria established in Table 1 and condition 8(m) (ie. all PAH contaminants listed in CCME, Canadian Environmental Quality Guidelines) within the first six (6) months following the signing of this Approval and every two years thereafter.
- (h) The test shall be conducted while processing PAH and petroleum hydrocarbon contaminated soils which are acceptable to the Department.
- (i) The following parameters shall be continuously monitored and recorded whenever the LTTD unit is in operation:
- carbon monoxide concentrations in the stack gas,
 - gas temperature at the exit from the secondary treatment unit (STU),
 - the baghouse pressure drop.
 - gas temperature at the inlet to the baghouse
 - oxygen concentration at the outlet to the STU

Note: Continuous monitoring for opacity may be required by the Department if particulate emissions become a concern.

- (j) The baghouse shall be fully functional and in operation whenever the LTTD unit is operating. A preventive maintenance program shall be implemented to ensure the baghouse is operating to expected efficiency.
- (k) Corrective actions, additional air emission controls and/or additional monitoring may be required if off-site impacts, such as odor or particulate become a problem.
- (l) The Approval Holder may be required to make modifications to the Facility or the LTTD unit if there is sustained non-compliance with the air emission limits established in this Approval or if Destruction and Removal Efficiency (DRE) for PAH's or particulate removal efficiency drops below the results of the test burn evaluation.

- (m) The DRE for PAH destruction and removal from the LTTD unit shall be at minimum 99.99%. DRE shall be calculated based on the total mass of all PAH inputs to the airstream and PAH outputs to the stack.

$$\text{DRE} = 100\% * (1 - \text{PAH}_{\text{out}} / \text{PAH}_{\text{in}})$$

LTTD Unit Operating Conditions During PAH Destruction

- (n) The average minimum operating temperature for treatment of PAH impacted soils shall be 955° C at the outlet to the secondary treatment (STU). This minimum operating temperature shall only be modified with the prior written approval of the Department.
- (o) The average maximum baghouse inlet temperature shall be 215° C.
- (p) Maximum pressure drop across the baghouse shall be 3-6 inches of water.
- (q) The minimum permissible oxygen concentration shall be 3% at the outlet to the STU.
- (r) Stack monitoring may be requested by the department if the Approval Holder experiences difficulty in maintaining the LTTD Unit operating conditions specified by this Approval.
- (s) The Approval Holder shall ensure that all design emergency shutdown and alarm features of the LTTD unit are operational prior to processing of soils.

9. SOIL TREATMENT AND CONFIRMATORY SAMPLING

- (a) All soils shall be treated to the criteria established in Table 3.
- (b) Confirmatory sampling for treated soils shall be in accordance with the following minimum protocol for each batch of soil which is delineated:

<u>Soil Volume (Tonnes)</u>	<u>No. of Composite Samples *</u>
1 - 50	1
50 - 500	2
500 - 1000	3
1000 - 2000	4
2000 - 5000	5
Each Additional 2000	1 Additional

* A composite shall consist of at least 3 representative grab samples.

- (c) Alternately the Approval Holder shall submit a protocol for confirmatory sampling of soils treated by the LTTD unit. The protocol shall be approved by the Department prior to removal of these soils from the Site.
- (d) Compliance monitoring for PAH's and total phenols shall only be required on soils which have been predetermined as containing PAH's that exceed the CCME parkland/residential criteria.
- (e) All treated soil is to remain on-Site unless prior written authorization for off-Site disposal is obtained from the Department. Removal of soils from the Site shall require submission of analytical results confirming compliance with criteria established in Table 3.
- (f) All soils shall be leach tested in accordance with method (Canadian General Standards Board) CGSB 164-GP-IMP prior to removal from the Site. Leachate concentrations shall meet the criteria established in Table 4.
- (g) Subject to approval by the Regional Manager, disposal of treated soils at an approved municipal landfill shall be in accordance with the "Nova Scotia Department of Environment and Labour Guidelines For Disposal of Contaminated Solids in Landfills", as amended from time to time. In addition to the approval by the Regional Manager, the Approval Holder shall obtain approval from the landfill operator prior to disposal.

10. LIQUID EFFLUENT

- (a) The Approval Holder shall establish one compliance monitoring station designated Station #1, (Figure 1, JWEL, Sampling Location). This station shall be monitored monthly for compliance with limits as established in Table 2.

11. GROUND WATER MONITORING

- (a) The Approval Holder shall establish nine groundwater monitoring stations as designated MW 1 through MW 9 in the appended Drawing 8370-7-1, Rev.1, Envirosoil Limited, Soil Recycling Facility, JWEL, January 16, 2001.
- (b) All groundwater monitoring stations shall be monitored every two (2) months for static water level, flow direction, total petroleum hydrocarbons and total BTEX.
- (c) All groundwater monitoring stations shall be monitored quarterly for the PAH's identified by CCME, Canadian Environmental Quality Guidelines and subsequent revisions.

- (d) Results of groundwater monitoring shall be presented in a chronological spreadsheet format for each station with an experienced professional interpretation of results.
- (e) The Approval Holder shall be required to implement remedial measures, if necessary, to address groundwater contamination.

12. Drill Mud Waste Disposal

- (a) (ii) The disposal of all treated drill mud waste which has been treated for petroleum hydrocarbon contamination shall be within the top six (6) inches of the reclaimed surface of the quarry unless otherwise approved by the Department.
- (iii) Soils containing drill mud waste shall be blended to achieve a barium concentration of not more than the CCME Industrial criteria for contaminated sites in the quarry reclamation.
- (iii) The Approval Holder shall identify the storage and disposal location of all soils containing treated drill mud waste on an annual basis.

13. RECORDS AND REPORTING

- (a) Any non-compliance with this Approval shall be reported immediately to the Department's Regional Office.
- (b) The Approval Holder shall submit a Facility and/or Site close-out report to the Regional or District Manager within 30 days after the completion of all remedial works. The report shall detail the client, quantities and concentrations of all materials treated, testing and site monitoring results, final disposal details, and all site decommissioning activities.
- (c) The Approval Holder shall maintain records of all soils treated within Nova Scotia for a minimum of 2 years.
- (d) A yearly summary report is to be completed and submitted to the Department by January 31st of each year. This report shall include the sources and quantities of all soils treated, pre and post treatment contaminant levels, standard operating procedures, plant equipment testing, and the final destination of all soils.
- (e) Stack test results shall be submitted to the Department within 60 days of completion of the stack testing.
- (f) All compliance testing and monitoring shall be conducted by competent technical personnel.

- (g) All sampling and analysis shall be conducted in accordance with the protocols in the "Guidance Manual on Sampling Analysis and Data Management for Contaminated Sites". (Vol. I & II) Report CCME EPC-NCS62E and CCME EPC-NCS66E - December, 1993 and its amendments.
- (h) Two (2) copies of all reports are required for review.

14. Spills or Releases

- (a) All spills or releases shall be reported to the Department in accordance with the Act and the *Emergency Spill Regulations*.
- (b) Spills or releases shall be cleaned up immediately following industry standards and practices.
- (c) An adequate quantity of spill/release response material shall be maintained at the Facility at all times.
- (d) The Approval Holder shall maintain an up to date contingency plan to address discharges of dangerous goods, fires or other emergency situations. The contingency plan shall be developed and updated in accordance with NSDEL's criteria for Contingency Plans dated March 26, 1990, as amended from time to time. The local fire Department should be made aware of this plan and typical Site inventories.

TABLE 1	
STACK EMISSION CRITERIA	
Parameter	Limit
Carcinogenic Polynuclear Aromatic Hydrocarbon (PAH) ¹	0.01 mg/Rm ³ Individual
Non-Carcinogenic Polynuclear Aromatic Hydrocarbon (PAH) ²	0.15 mg/Rm ³ Individual
Particulate Matter	90 mg/Rm ³
Carbon Monoxide (CO)	100 mg/Rm ³
Opacity	10%

R - dry flue gas at 25°C, 101.3kPa and corrected to 11% O₂

- 1 - benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene
 2 - naphthalene, phenanthrene, pyrene

Table 2
Liquid Effluent Limits

Parameters	Limit (mg/l)
Benzene	0.3
Toluene	0.3
Ethylbenzene	0.7
Xylene	0.3
Total Suspended Solids	50.0
Total Petroleum Hydrocarbons	1.0
Phenols	1.0
Napthalene	0.03
Benzo(a)pyrene	0.03

**Table 3
Soil Remediation/Reuse Criteria¹**

Parameters	On-Site Disposal (Quarry Reclamation) (mg/kg) (dry wt.)	Parkland Use (mg/kg) (dry wt.)
Total BTEX	1.0	Non -detect
Benzene	0.5	Non-detect
Total Petroleum Hydrocarbon	100	Non-detect
Polycyclic Aromatic Hydrocarbons Listed Below	CCME Canadian Environmental Quality Guidelines Residential/Parkland Criteria	Non-detect or less than 0.01mg/kg
Benzo(a)anthracene	1.0	less than 0.01
Benzo(a)pyrene	0.7	less than 0.01
Benzo(b)fluoranthene	1.0	less than 0.01
Benzo(k)fluoranthene	1.0	less than 0.01
Dibenzo(a,h)anthracene	1.0	less than 0.01
Indeno(1,2,3-c,d)pyrene	1.0	less than 0.01
Napthalene	0.6	less than 0.01
Phenanthrene	5.0	less than 0.01
Pyrene	10.0	less than 0.01
Methyl napthalene	not applicable	less than 0.01
Total phenols	CCME Canadian Environmental Quality Guidelines Residential/Parkland Criteria	less than 0.10

Note 1. Soil may otherwise be acceptable for parkland use if concentrations of contaminants in the treated soil are less than the concentration of naturally occurring contaminants in the receiving environment.

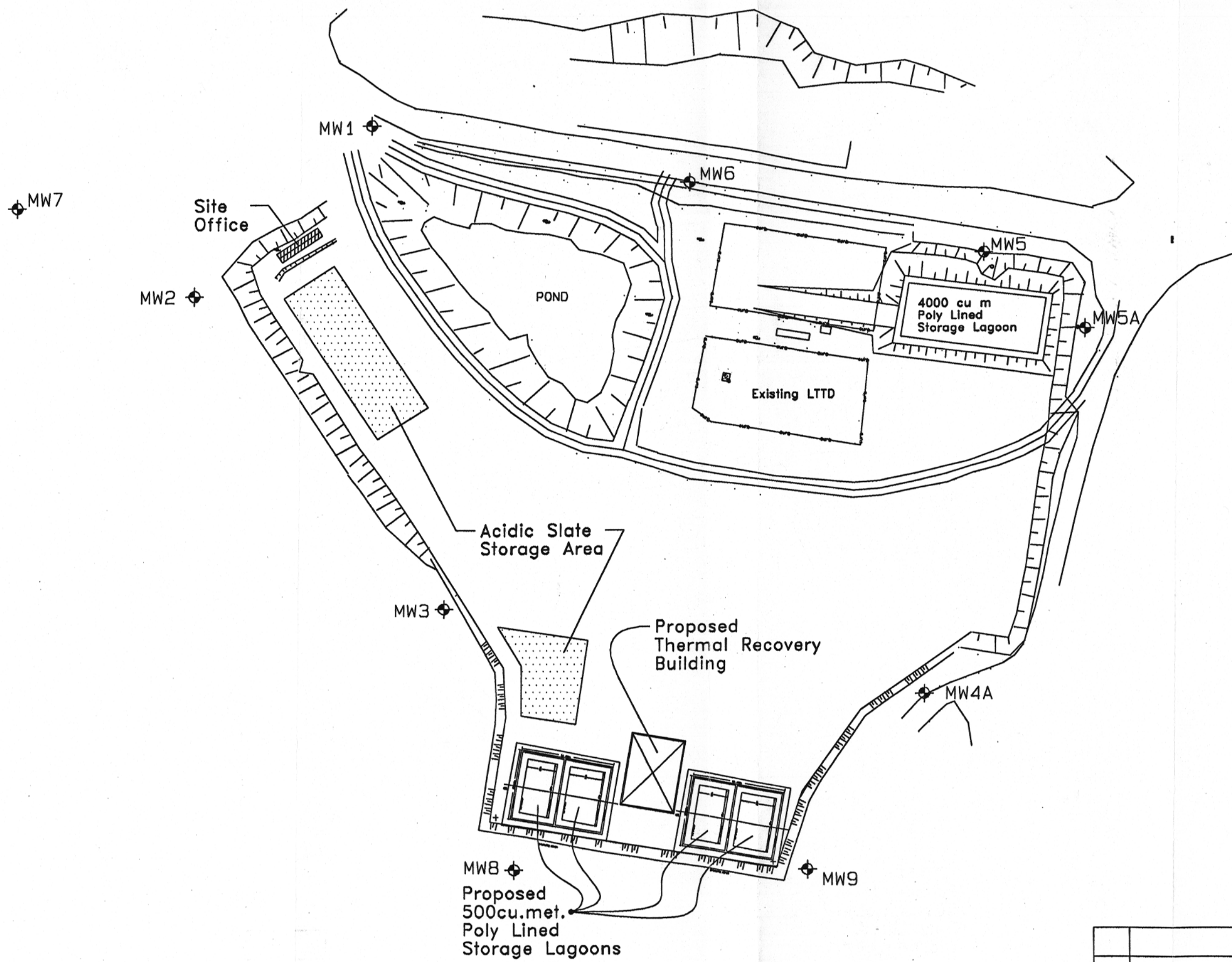
Table 4
Off-Site Soil Reuse Criteria²

Parameter¹	Limit Leachate Concentration (mg/l)
Aluminum	0.10
Arsenic	0.025
Barium	1.0
Cadmium	0.002
Iron	0.30
Lead	0.007
Zinc	0.03
Manganese	0.05

1. As tested using (CGSB) GP-164-IMP Leachate Extraction Procedure.
2. Soil may otherwise be acceptable for parkland use if concentrations of contaminants in the treated soil are less than the concentration of naturally occurring contaminants in the receiving environment.

Appendix M

Detailed Facilities Map

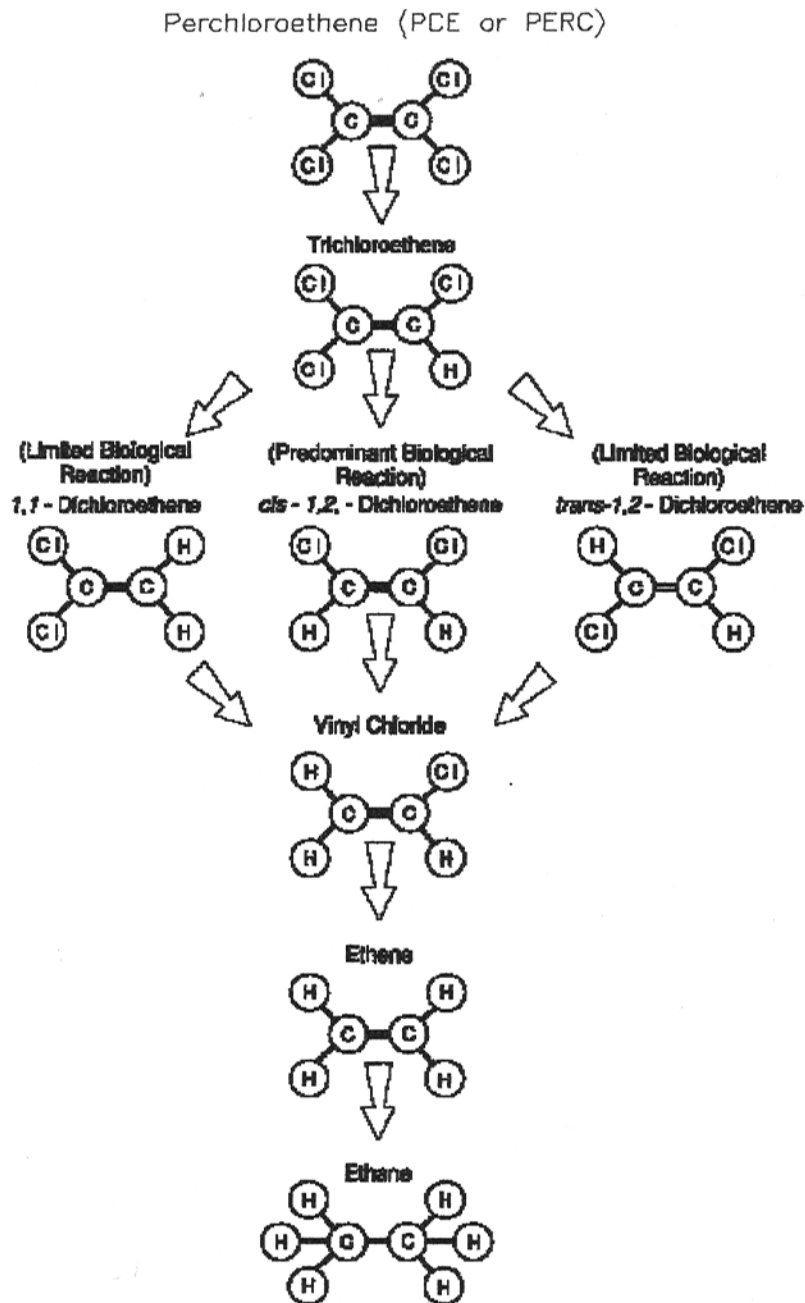


envirosoil	
Overall Site Rocky Lake Quarry	
◆	Monitor Well
Scale 1:1500	Jan 13,2003

Appendix N

Biodegradation of PERC

APP'D _____ H:\Box\8370 Enwires\ 2003\04\15 - 10:33am 51800
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REDUCTIVE DECHLORINATION OF
CHLORINATED ETHENES

(WIEDEMEIER et al. 1999)

