# *MID CANADA SOIL TREATMENT LTD.*

**89 Cliffwood Drive, Winnipeg, Manitoba R2J 3N2**


May 13, 1996

Manitoba Environment
Building #2
139 Tuxedo Avenue
Winnipeg, Manitoba
R3N 0H6

Attention: Mr. Edwin Yee
Manager, Contaminated Sites

Dear Edwin:

**Re: Remediation of PAH Contaminated Soil and Water**

Please find attached information relating to two potential soil remediation processes that may be utilized at the Mid Canada Soil Treatment Centre, located in the Rural Municipality of Macdonald. The selection of the appropriate treatment process will be determined by both Centra Gas Manitoba Inc., and their Consultant, AGRA Earth & Environmental Limited.

The first process is a chemical oxidation process, developed by Harbour Remediation and Transfer Ltd. Advanced Chemical Treatment (ACT) is a "state of the art" chemical treatment that can be applied to contaminated soils or sludges to reduce their inherent toxicity. This is done with a proprietary chemical mix that breaks down the PAH into $CO_2$ and $H_2O$ by means of an exothermic chemical oxidation process.

The second is a proprietary bioremediation process developed by Hobbs Miller Maat Inc. in conjunction with ESP Corporation of Arlington, Texas. The process is based on a unique combination of surfactants, nutrients and microbes. The combination of these distinct products has been formulated to address recalcitrant contaminants which historically have not been "biodegradable" with indigenous and / or selected strains of microbes.

It is my understanding that AGRA E&E will be submitting a remedial plan to Manitoba Environment once the selected process has been determined. If you have any questions regarding any aspects of either process, please give me a call.

Sincerely,

John S. McCabe, P.Eng.
President


*Telephone: (204) 255-3932 Fax: (204) 255-3932 Cellular: (204) 981-4813*

# ADVANCED CHEMICAL TREATMENT : PROCESS DESCRIPTION

The basis of the IWT Advanced Chemical Treatment technology (ACT) is to define and create an antecedent, generative inorganic chemistry that has an emergent property of ordering or crystallization and the ability to effect a chemicals re ordering and/or crystallization of organic and/or inorganic polluted soil, sediment, or sludge to a form that is at least inert, and if all possible, bio-compatible in a short amount of time as possible. This, as S. A. Kauffman would define as an algorimthnic chemistry but inorganic rather than organic origin. That is, (ACT) is a series of chemical reactions that continue to evolve and simplify in an extremely diverse and complex chemical environment to a new complex order that is relatively innocuous or bio-compatible.

ACT is a manifestation and intensification of various chemical systems that occur in geochemistry.

Of particular interest is the study of how the abiogenesis of the biochemical building block molecules occurred in the extremely hostile early, pre-life environments. In the work done by A. G. Cairns-Smith he has postulated that clays were the preceding or co-evolving templates or catalysts for the formation of the basic biomolecules. the objective of the IWT ACT technology is not to generate nucleic acids but to produce inert, innocuous, or bio-compatible chemical entities from hazardous wastes in soil, sediment, or sludge matrices in a very economical and efficient fashion.

Cairns-Smith's basic position is that clays and certain mineral colloids are ordered, crystalline materials that contain particular "information" and in the right chemical context will generate or act as the catalytic templates for the re-ordering or crystallization of materials very much like coal gasification waste to bio-compatible entities.

The IWT ACT technology generates clays and certain minerals, at a fast rate, in colloidal forms, in-situ, within the contaminated soil, sediment and sludge medium.

In-situ in this case means that he clay and mineral collides are evolving at a molecular level within and around the contaminated soil, sediment, or sludge waste matrix. This process is called authigenesis. This generated inorganic matrix of silicate and non-silicate mineral colloids is the basis of the Reactive Geology Concept that forms the basis of the IWT ACT technology.

This "Reactive Geology" is defined as a chemical process involving, free radicals, Lewis acids and bases, etc., that interact among themselves and chemically alter toxic organic and inorganic compounds and complexes to ecologically inert or bio-compatible forms of compounds. The matrix imparts or effects a new chemical order on the previously defined toxic material. This ACT system continues to work for an indefinite period. Toxic organics are immobilized initially and then chemically altered to innocuous complexes in most cases.

No form of treatment destroys elements, the maximum any form of treatment can achieve is a molecular alteration or rearrangement to a new and safe end-state. ACT does not leach carbon dioxide and monoxide into the atmosphere which are major greenhouse gases. The carbon stays in the matrix in the form of geopolymers or kerogens. Toxic metals are immobilized into insoluble mineral entities that become part of the matrix.

# 1 Introduction to the Technology

A series of formulations has been developed which can treat soils, sediments, sludges and like materials which have been contaminated with organic substances of concern, heavy metals and radioactive materials in a simple fashion. Treatment is deemed acceptable when treated materials upon bulk analysis (i.e., US EPA TWA, or equivalent) for organic contaminants of concern or by a suitable leachate procedures (such as US EPA TCLP or Ontario Regulation 347) and analysis for heavy metals meet guidelines or criteria.

The formulations are simply mixed with the wastes and a suitable amount of water to effect changes which render the waste innocuous. Although further investigation by regulatory agencies may be required, the treated wastes will pass all required tests for remediation of soils and, depending upon the degree of treatment be deemed suitable for all types of uses.

The formulations react with organic substances to mineralize or break large molecular weight compounds into simpler more innocuous forms. Pesticides, Pentachlorophenol and PCBs have been shown to be dehalogenated using these formulations.

It is felt that the treated wastes undergo a process of diagenesis in which the soil/sediment matrix itself is chemically altered as well as the contaminants.

The formulations are efficient and cost effective when compared to other technologies such as incineration, bio-remediation, thermal desorption, high pressure hydrogen reduction, stabilization and land filling.

## 1.1 General Product Chemistry

Inorganic compounds are immobilized and stabilized as in any standard stabilization/solidification or chemical fixation process. Obviously, no non-nuclear process will destroy heavy metals and pass bulk analysis; however, stabilization/solidification processes can reduce or eliminate leachate toxicity due to heavy metal contamination.

Organic substances of concern are usually not immobilized by stabilization/soliditication and chemical fixation technologies, and in fact, their presence may actually hinder these processes. This physics-chemical treatment reacts with organics to form innocuous compounds such as carbon dioxide, simple alcohols, acids and ketones. Although carbon dioxide is produced,, it is claimed that the formulations will not release this compound to the atmosphere but will react with it and form a carbonate which will stay in the matrix. Organic compounds are chemically altered by free radical chemistry and oxidation reduction reactions assisted by catalysts which are either added to the formulation or generated by reactions with the waste substrate itself.

The formulations are designed to supply catalytically enriched aluminum-silicon dioxide structures called tectosilicates which provide a very large number of reactive sites. These reactive sites can promote dehalogenation, increase rates of reaction and assist in cracking and polymerization of organic substrates.

The actual treatment process resembles that of stabilization/solidification or chemical fixation. Although physical entrapment is one mechanism which occurs during the treatment process, the formulations rely on well-known physics-chemical reactions to destroy organics. Unlike the stabilization/solidification and chemical fixation technologies, these formulations have been shown using bulk analysis (US EPA TWA) techniques to substantially decrease or eliminate organic substances of concern. Furthermore, extensive research (conducted in association with the Ontario Ministry of the Environment and Energy) has shown that the extraction techniques are not hindered by the matrix modifiers which constitute part of the formulations. Hence, the bulk analyses indicate actual destruction, not simply entrapment by the materials added. Some stabilization/solidification and chemical fixation techniques have been able to apparently reduce organic levels (using reactive silicates to entrap the organic compounds) but these reductions have been ephemeral, releasing the compounds when the entrapping material is degraded. In such cases, no destruction has been done.

The formulations provided by International Waste Technologies Corporation and Harbour Remediation & Transfer Inc. produce actual destruction of organic compounds of concern - not simple entrapment of organics. Although some clays, Portland cement, slag cement and other matrix modifiers are often added, these are added to assist and prolong reaction chemistry which occurs in the wastes for periods of weeks to years. A benefit from adding such compounds is the reduction in leachability of heavy metals (as shown by US EPA TCLP and Ontario Regulation 347 leachate tests).

## 2 Case Histories

### 7.1 Sediments Contaminated with Polyaromatic Hydrocarbons - Northern Wood Preservers

A sediment sample was obtained from Thunder Bay Harbour which had been contaminated by wastes discharge from Northern Wood Preservers. In order to prove that matrix modifiers were not inhibiting the bulk analysis extractions, only the free radical and oxidation chemicals were added. The addition rate was 5% by weight of the contaminated sediment and the treated waste was allowed to cure for only 10 days before analyses were performed. It is interesting to note that no pentachlorophenol were identified in the sediments. It is believed that the compound, due to its relatively high solubility, had dispersed into the water phase.

Table 2.1 shows the results of the short experiment. Overall, there was about an 80% reduction in PAHs using this technique. Additional investigations were not continued.

Table 2.1

Sediment Treatment using only free radical and oxidizing chemicals of Sediments contaminated by the Operations of Northern Wood Preservers, Thunder Bay, Ontario.

| Contaminant | Untreated (ppb) | Treated (ppb) | % Decrease |
|---|---|---|---|
| Acenaphthene | 190,000 | 11,000 | 94.21 |
| Acenaphthlene | 4,200 | 820 | 80.48 |
| Anthracene | 84,000 | 5,700 | 93.21 |
| Benzo(a)anthracene | 74,000 | 18,000 | 75.68 |
| Benzo(b)fluoranthene | 68,000 | 19,000 | 72.06 |
| Benzo(k)fluoranthene | 22,000 | 6,000 | 72.73 |
| Benzo(g,h)perylene | 20,000 | 4,400 | 78.00 |
| Benzo(a)pyrene | 56,000 | 12,000 | 78.57 |
| Bis(2-ethylhexyl)phthalate | 950 | 510 | 46.32 |
| Chrysene | 55,000 | 12,000 | 78.18 |
| Dibenz(a,h)anthracene | 1,600 | 330 | 79.38 |
| dibenzofuran | 140,000 | 23,000 | 83.57 |
| Di-n-butylphthalate | 370 | 150 | 59.46 |
| 2,4 dimethylphenol | 890 | 0 | 100.00 |
| fluoranthene | 270,000 | 76,000 | 71.85 |
| Fluorene | 190,000 | 19,000 | 90.00 |
| Indeno(1,2,3-cd)pyrene | 17,000 | 3,900 | 77.06 |
| 2-Methylnaphthalene | 130,000 | 23,000 | 82.31 |
| Naphthalene | 260,000 | 64,000 | 75.38 |
| Phenanthrene | 490,000 | 120,000 | 75.51 |
| Pyrene | 200,000 | 44,000 | 78.00 |
| N-Nitrosodiphenylamine | | 1,100 | |
| Di n octylphthalate | | 110 | |
| 2-Chloronaphthalene | | 150 | |

# PROPOSED TREATMENT PROCESS

The process which HR&T is proposing to treat the material on this site is one which has been successfully apply on many sites in the USA and Europe using the IWT formulation of Advanced Chemical Treatment technology (ACTT).

A bench scale laboratory study using the (IWT) formulation was conducted in conjunction with the MOEE at their Resources Rd. lab in late 1993. The results of this were promising enough to proceed with a full scale pilot study in July 1994 at (HR&T) site in Toronto.

The pilot study consisted of treating three type of soils from the Port area of Toronto, these consisted of the following;

- Soils from the Toronto Harbour Commission (TCH) pilot study which were treated using the Borgman Soil Washing Process. These soils were very high on oil & grease, Pah's & VOC's (Classed as soil "B").

- Soils which treated by the (THC) using soil washing, bio-remediation and chelation processing. These soils were residues left after the processing and were high concentrated in heavy metals along with organics (Classed as soil "A")

- Soil was also received from the Imperial Oil site on Commissioners St. Toronto. This soil was typical of material contaminated with petroleum storage from an abandoned tank farm. (Classed as IMP OIL)

2.2 Soil Contaminated with PCBs - General Electric (GE) Miami SITE Program

A formulation was used successfully in the treatment of PCB-contaminated soils at the General Electric (GE) Miami Site under the US EPA Superfund Innovative Technology Evaluation (SITE) Program. The treatment was performed in-situ, using an injection mixing drill to a depth of 6.15 m. In general, the upper 1.2 m was sand, from 1.2 to 2.5 m was limestone, and quartz sand below that. Water was found at 1.2 m. 15% by weight of the selected formulation was added to the soil. Although most of the testing performed was to satisfy leaching criteria (i.e., US EPA TCLP), some preliminary laboratory testing, after only three days of reaction (curing) indicated substantial reduction (Table 2.2) using bulk analyses.

Table 2.2

Soils Treatment using a formulation

| Contaminant | Untreated (ppm) | Treated (ppm) | % Decrease |
|---|---|---|---|
| PCBs | 28,800 | 2,800 | 90.00 |

2.3 Marine Sediments Contaminated with PCBs - New Bedford Harbour

A different formulation was used on sediments contaminated with PCBs. The sediments contained Total Petroleum Hydrocarbons of around 30%. The ten day bulk analyses are shown in Table 2.3.

Table 2.3 NOTE: These results are based on Ten (10) Results.

Sediment Treatment using a formulation

| Contaminant | Untreated (ppm) | Treated (ppm) | % Change |
|---|---|---|---|
| PCB 1242 | 11,000 | 930 | |
| PCB 1254 | 2,900 | 230 | |
| Total | 13,900 | 1,160 | 92.00 |

These sediments also contained heavy metals. A range of different formulations was tested on the sediments and even the formulations without matrix modifier (FR3) significantly decreased the leachability of the metals (Table 2.3.1).

Table 2.3.1

Ten Day TCLP Results of Heavy Metals in New Bedford Harbour Sediment

| Contaminant | Untreated (ppm) | FRC Treated (ppm) | HWT 25 Treated (ppm) | HWT 27 Treated (ppm) | HWT-30 Treated (ppm) |
|---|---|---|---|---|---|
| Barium | 181 | ND | 1.00 | ND | ND |
| Cadmium | 5.2 | 0.09 | ND | ND | ND |
| Chromium | 152.8 | 9.79 | 0.02 | 0.06 | |
| 0.08 | | | | | |
| Silver | 1.4 | ND | ND | ND | ND |
| Lead | 251 | 1.2 | ND | ND | ND |
| Arsenic | 5 | ND | ND | ND | ND |
| Mercury | 0.7 | ND | ND | ND | ND |

## 2.4 Soils Contaminated with PAHs

The formulations have been shown to be highly effective when treating soils and sediments contaminated with PAHs. Because of the free radical chemistry, the dosage is not stoichiometric. In fact, with high TOC content, less of the formulations are required. Laboratory studies are always required to optimize the treatment.

### 2.4.1 Acid Tar Pit at ARCO Refinery - Tulsa Oklahoma

Waste from this site had a high organic content of 25 to 30% total organic carbon and initially had a very low pH of 0.2 to 0.3. The soils release sulphur dioxide and hydrogen sulphide when excavated. A full scale field pilot test was conducted using about 100 cubic yards.

Tests in the field indicated that the treated pile maintained a temperature of between 90 to 95 °F for more than six weeks after initial treatment. Background soil temperature during this period was around 72 °F.

Table 2.4.1 show the results (US EPA TWA) of treatment after 30 days

Table 2.4.1

Soil Treatment using a formulation - ARCO Acid Tar Pit Material

| Contaminant | Untreated (ppb) | Treated (ppb) | % Decrease |
|---|---|---|---|
| Benzene | 7.9 | 0 | 100.00 |
| Methyl Ethyl Ketone | 240 | 0 | 100.00 |
| Ethyl benzene | 41 | 5 | 87.80 |
| 2-Hexanone | 290 | 1 | 99.66 |
| Toluene | 67 | 5 | 92.54 |
| Xylenes | 23 | 18 | 21.74 |
| Acetone | 2200 | 263 | 88.05 |
| Methylene chloride | 110 | 0 | 100.00 |
| Benzo(a)anthracene | 73,000 | 0 | 100.00 |
| Chrysene | 300,000 | 45,000 | 85.00 |
| Phenanthrene | 68,000 | 0 | 100.00 |
| Benzo(b)fluoranthene | 85,000 | 0 | 100.00 |
| Benzo(k)fluoranthene | 68,000 | 0 | 100.00 |
| Benzo(ghi)fluoranthene | 1,000 | 0 | 100.00 |
| Benzo(a)pyrene | 59,000 | 0 | 100.00 |

## 2.4.2 Douglasville Superfund Site, Pennsylvania

The Douglasville, Pennsylvania Superfund Site was an oil recycling facility. The soils had a total organic content of 36% and a pH of 2. Results after 30 days using a complete formulation are shown in Table 2.4.2

Table 2.4

Soil Treatment using a formulation - Douglasville, Pennsylvania

| Contaminant | Untreated (ppb) | Treated (ppb) | % Decrease |
|---|---|---|---|
| Benzene | 390 | 280 | 28.21 |
| Methyl Ethyl Ketone | 470 | 1,200 | -155.62 |
| Carbon disulphide | 37 | 8.9 | 75.95 |
| Carbon tetrachloride | 140 | 13 | 90.17 |
| Chlorobenzene | 1.2 | 12 | -900.00 |
| Chloroform | 130 | 80 | 38.46 |
| 1,1-Dichloroethane | 1.1 | 11 | -900.00 |
| 1,2-Dichloroethane | 87 | 6.2 | 92.87 |
| Ethylbenzene | 3,100 | 9.7 | 99.69 |
| 2-Hexanone | 13 | 130 | -900.00 |
| Methyl isobutyl ketone | 1,500 | 130 | 91.33 |
| Tetrachloroethane | 930 | 1000 | -7.53 |
| Toluene | 5,700 | 4,900 | 14.04 |
| 1,1,1-Trichloroethane | 820 | 260 | 68.29 |
| 1,1,2-trichloroethane | 3.4 | 7.9 | -132.35 |
| Trichloroethene | 8,500 | 3900 | 54.12 |
| Xylenes | 16,000 | 14,000 | 12.50 |
| Acenaphthene | 5,700 | 690 | 87.89 |
| Anthracene | 4,300 | 580 | 86.51 |
| Benzo(a)anthracene | 2,900 | 1200 | 58.62 |
| Benzoic Acid | 93,000 | 11,000 | 88.17 |
| Benzo(g,h)perylene | 7,200 | 350 | 95.14 |
| Benzyl alcohol | 4,300 | 520 | 87.91 |
| Bis(2-Chloroethyl)ether | 4,300 | 520 | 87.91 |
| Bis(2-ethylhexyl)phthalate | 8,000 | 1,800 | 85.00 |
| 4-Chloroaniline | 4,300 | 520 | 87.91 |
| 2 Chlorophenol | 2,500 | 350 | 87.91 |
| Chrysene | 5,700 | 3,800 | 33.33 |
| dibenzofuran | 7,200 | 870 | 87.92 |
| Di-n-butylphthalate | 4,300 | 520 | 87.91 |
| 1,2-Dichlorobenzene | 2,900 | 3,500 | -20.69 |
| 1,3-Dichlorobenzene | 4,300 | 520 | 87.91 |
| Diethylphthalate | 5,700 | 690 | 87.98 |
| 2,4-dimethylphenol | 8,600 | 1,000 | 88.37 |
| Fluoranthene | 3,100 | 1,800 | 41.94 |
| Fluorene | 7,200 | 1,400 | 80.56 |
| Indeno(1,2,3-cd)pyrene | 5,200 | 520 | 90.00 |
| Isophorone | 4,300 | 540 | 87.44 |
| 2-Methylnaphthalene | 28,000 | 28,000 | 0.00 |
| 2-Methylphenol | 4,300 | 540 | 87.91 |
| 4-Methylphenol | 5,700 | 2,900 | 49.12 |
| Naphthalene | 20,000 | 21,000 | -5.00 |
| Phenanthrene | 9,000 | 9,100 | -1.11 |
| Phenol | 4,300 | 520 | 30.23 |
| Pyrene | 7,200 | 3,700 | 48.61 |
| 1,2,4-trichlorobenzene | 5,700 | 690 | 87.89 |

# PROCESSING EQUIPMENT

EQUIPMENT PROCESSING:

The equipment required to process the untreated material ex situ consists of the following components;

- feed hopper to receive untreated material,
- conveyor belt equipped with weight registration for material feed,
- storage bins and batch blending system for (ACT) treatment materials,
- pugmill blender equipped with slurry injection and mixing paddles,
- jet slurry injection system for delivery of (ACT) material to pugmill,
- metering devices on slurry feed to insure proper admixture,
- discharge conveyor to stockpile treated material in containment area,
- front end loader to feed material for treatment,
- dump trucks to transport treated material to final disposition location,
- D6-II dozer to stockpile and/or spread treated material,
- Sheepsfoot compactor to re-compact treated material back in place.

Ontario

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

*PROVISIONAL CERTIFICATE OF APPROVAL*
*FOR A WASTE MANAGEMENT SYSTEM*
*NO. A 841490*


Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Harbour Remediation & Transfer Inc.

for the use and operation of three (3) mobile waste disposal sites (processing), serving the Province of Ontario, and each consisting of the following major components:

- crushing and screening equipment;
- feed hopper and conveyor system;
- pugmill blender; and
- a jet slurry injection system

to treat hazardous waste, limited to that considered leachate toxic only, and non-hazardous waste contaminated with organics and heavy metals which are listed under the following waste classes of waste: (Note: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval) waste class 111-114, 121-123, 131-135, 141-150, 211-213, 221, 222, 241, 242, 251, 252, 253, 254, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 281, and 282 as described in the "Ministry of the Environment New Ontario Waste Classes" dated January 1986.

**DEFINITIONS**

1. For the purpose of this Provisional Certificate of Approval:

   (1) "Mobile Unit" means the mobile waste disposal site (processing) that is approved to operate pursuant to this Provisional Certificate of Approval;

   (2) "Ministry" means the Ontario Ministry of the Environment and Energy;

   (3) "Certificate" means this Provisional Certificate of Approval for a Waste Management System, including Schedule "A", issued in accordance with Part V of the Act;

   (4) "Act" means the Environmental Protection Act, R.S.O. 1990, Chapter E.19;

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(5) "Company" means Harbour Remediation & Transfer Inc.; and

(6) "Director" means any Ministry employee appointed by the Ministe pursuant to Section 5 of the Act.

**IDENTIFICATION**

2. The Mobile Unit shall be clearly marked, on both sides, with th following information being displayed:

(1) Company name;

(2) this Certificate No. A 841490; and

(3) Provisional Certificate of Approval for a Waste Disposal Sit (Processing) No. A 290025.

3. A copy of this Certificate, in its entirety and including all Notices o Amendment, shall be with the Mobile Unit at all times that the Mobil Unit is operated or is located at sites where operation is to occur.

**SCOPE**

4. No waste shall be contained in the Mobile Unit while it is transporte from one operating site to another operating site or to the storag location(s) as listed in the supporting documentation contained i Schedule "A".

5. The Company shall operate the Mobile Unit in accordance with th following:

(1) plans and specifications outlined in Schedule "A" attached to thi Certificate, except when specified otherwise by the conditions o this Certificate;

(2) terms and conditions listed in this Certificate;

(3) Provisional Certificate of Approval for a Waste Disposal Sit (Processing) No. A 290025;

(4) Certificate of Approval (Air); and

(5) all applicable municipal by-laws.

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6. (1) The Mobile Units approved for operation pursuant to thi: Provisional Certificate of Approval are ARAN ASR-250EA Mobil Mixing Plants, as specified in the supporting documentation a: listed in the attached Schedule "A".

(2) Pursuant to subcondition 6(1) above, the Company shall submit t the Director, the Mobile Unit's license plate and serial number within thirty (30) days prior to the first time operation of th Mobile Units in Ontario.

(3) Only the Mobile Unit listed in subcondition 6(1) shall be operate pursuant to this Provisional Certificate of Approval.

(4) In the event that the Company proposes to operate additional equipment, which is not a part of the Mobile Unit approved by this Certificate, a separate application shall be submitted to the Director, who may amend this Certificate or issue a separate Provisional Certificate of Approval for a Waste Management System.

**NOTIFICATION OF CHANGES**

7. (1) The Company shall notify the Director, in writing, of any of the following changes within thirty (30) days of the occurrence of the change:

(a) change of owner or operator or both;

(b) change of address or address of new owner;

(c) change of partners where the Company is or at any time becomes a partnership, and a copy of the most recent registration registered under the Business Names Act shall be included in the notification to the Director;

(d) change of name of the corporation where the Company is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1, 2 of O. Reg. 189, R.R.O 1980, as amended from time to time), filed under the Corporation Information Act shall be included in the notification to the Director; and

(e) change in director(s) or officer(s) of the corporation where the Company is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in (d).

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(2) In the event of any change in ownership of the Mobile Unit, the Company shall notify the succeeding (new owner) company of the existence of this Certificate, and a copy of such notice shall be forwarded to the Director.

(3) The Company shall ensure that all communications made pursuant to this Condition will refer to this Certificate No. A 841490.

**INSURANCE**

8. The Company shall at all times while the Mobile Unit is operating in Ontario maintain a liability insurance policy in the amount of $1,000,000.00.

A copy of a Certificate of Insurance confirming all insurance coverage for the operation of the mobile unit shall be submitted to the Director within thirty (30) days prior to the first time use in Ontario.

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*PROVISIONAL CERTIFICATE OF APPROVAL*
*FOR A WASTE MANAGEMENT SYSTEM*
*NO. A 84149*
*Page 5 of*

## *SCHEDULE "A"*

*This Schedule "A" forms part of Provisional Certificate of Approval* No. A 841490.

Information and Documents which form the Basis of this Approval

1. The application for Certificate of Approval for Waste Management System dated July 25, 1995 and supporting information.

2. The document entitled "Application for Certificates of Approval for a Waste Disposal Site & For a Waste Management System, Harbour Remediation & Transfer Inc.", as submitted with item 1 above.

3. The document entitled "Appendix to Application for Certificates of Approval for a Waste Disposal Site & For a Waste Management System, Harbour Remediation & Transfer Inc.", dated August 23, 1995.

4. The document entitled "Harbour Remediation and Transfer Certificate of Approval Review" as provided on October 3, 1995.

Ministry of Environment and Energy / Ministère de l'Environnement et de l'Énergie

Ontario

*PROVISIONAL CERTIFICATE OF APPROVAL*
*FOR A WASTE MANAGEMENT SYSTEM*
*NO. A 84149*


*The reasons for the imposition of these conditions are as follows:*

**DEFINITIONS**

1. Condition No. 1 is included to define terms that are used throughout th Certificate.

**IDENTIFICATION**

2. Condition No. 2 is included to require the Company to provide visibl identification for the Mobile Unit as an authorized waste managemen facility and for inspection purposes.

3. Condition No. 3 is included to provide easy access to the listing of th terms, conditions and operating requirements to operators and personne working on the Mobile Unit as well as to Ministry staff who may i inspecting the Mobile Unit.

**SCOPE**

4. Condition No. 4 is included to reflect the fact that this Certificat represents an approval only for the transport of processing equipmen and not waste.

5. Conditions Nos. 5 and 6 are included to emphasize, to the Company, th scope of this Certificate and the basis of the approval, which th Director has been asked to consider.

**NOTIFICATION OF CHANGES**

6. Condition No. 7 is included to require the Company to provi notification so that the waste disposal site (processing) is operat under the corporate name which appears on the application submitted t this Certificate and not under any name which the Director has not be asked to consider.

**INSURANCE**

7. Condition No. 8 is included to ensure that the mobile unit operat under this Provisional Certificate of Approval is adequately insur under a liability policy.

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Ministry of Environment and Energy

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*PROVISIONAL CERTIFICATE OF APPROVAL*
*FOR A WASTE MANAGEMENT SYSTEM*
*NO. A 84149(*


*In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:*

1. *The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;*
2. *The grounds on which you intend to rely at the hearing in relation to each portion appealed.*

*In addition to these legal requirements, the Notice should also include:*

3. *The name of the appellant;*
4. *The address of the appellant;*
5. *The Certificate of Approval number;*
6. *The date of the Certificate of Approval;*
7. *The name of the Director;*
8. *The municipality within which the waste management system is located.*

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary,
Environmental Appeal Board,
112 St. Clair Avenue West,
Suite 502,
Toronto, Ontario,
M4V 1N3

AND

The Director,
Section 39, Environmental Protection Act,
Ministry of the Environment and Energy,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario.
M4S 1H2

*DATED AT TORONTO this* 7th *day of* November, 1995.

A. Dominski, P. Eng.,
Director,
Section 39,
Environmental Protection Act