WELL WIZARD
Dedicated sampling systems

Installation, Operation, and Maintenance
User's Guide

Part No 34999

(This manual is on file in the MDEQ, Waste Management Division Office in Lansing.
For a copy, please contact the Hazardous Waste Program Section, Technical Unit.)

ATTACHMENT G

Handling Requirements of Monitoring Parameters

Parameter	Code	Perservation	Holding Time	Bottle Type	Minimum Volume
Total Phenolics	PHN	1,2	28 Days	Glass	0.5 L
Sulfate	SO4	2	28 Days	Plastic	50 ml*
Total Alkalinity	ALK	2	14 Days	Plastic	100 ml*
Fluoride	F-	2	28 Days	Plastic	300 ml*
Chloride	CL-	2	28 Days	Plastic	50 ml*
Nitrate/Nitrite	NPN	1,2	48 Hrs	Plastic	0.5 L
Arsenic	AS	3,5	6 Mos	Plastic	200 ml**
Cadmium	CD	3,5	6 Mos	Plastic	200 ml**
Calcium	CA	3,5	6 Mos	Plastic	200 ml**
Chromium	CR	3,5	6 Mos	Plastic	200 ml**
Iron	FE	3,5	6 Mos	Plastic	200 ml**
Potassium	K	3,5	6 Mos	Plastic	200 ml**
Lead	PB	3,5	6 Mos	Plastic	200 ml**
Magnesium	MG	2,3,5	6 Mos	Plastic	200 ml**
Manganese	MN	2,3,5	6 Mos	Plastic	200 ml**
Molybdenum	MO	2,3,5	6 Mos	Plastic	200 ml**
Nickel	NI	2,3,5	6 Mos	Plastic	200 ml**
Sodium	NA	3,5	6 Mos	Plastic	200 ml**
Zinc	ZN	3,5	6 Mos	Plastic	200 ml**
Cyanide	TCN	2,4	14 Days	Plastic	500 ml
Copper	CU	3,5	6 Mos	Plastic	200 ml**
pH	PHN		Immediate	Plastic	25 ml
Bicarbonate	BAL	2	14 Days	Plastic	100 ml*
Carbonate	CAL	2	14 Days	Plastic	100 ml*
TOC	TOC	2,7	28 Days	Glass	100 ml
Specific Conductivity	CON	2	28 Days	Plastic	100 ml
Volatile Organics	VOC	2,6	14 Days	Glass	2x40 ml

1) pH<2 with concentrated Sulfuric Acid
2) Store at 4 degrees Centigrade
3) pH<2 with nitric acid
4) pH>12 with sodium hydroxide
5) Filtered in the field using 0.45 micron membrane filters on the time of collection
6) 4 drops HCL, no headspace
7) pH<2 with hydrochloric acid

* Note: One liter for all of these parameters stored similarily
** Note: One liter for all of these parameters stored similarily

ATTACHMENT H

Table 3. Ground Water Monitoring Parameter List

3.A. Primary Parameters

Benzene	1,2 Dichlorobenzene	Xylene
1,2 Dichloroethane	1,2 Dichloroethene	Ethylbenzene
Methylene Chloride	Toluene	Trichloroethene
1,1,1 Trichloroethane	Vinyl Chloride	1,1 Dichloroethane

3.B. Secondary Parameters

Potassium	Sodium	Nickel
Chromium(t)	Lead	Molybdenum
Sulfate	Chloride	Bicarbonate
Carbonate	Arsenic	Cyanide[3]
Nitrate	Nitrite	Fluoride
Total Phenolics	Total Organic Carbon	Iron

3.C. Tertiary Parameters

Calcium[1]	Magnesium[1]	Copper[1]
Manganese[1]	Zinc[1]	Cadmium[1]
Silver	Mercury	Selenium
Barium	2,4-D	Endrin
Silvex	Methoxychlor	Toxaphene

3.D. Field Monitoring Parameters[2]

Specific Conductance	Temperature	pH

Notes:

1. Tertiary parameter that will be measured during detection monitoring.
2. Parameter to be measured in field for all samples collected
3. Amenable cyanide to be analyzed if cyanide is detected

ATTACHMENT I

Method Detection Limits for Inorganic Parameters

Parameter	Code	MDL (mg/L)	Method Reference
Total Phenolics	PHN	0.005	420.1/9065/5530 BD
Sulfate	SO4	2	375.4/9038/9056/4500SO4E/4110B
Total Alkalinity	ALK	10	310.1/2320B/4031
Fluoride	F-	0.1	340.2/9214/9056/4500 FC/ 4110B
Chloride	CL-	1	325.2/4500CLB/4110B/9253/9056
Nitrate/Nitrite	NPN	0.01	353.2/9056/4500NO3F/4110B
Arsenic	AS	0.001	6020/6010/7000 Series
Cadmium	CD	0.0002	6010/6020
Calcium	CA	0.2	6010/7000 Series
Chromium	CR	0.02	6010/6020
Iron	FE	0.02	6010/6020
Potassium	K	0.1	6010/7000 Series
Lead	PB	0.001	6010/6020
Magnesium	MG	0.2	6010/6020
Manganese	MN	0.005	6010/6020
Molybdenum	MO	0.025	6010/6020
Nickel	NI	0.05	6010/6020
Sodium	NA	0.2	6010/7000 Series
Zinc	ZN	0.02	6010/6020
Cyanide	TCN	0.005	9010/9014/335.2/335.4/4500CN CE
Copper	CU	0.02	6010/6020
pH	PHN	N/A	9040/150.1/4500 H&B
Bicarbonate	BAL	5	4500CO2D
Carbonate	CAL	5	4500CO2D
TOC	TOC	0.5	9060/415.1/5310 C
Specific Conductivity	CON	1(µmhos/cm)	9050/120.1/2510 B

Note:
Methods referenced from TEST METHODS FOR EVALUATING SOLID WASTE, USEPA SW-846, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 20th Edition, USEPA METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTEWATER, 3/83 and METHODS FOR ORGANIC ANALYSIS OF MUNICIPAL AND INDUSTRIAL WASTEWATER, 10/84

Method Detection Limits - Organic Analysis

Parameter	USEPA Method	Detection Limit (mg/l)
1,1-Dichloroethane	8260/8021	0.001
1,2-Dichloroethane	8260/8021	0.001
1,2-Dichloroethene	8260/8021	0.001
1,1,1-Trichloroethane	8260/8021	0.001
Trichloroethene	8260/8021	0.001
Vinyl Chloride	8260/8021	0.005
Methylene Chloride	8260/8021	0.005
1,2-Dichlorobenzene	8260/8021	0.001
Benzene	8260/8021	0.001
Toluene	8260/8021	0.001
Ethylbenzene	8260/8021	0.001
Total Xylenes	8260/8021	0.003*

* Detection limit for individual isomers is 0.001 mg/l
Note: Methods referenced from TEST METHODS FOR EVALUATING SOLID WASTE,USEPA, SW-846

Quality Control Frequency Summary

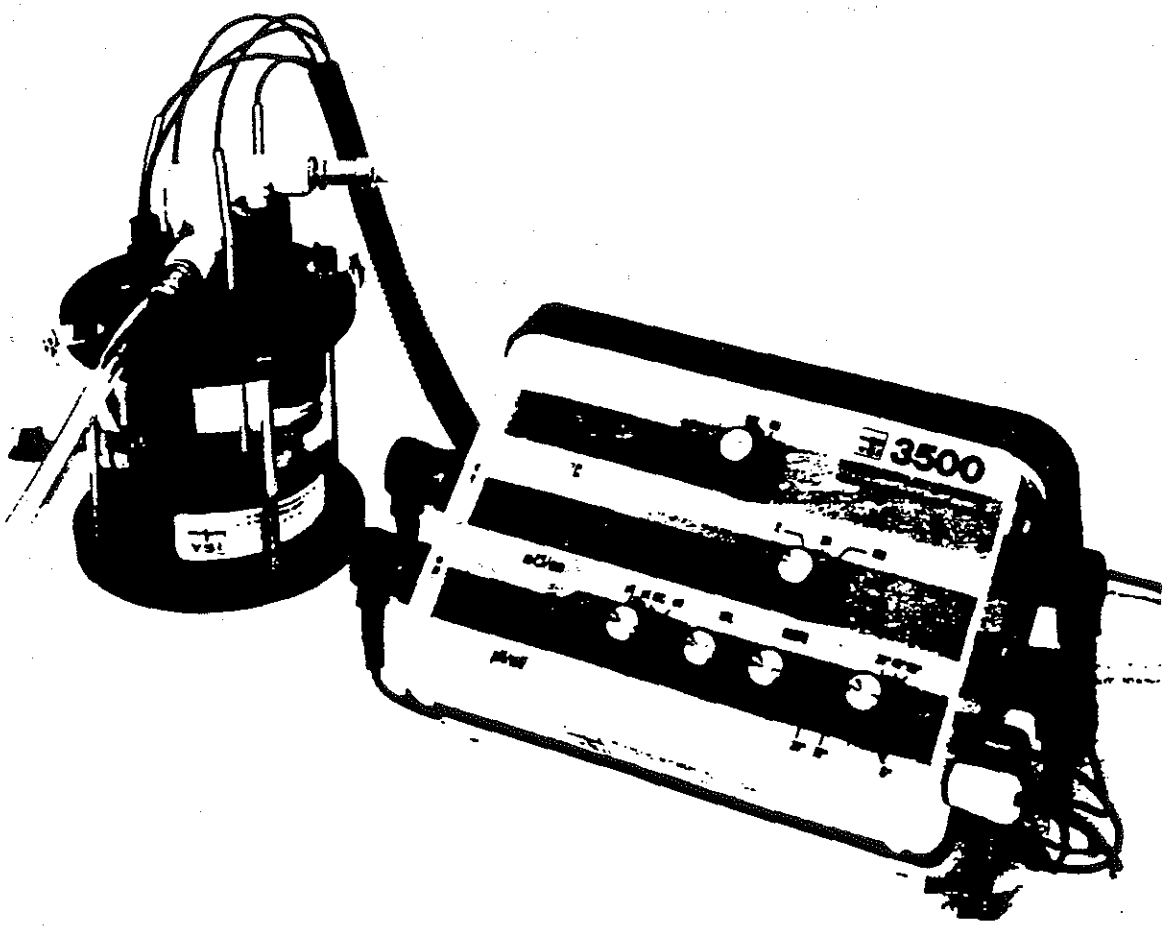
Type	Description	Inorganics	Organics
Blank	Method or preparation	Minimum one per analytical batch*	Minimum one per analytical batch*
Duplicate (Inorganics)	Field and/or duplicate of sample	Minimum one per analytical batch	---
Laboratory Control Sample	Analyte fortified blank	Minimum one per analytical batch	Minimum one per analytical batch
Laboratory Control Sample Duplicate (if requested)	Analyte fortified blank	Minimum one per analytical batch	Minimum one per analytical batch
Matrix Spike	Analyte fortified blank	Minimum one per analytical batch	Minimum one per analytical batch
Matrix Spike	Duplicate of analyte fortified sample	---	Minimum one per analytical batch

The above is a general summary of quality control frequency. A more complete definition of the above plus additional QC specific to each department will be found in the analytical method SOPs.

* Note: Maximum of 20 samples per analytical batch or monthly, whichever is more frequent.

ATTACHMENT J

YSI MODEL 3560
WATER QUALITY MONITORING SYSTEM
INSTRUCTIONS



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GENERAL DESCRIPTION

The YSI 3560 Water Quality Monitoring System

The rugged YSI 3560 Water Quality Monitoring System is primarily designed to be used in the field with a well or surface water pump, but use with a bailer, in the laboratory, or the like, is also possible. The 3560 system consists of a YSI 3500 Water Quality Monitor, a YSI 3510 Temperature Probe, a YSI 3520 Flow-Through Conductivity Cell, a YSI 3530 pH Electrode, a YSI 3550 Sample Chamber Assembly, a YSI 3565 Sample Cup Pack and assorted fittings. Other components, described below, are available as optional accessories.

As water is pumped through the system, temperature, conductivity, temperature compensated conductivity, pH, temperature compensated pH, and millivolts can all be measured. It is possible to make stable readings of the fluids running through the sample chamber in as little as two minutes. The constant monitoring of these values will help determine when a representative sample of the aquifer has been obtained. The system is designed for simple assembly and disassembly to facilitate frequent sensor calibration and easy cleaning.

The YSI Model 3500 Water Quality Monitor

The YSI 3500 Water Quality Monitor is an integral part of the 3560 system. This instrument allows the user to visually monitor three parameters simultaneously by means of three 1/2" LCD displays. The recorder output allows simultaneous recording of four parameters. The monitor is housed in a yellow molded ABS plastic case which has been tested to military specifications for shock and vibration. The 3500 uses 6 alkaline D cells which will power it for a minimum of 1400 hours. When BAT is shown on any of the displays, it is time for battery replacement.

An on/off switch controls power to the instrument. A second function switch controls each of the three ranges of conductivity and automatically temperature compensated conductivity as indicated on the middle display. The displayed values are read out in millimho/cm (m℧/cm). When a temperature probe is attached, temperature is read out constantly in °C on the top display and temperature compensated conductivity can be measured, automatically corrected to 25°C. This correction uses a temperature coefficient recommended in "Official Methods of Analysis of the Association of Official Analytical Chemists", Ed. Sidney Williams, 14th edition, 1984, Arlington, Va. This temperature coefficient of 2%/°C is calculated by the formula:

$$\text{Compensated Conductivity} = \frac{\text{Uncompensated Conductivity}}{[(P/4\%)(0.04T-1)]+1}$$

T = temperature in °C
P = temperature coefficient in %

A third function switch controls the bottom display which shows manually temperature compensated pH, or automatically temperature compensated pH, in either pH units or in millivolts (mV). Both of the temperature compensated pH functions use a temperature coefficient of .335%/°C. The mV function is designed to work with optional electrodes such as the YSI 3540 ORP Electrode. It may be used with most ion specific electrodes that meet the 3500 input specifications.

The YSI Model 3510 Temperature Probe

The YSI 3510 Temperature Probe can be used as either a Temperature/ATC Conductivity Probe or as a pH ATC Probe when attached appropriately to the YSI 3500 Water Quality Monitor. It is usable over a temperature range of -5 to 50°C with an accuracy of ±.2°C. The polyurethane cable is three feet long and is terminated at one end with a watertight MS connector. A YSI Thermilinear® thermistor is mounted in a stainless steel sheath.

The YSI Model 3520 Flow-Through Conductivity Cell

The YSI 3520 Flow-Through Conductivity Cell is an integral conductivity cell of rigid and durable chlorinated polyvinyl chloride (CPVC). A three foot polyurethane jacketed cable is attached to the cell body with a bend relief. A watertight MS type connector terminates the cable.

Two electrodes measure conductivity. The cell response time is 10 seconds for 95% reading of conductivity changes. Accurate measurements can be made with a flow rate up to 1.5 gallons per minute. The conductivity cell constant is K = 5.0/cm.

The YSI Model 3530 pH Electrode Assembly

The YSI 3530 pH Electrode Assembly has been designed for YSI for use with the YSI 3560 Water Quality Monitoring System, but it may be used equally well with other pH measuring systems that have similar specification requirements. The 3530 has a rugged 5.5 inch long polymer body designed to withstand demanding field and laboratory use. The silver/silver chloride reference electrode and silver working electrode are sealed in a 4 molar potassium chloride gel to eliminate the need to add filling solution; a porous Teflon® junction is used to maximize electrode life. The 3530 comes with a 36 inch long cable, a black BNC cover and a black end cap for easy visual distinction. The unit is shipped in a soaker bottle containing pH 4.0 buffer. It is important that the electrode be immersed in the buffer solution to prevent the electrode from drying out in storage or transport.

The YSI Model 3540 ORP Electrode Assembly

The YSI 3540 ORP Electrode Assembly has been designed for YSI for use with the YSI 3560 Water Quality Monitoring System, but it may be used equally as well with other ORP measuring systems that have similar specification requirements. The 3540 has a rugged 5.5 inch long polymer body designed to withstand demanding field and laboratory use. The silver/silver chloride reference electrode and platinum working electrode are sealed in a 4 molar potassium chloride gel to eliminate the need to add filling solution; a porous Teflon Circle R junction is used to maximize electrode life. The 3540 comes with a 36 inch long black cable, a yellow BNC cover and a yellow end cap for easy visual distinction.

The electrode assembly is shipped in a soaker bottle containing pH 4.0 buffer. It is important that the electrode be immersed in the buffer solution to prevent the electrode from drying out in storage or transport.

The YSI Model 3682 Zobell Solution

This is a reference solution used to verify the performance characteristics of redox potential cells such as the YSI 3540 ORP Electrode Assembly.

The YSI Model 3550 Sample Chamber Assembly

The YSI 3550 Sample Chamber Assembly is an integral part of the YSI 3560 Water Quality Monitoring System. It is designed to be attached to a pump outlet but can be used equally well as a non-flowing sample chamber. It is designed to hold up to five sensors and to provide inlet and outlet ports for fluid movement through the chamber. It provides good mixing of fluids so residual sample will not be a problem. The clear acrylic sides of the chamber permits observation of fluid flow.

Two gaskets keep fluids from leaking around the sensor mounting plate and base assemblies, while two o-rings in each of the sensor ports provide excellent seals. The sensor mounting plate is permanently marked to indicate the location of each sensor. This sample chamber holds approximately one liter. See Figure 1.

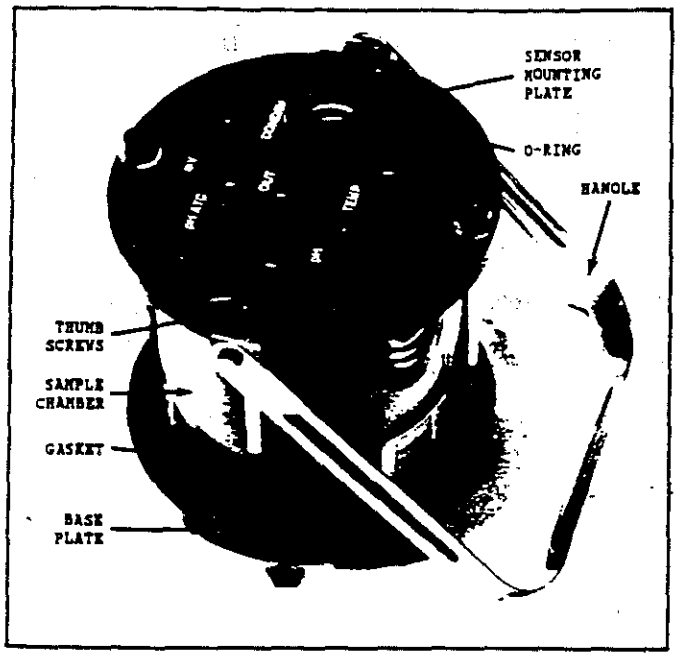

Figure 1. The YSI Model 3550 Sample Chamber Assembly

The YSI Model 3555 Sample Chamber Maintenance Kit

The YSI Model 3555 Sample Chamber Maintenance Kit is designed to provide all the o-rings, gaskets and tools necessary to perform the prescribed annual maintenance on the 3550 Sample Chamber Assembly.

The YSI Model 3565 Sample Cup Pack

The YSI Model 3565 Sample Cup Pack consists of five boxes of 100 each 50 ml polypropylene sample cups. Each box comes with velcro strips for easy installation to most surfaces. The 50 ml size is ideal for use with the 3560 system to minimize the consumption of buffers and standards used in routine calibration procedures.

The YSI Model 3570 Recorder Interface Cable

The YSI 3570 Recorder Interface Cable Assembly has four leads and a common conductor, terminated with a PVC molded connector. The 1/4 inch diameter, 10 foot long polyurethane jacketed cable provides the interface between the YSI Model 3500 Water Quality Monitor and whatever data logging or data recording device is in use. The watertight MS connector is pinned out as follows:

Pin A - Green Conductor	-	mV
Pin B - White Conductor	-	pH
Pin C - Gray Conductor	-	Common
Pin D - Red Conductor	-	mO/cm
Pin E - Black Conductor	-	°C

The YSI Model 3580 Carrying Case

The YSI Model 3580 Carrying Case is constructed of yellow polyethylene outer shells and has a yellow ABS insert which holds the 3560 system in place for carrying and provides a convenient working platform for the system in use. All metal parts are either plated or anodized to resist corrosion in the harshest environments. Two stays and a continuous hinge give the case rugged strength and durability. Two locks assure that it will stay closed in transit; tie-down straps keep the components secure from movement or damage. Up to four bottles of calibrator solutions can be put into the cavity in the lid for easy access and safe storage away from the instrument. A recess in the lid of the case is provided for convenient mounting of a 3565 Sample Cup Pack box.

SYSTEM SPECIFICATIONS

The time needed for the system to come to equilibrium with the sample under test will very with sample flow characteristics. It could be two minutes or longer.

Temperature Measurement (using YSI 3500 and 3510)
Measurement range: -5.0 to 50.0°C.
Accuracy of temperature measurements: ±0.4°C
Resolution: 0.1°C
Response Time: 95% of reading in 10 seconds

Conductivity Measurement (using YSI 3500, 3510 and 3520)
Ranges: 0.0 to 2.000 mÖ/cm conductivity
0.0 to 20.00 mÖ/cm conductivity
0.0 to 100.0 mÖ/cm conductivity
0.0 to 2.000 mÖ/cm conductivity ATC to 25°C
0.0 to 20.00 mÖ/cm conductivity ATC to 25°C
0.0 to 100.0 mÖ/cm conductivity ATC to 25°C

Accuracy of conductivity and ATC conductivity measurements:
at 25°C: ±3% of full scale from 0 to 20.00 mÖ/cm,
and ±6% of full scale from 20.00 to 50.0 mÖ/cm,
with cell electrodes not platinized

When the cell is platinized using YSI 3140 Platinizing Solution and YSI 3045 Platinizing Instrument an accuracy of ±6% of full scale from 50.0 to 100.0 mÖ/cm, can be achieved.

Temperature compensated conductivity is automatically corrected to 25°C with a temperature coefficient of 2%/°C

Resolution: 0.001 mÖ/cm for 0.0 to 2.000 mÖ/cm range
0.01 mÖ/cm for 0.0 to 20.00 mÖ/cm range
0.1 mÖ/cm for 0.0 to 100.0 mÖ/cm range

Response Time: 95% of reading in 10 seconds

pH Measurement (using YSI 3500, 3510 and 3530):
Range: 0 - 14.00 pH units
Accuracy: Subject to calibration using available pH buffer solutions in measurement range
Resolution: 0.01 pH
Response Time: 95% of reading in 10 seconds
Temperature Compensation: Automatic: -5 to 50°C
Manual: ±1°C from 0 to 50°C
Sample Temperature: -5 to 50°C

mV Measurement (using YSI 3500)
Range: -1500 mV to +1500 mV
Accuracy: ±1% of reading, plus 1 count
Resolution: 1 mV

Instrument (YSI 3500)
Monitor Size: 8.3 x 11.8 x 4.1 inches
(21.1 x 30.0 x 10.4 centimeters)
Weight: 5.5 pounds (2.5 kilograms)
Ambient Operating Temperature Range: -20 to 50°C
Humidity: operates in 10 to 90% RH, non-condensing at 25°C
Shock and Vibration: conforms to MIL-T-28800-C, Class 3, Style A
EMI: conforms to FCC (47CFT, Part 15, Subpart J), Class A & B
Recorder Output: 4 channels simultaneous (°C, mÖ/cm, pH, mV)
Sensitivity: 1 mV = 1 count on display
Accuracy: ±10 counts of display
50 K ohm minimum load impedance
Conductivity ATC output = uncompensated conductivity output
Calibrated with 50 K ohm lead resistor

Power Supply: Batteries: 6 alkaline D cells
Life: At 1 micromho/cm, 25°C, 8 hr. per day, 700 hours minimum, 1,000 hours typical

Carrying Case (YSI 3580) (not included with system)
Size: 8.5 x 24.0 x 14.9 inches
(21.6 x 61.7 x 37.8 centimeters)
Weight: 11.0 pounds (5.0 kilograms)

ACCESSORIES

3500 Water Quality Monitor
3510 Temperature Probe
(also used for Conductivity ATC, and pH ATC)
3520 Flow-Through Conductivity Cell
3530 pH Electrode Assembly
3540 ORP Electrode Assembly (Redox Potential)
3550 Sample Chamber Assembly
3555 Sample Chamber Maintenance Kit
3565 Sample Cup Pack (500 each)
3570 Recorder Interface Cable Assembly
3580 Carrying Case
3682 Zobell Solution (ORP Calibrator Solution)
3167 Conductivity Solution, nom. 1.0 mÖ/cm, field use
3168 Conductivity Solution, nom. 10.0 mÖ/cm, field use
3169 Conductivity Solution, nom. 50.0 mÖ/cm, field use
3045 Platinizing Instrument
3140 Platinizing Solution

Accessories may be purchased through your YSI dealer.

OPERATION

Pump Hook-Up

The YSI 3560 Water Quality Monitoring System is shipped unassembled and must be assembled before use. The system may be connected to the pump outlet at any time during the purging-pumping process as long as the flow rate does not exceed 1.5 gallons per minute. The system is normally connected prior to starting the pump so that constant parameter monitoring may be achieved and the point for logging the representative sample values can be determined. Because of sample chamber construction, it is very important that a 1.5 gallons per minute sample flow not be exceeded; otherwise, leakage may occur.

The outlet from the pump must first be prepared for the sample chamber input. Inlet and outlet lines for the 3550 are cut to the length desired from the ten foot long plastic tubing supplied. Insert a tube-hose stem adapter into each end of the inlet tubing. This section connects the pump outlet to the sample chamber inlet. Insert a third tube-hose stem adapter into one end of the outlet tubing. This goes from the sample chamber to a waste container.

Next, the 3550 is connected to a 1/2" or 3/8" OD pump outlet by using the appropriate straight union connector supplied. For a 1/2" OD pump outlet, use the straight-union connector with two 1/2" ID ports. For a 3/8" OD pump outlet, use the straight-union connector which has one 3/8" ID port and one 1/2" ID port. Hand-tighten the appropriate port of the straight union connector at the pump outlet. Insert one end of the previously constructed sample chamber inlet tubing into the opposite port of the straight union connector and hand tighten it (see Figure 2).

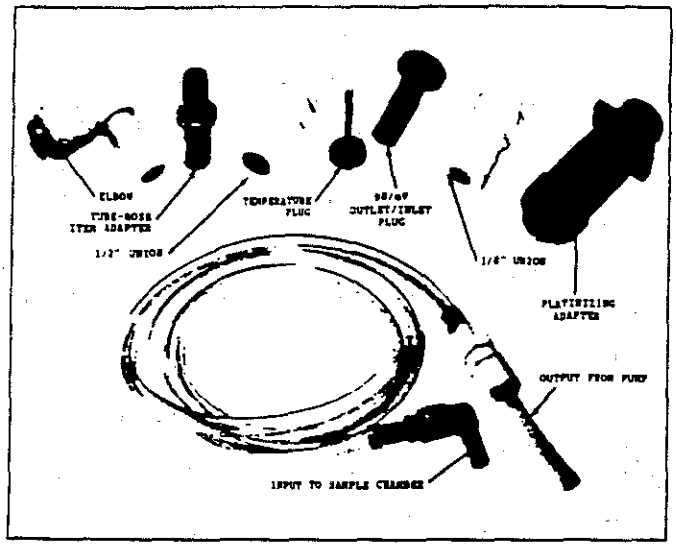

Figure 2. Plumbing Components and Platinizing Adapter

Insert the other end of the constructed inlet tubing into an elbow until it stops. Then insert the elbow into the top of the YSI 3520 Flow-Through Conductivity Cell and push down until it stops. Two internal o-rings in the cell serve as water seals.

The constructed end of the outlet tubing with the inserted tube-hose stem adapter is then pushed into another elbow until it stops. Then the elbow is inserted into the outlet port of the sensor mounting plate and pushed down until it stops. There is a double o-ring seal here too.

Install the sensors that will be used into the sensor mounting plate in their respective ports. The sensor ports not in use must have plugs installed to close off the system. Attach each of the sensors to the 3500. The input jacks are marked for proper placement of each connector. The temperature, conductivity, pH ATC probe inputs, and the recorder output have MS connectors. The pH and ORP electrodes come with BNC connectors which have very low water integrity and so should have their "boots" installed over their connectors. The color coding on the boots also helps identify them when they are in the cable harness. With the sensors attached to the 3500, place all the cables from the sample chamber into the black cable harness provided with the 3560 system. The harness is slotted for easy cable installation. The system is now ready for operation. (See Figure 3.)

With the system connected to the pump, begin pumping according to the pump manufacturer's instructions. Turn on the 3500. Before recording any values, make sure the sample chamber is full, that all air is voided, and that all of the displayed values are stable.

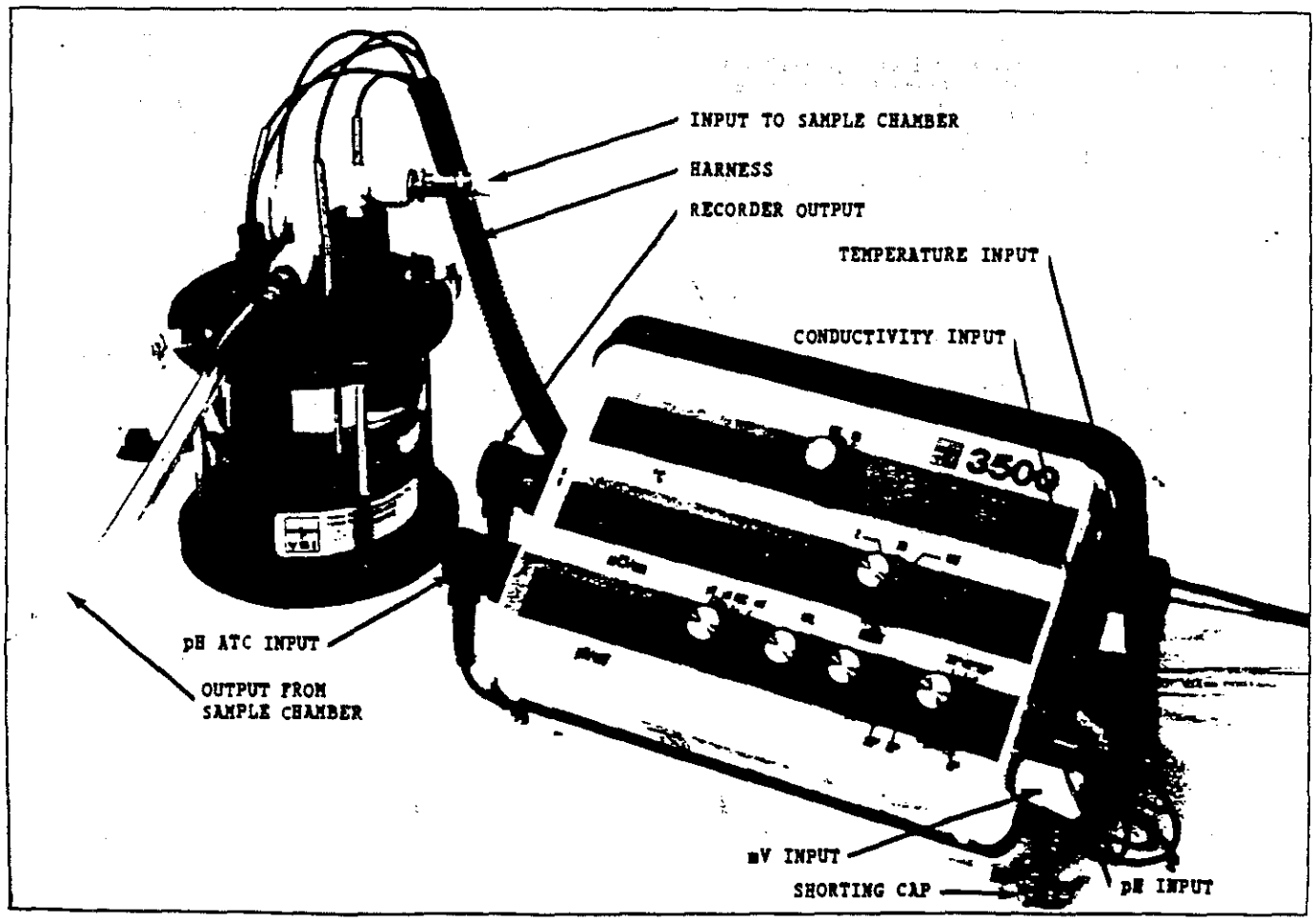

Figure 3. The 3560 System, Assembled

Temperature Measurement

To measure temperature, connect a 3510 Temperature Probe to the 3500. Temperature is measured in °C and is shown continuously on the top display. With no probe attached, the 3500 display will read -34.0 ±.2°C.

Conductivity Measurements

Before any conductivity cell is used, it should be soaked in distilled or deionized water for at least one hour. To make conductivity measurements, connect a YSI 3520 Flow-Through Conductivity Cell to the 3500. Set the conductivity function switch to 2 and observe the displayed value after the reading is stable. The display reads out in millimhos/centimeter (mO/cm). If micromhos/centimeter (µO/cm) is desired, multiply the displayed value by 1000.

If the overrange signal (1.___) is displayed, the conductivity of the water being assayed is greater than 1.999 mO/cm. Reset the function switch to 20. If the overrange signal is still displayed, reset to 100. If the overrange signal is still displayed, either the conductivity is greater than 100.0 mO/cm and the YSI 3500 Water Quality Monitor can not be used for conductivity determinations, or else there is a system error.

If no cell or a dry cell is attached to the 3500, the display will read 000 (±002) with the appropriate decimal point.

Automatically Temperature Compensated Conductivity

To measure automatically temperature compensated conductivity, connect a YSI 3510 Temperature Probe and a YSI 3520 Flow-Through Conductivity Cell to the 3500, and set the conductivity function switch to the correct ATC conductivity range. Readings are automatically compensated by 2%/°C to 25°C. The 3510 must be located in the sample under test for the automatic compensation to work correctly. If no temperature probe is connected to the monitor, the display will show the overrange signal (1.___). See Tables I and II for the correction values.

pH Measurements

To measure pH, connect a YSI 3530 pH Electrode or equivalent to the 3500, and set the pH function switch to pH. Typically, a two point calibration is necessary before actual measurements can be made. See pH Calibration procedure. Once the 3530 is calibrated, install the electrode into its port in the 3550. Though the instrument and electrode have been calibrated at one temperature, they can be used at other temperatures as long as the manual temperature knob is reset to the new sample temperature before final values are determined. Be sure to reset the dial to the temperature indicated by the top display. Though pH is temperature dependent, it is not customarily corrected to 25°C, as conductivity often is. pH changes with temperature at the rate of .335%/°C from the calibration point.

When measuring pH with no electrode connected to the mV input, the shorting cap attached to the 3500 should be on the mV input jack.

Automatically Temperature Compensated pH

To measure automatically temperature compensated pH, a YSI 3510 Temperature Probe and a YSI 3530 pH Electrode must be connected to the 3500. As long as the pH ATC mode is being used, the 3510 must remain connected to the pH ATC input jack or else the pH display will show an underrange negative value, or an overrange condition greater than 14.00--which are outside of the pH range of 0.00 to 14.00 and can not be adjusted into the measurable pH range.

Typically, a two point calibration is necessary before actual measurements can be made. See pH Calibration procedure. Once the 3530 is calibrated, install the electrode into the 3550 in its appropriate port, and the 3510 into the pH ATC port. Though the instrument and sensors have been calibrated at one temperature, they can be used at other temperatures, since temperature changes from the calibration point will be automatically corrected to the new value. Though pH is temperature dependent, it is not customarily corrected to 25°C, as conductivity often is. pH changes with temperature at the rate of .335%/°C from the calibration point.

When measuring pH with no electrode connected to the mV input, the shorting cap attached to the 3500 should be on the mV input jack.

mV Measurement

The millivolt (mV) function is intended for use with the YSI 3540 ORP Electrode, though other sensors may also be used. Set the pH function switch to the mV mode and read the bottom display. There are no adjustments in this mode, so any sensor that is attached to this input jack should be tested against some known standard as defined by its manufacturer. See Calibration for ORP Electrode. When no electrode is attached to the mV input, the shorting cap attached to the 3500 should be installed on this jack. If the pH input is not to use when an ORP electrode is on the mV input, the shorting cap should be connected to the pH input jack. With the shorting cap installed, the display will read 000 ±002.

Bailers

To use the 3560 system with a bailer instead of a pump, use the funnel provided to fill the sample chamber with the solution to be tested. The sample chamber and the conductivity cell must be filled to the very top and all air must be removed to ensure accurate readings.

Recorder Output

The Model 3500 recorder output is capable of driving a data logging device or strip chart recorder. Four outputs are located on the connector designated REC OUT and are defined as Temperature (pin E), Conductivity (pin D), pH (pin B), and mV (pin A); the common for each output is pin C. Each output circuit has a minimum load impedance of 50 K ohms. Each produces 1 mV for every count on the respective displays, and is accurate to ±10 counts of the display. The outputs have been calibrated with a 50 K ohm load. It should be noted that the conductivity output in the ATC mode is not temperature compensated. Conductivity output is always uncompensated conductivity. Compensated conductivity can be calculated as described elsewhere.

Shut Down

To shut down the system, simply turn the power switch to OFF. Turn the pump off before disconnecting the plumbing. Remove the straight union connector from the pump outlet, then remove the hose and fittings from the sample chamber ports and drain them. Plug the ports with the plastic plugs provided.

To keep the sensors in a suitable environment, the sample chamber can be moved from one site to another with its contained fluid. When the day's measurements are finished, drain the chamber by removing one of the plugs from its port and pouring out the sample. The pH and ORP electrodes should be stored in their soaker bottles to prevent them from drying out. The conductivity cell should be stored moist to minimize its equilibration period.

MAINTENANCE

Instrument

The YSI 3500 Water Quality Monitor requires occasional battery replacement and cleaning. Six alkaline "D" cells in the 3500 provide a minimum of 1400 hours of operation. When BAT appears on any of the three displays, it is time to replace the batteries. It is important to replace all the alkaline batteries at the same time for long life between battery changes. Remove the four rubber feet located on the back of the instrument and take off the back. Replace the batteries in the battery holder tubes, making sure the polarity is correct (red is positive). Reassemble the case, being careful to align the gasket correctly to prevent water infiltration. The rubber feet should be reinstalled finger tight. Do not use a screw driver.

Use a mild soap and water solution to clean the instrument. Wipe the solution on and wipe it off right away; follow this with a clean water wipe. Either a probe or connector cap should be in place over every jack to keep water out. If water gets into the instrument, disassemble it and wipe it dry. Do not dry it with hot air; this could damage the electronic components.

For stubborn stains and other marks, a solution of 50% water and 50% isopropyl alcohol may be used. Do not allow the solution to stand on the instrument case. Rinse by wiping with water, as above.

When storing the 3500 for long periods, remove the batteries to lessen the possibility of leakage.

Sample Chamber

The YSI 3550 Sample Chamber Assembly comes apart easily. The o-ring seals in the ports and the chamber gaskets should be replaced annually. Use the tweezers provided in the YSI 3555 Sample Champer Maintenance Kit to remove old o-rings and install new ones. Be sure the o-rings are properly seated in their grooves; they fit back in the sides of the ports. When you replace the gaskets located in recesses at the top and bottom of the clear acrylic tube, re-apply the thumbscrews finger-tight only; do not use any tool to tighten them. The gaskets could be cut, which would cause them to leak.

You may clean the parts of the disassembled chamber, as well as the plumbing fittings, with a mild soap solution or with isopropyl alcohol for tough stains. Rinse the cleaned components with water to remove any residual soap or alcohol; residues might cause interference with measurements.

Whenever storing the 3550, remove all the sensors to minimize the possibility of damaging, and store each one as recommended below. The sample chamber should be disassembled and dried before storage to prevent microbial growth.

The tubing and fittings used with the Sample Chamber may be cleaned with a general laboratory detergent. The tubing may be autoclaved. To remove the hose-stem adapter from the elbow, push in the collar on the elbow while pulling out the hose-stem adapter.

Temperature Probe

The 3510 requires very little maintenance in normal use. The durable stainless steel sheath and polyurethane cable may be cleaned with a mild soap and water solution. A solution of 50% isopropyl alcohol and 50% water may be used to remove stains and mineral deposits.

The 3510 should be stored dry in its own shipping box, and kept in a dry location.

Flow-Through Conductivity Cell

The stainless steel electrodes of the 3520 do not require platinization when used between 0.0 and 50.0 mÖ/cm. When conductivity values from 50.0 to 100.0 mÖ/cm are to be measured, the electrodes do require platinization for system accuracy. A platinization adapter has been provided with the system for use in conjunction with the YSI 3045 Platinizing Instrument and YSI 3140 Platinizing Solution. See the 3045 instructions for further information. The cell must always be kept clean to assure proper operation and reproducible accuracy. A dirty cell will contaminate the sample under test and change the conductivity reading. Any of the foaming acid tile cleaners such as Dow Chemical "Bathroom Cleaner" will clean the cell adequately. When a stronger cleaning preparation is required, use a solution of 10 parts distilled water, 10 parts isopropyl alcohol, and one part 10 normal hydrochloric acid.

Dip the cell into the cleaning solution and agitate for two or three minutes. A small test tube brush may be used to gently clean the electrodes and the flow-through port. Be careful to not scratch the electrodes. Rinse the cell in several changes of distilled or deionized water. The cell constant should be checked after each cleaning (see Calibration).

Store the 3520 in deionized water. For short term storage, the cell can be wrapped in a moist towel and placed in a plastic bag. After the 3520 cell has been stored dry, the cell constant will be in error until it has been soaked in deionized water for at least an hour.

Change the two silicone o-rings annually to maintain their sealing integrity. Use the tweezers provided in the 3555 Sample Chamber Maintenance Kit to remove old o-rings and install new ones. Be sure the o-rings are properly seated in their grooves, and be careful not to damage the o-rings or the cell with the tweezers.

pH Electrode

All sealed pH electrodes, including the YSI 3530, will deteriorate with time. The typical electrode will deteriorate after 3 to 6 months of normal use. Age deterioration is characterized by a shortened slope adjustment and slower speed of response. Aging can best be detected by calibrating the electrode. As a rule, if the span for slope adjustment can not be brought into range (that is, a reading of 4.00 can not be set), the electrode should be cleaned and retested or reconditioned (see below). When storing the electrode, keep it in the soaker bottle provided. The solution in the bottle may be replenished with 5 to 10 mL of pH 4 buffer with 1/2 teaspoon of sodium chloride (NaCl). If performance is not restored the electrode should be replaced. The slope control on the YSI 3500 Water Quality Monitor will allow a pH electrode with an 80% to 100% efficiency to be calibrated to the slope adjustment value. If this cannot be set, the electrode is probably below an 80% efficiency value. To clean or recondition a 3530, proceed as follows:

pH Electrode Cleaning: Coating of the bulb can lead to erroneous readings including shortened slope adjustment. Cleaning technique is determined by the type of coating. Soft coatings can be removed by vigorous stirring or by use of a squirt bottle of water. Organic chemicals or hard coatings should be chemically removed. A half-hour soaking in an industrial strength

detergent is recommended. Only in extreme cases should the bulb be mechanically cleaned as abrasion can lead to permanent damage. If cleaning does not restore performance, reconditioning may be attempted.

pH Electrode Reconditioning: When reconditioning is required due to electrode aging or severe fouling, the following chemical treatments can be tried. They are presented in the order of the severity of their attack on the pH electrode glass and may not improve electrode performance, and in some cases they might actually reduce it.

NOTE: USE PROPER PRECAUTIONS WHEN HANDLING THESE HAZARDOUS CHEMICALS.

1. Immerse the electrode tip in 0.1 normal hydrochloric acid for 15 seconds, rinse it in tap water, then immerse the tip in 0.1 normal sodium hydroxide for 15 seconds, and rinse in tap water again. Repeat this sequence three times and then recheck electrode performance. If it has not been restored, try the next step.

2. Immerse the electrode tip in a solution of 20% ammonium bifluoride and 80% water for two to three minutes, rinse in tap water and recheck performance. If performance has not been restored, try the next step.

3. Immerse the electrode tip in a solution of 5% hydrofluoric acid and 95% water for 10 to 15 seconds, rinse well in tap water, quickly rinse in 5 Normal hydrochloric acid, then rinse well in tap water again and recheck performance. If performance has not been restored, replace the electrode.

ORP Electrode

The 3540 should be periodically inspected for coating of the platinum surface, which can cause erroneous readings. The bulb guard of the electrode can be removed to expose the platinum for cleaning. When storing the electrode, keep it in the soaker bottle provided. The solution in the bottle may be replenished with 5 to 10 mL of pH 4 buffer with 1/2 teaspoon of sodium chloride (NaCl). By testing the 3540 with YSI 3682 Zobell Solution, the need for cleaning can be determined (see Calibration). To clean the 3540, proceed as follows:

1. Soft coatings should be removed by use of a squirt bottle of water or by gently wiping with a soft cloth. Remove the bulb guard if necessary. Be careful not to scratch the platinum.

2. Hard coatings or organic chemicals should be removed by an appropriate chemical solvent, by gently scrubbing with a very fine cleansing powder such as "Softscrub," or by gently polishing with 600 grade wet silicon carbide paper. Wet a piece of the paper with water and gently polish the electrode with a circular twisting motion.

NOTE: After cleaning the platinum surface, soak the electrode for 8 to 24 hours in 4.0 pH buffer, then recheck it with YSI 3682 Zobell Solution before further use.

CALIBRATION

Instrument

The Model 3500 has no user serviceable adjustments. If you suspect that the instrument is out of calibration, it may be tested for accuracy using the YSI 3590 pH Sensor Simulator and the 3595 Test Probe Kit. Install the 3595 Test Probe Assembly by connecting the temperature unit (4 pins) to the TEMP input jack on the 3500, and the conductivity unit (2 pins) to the COND input jack. The readings you should see to ascertain correct operation of the temperature, conductivity and ATC conductivity functions of the 3500 are as follows:

°C = 15.5 ±0.3

2 mÖ/cm = 1.563 ±0.020
20 mÖ/cm = 1.56 ±0.10
100 mÖ/cm = 1.6 ±0.2

2 mÖ/cm ATC = 1.928 ±0.020
20 mÖ/cm ATC = 1.93 ±0.10
100 mÖ/cm ATC = 1.9 ±0.2

Connect the 3590 pH Sensor Simulatnr to the 3500 as described on the instruction label on the back of the 3590, then follow the steps listed in these instructions. If the displayed values are out of specification, the 3500 should be returned for service. See Warranty and Shipping Information.

Temperature

The 3510 Temperature Probe is assembled with a YSI Thermilinear thermistor and may be tested by customers using an ohmmeter. With the sheath of the probe submerged in a 0.0 ±.1°C ice bath, thermistor resistance can be compared to the following values:

Across Pins A & B = 94.98 K ±482 Ohms
Across Pins B & C = 19.59 K ±103 Ohms
Across Pins A & C = 114.6 K ±585 Ohms
Across Pins B & D = 0 ±1 Ohm

If any measurement is out of tolerance, see Warranty and Shipping Information for repair or replacement information.

Conductivity

The designed cell constant of the YSI 3520 Flow-Through Conductivity Cell is K = 5 /cm. Different accuracies in different ranges is a characteristic of the stainless steel electrodes. Though in normal use, re-determination of the cell constant may not be required, the constant can be affected by electrode fouling or mechanical shock. Therefore, it is wise to re-determine the cell constant routinely. When testing the calibration of the system, be sure check the accuracy of the test against System Specifications.

The total accuracy of the system is the sum of all the inaccuracy of its parts. As an example, at 10.00 mÖ/cm the 3500 and 3520 have an accuracy of ±3% of full scale (20.00), and the 3168 Conductivity Solution has an accuracy of ±1% of solution value. So when the solution is tested in the ATC mode, the displayed value should be 10.00 ±.70 mÖ/cm.

To check the cell constant, YSI 3167, 3168 or 3169 Conductivity Calibrator Solutions may be used. These solutions are packaged eight to a box in unbreakable plastic one pint bottles designed for field use. The solutions are manufactured to nominal values of 1, 10, or 50mÖ/cm at 25°C, with a ±1% accuracy of the stated

value on the label. A chart for uncompensated values at temperatures other than 25°C is included with each box.

In the following example, cell/instrument calibration is confirmed by use of YSI 3167 solution, but these procedures may be followed using any of the YSI solutions with only slight procedural changes.

Connect the 3520 cell and a 3510 Temperature Probe to the 3500, and remove them from the sample chamber. Set the conductivity function switch to 2 ATC. Rinse the inside and outside of the cell and the probe with about 1/3 of the contents of the 3167 bottle. Place both of the sensors into the remainder of the solution in the bottle, and allow them to come to temperature equilibrium. Make sure that the 3520 body is immersed so that the water level is half way up the knurled portion of the cell. See Figure 4. Read the displayed value and determine if the cell/instrument is within specified accuracy. The displayed value is corrected to 25°C automatically and should be 1.000 ±.070 mO/cm. If the value is within specification, the measured error can be used to further improve the accuracy of the system by providing a correction factor for further readings. This is done as follows:

$$\text{Corrected Sample Value} = \frac{\text{Calibrator Value}}{\text{Displayed Value}} \times \text{Sample Value}$$

Calibrator Value = 1.000 mO/cm
Displayed Value = .978 mO/cm
Sample Value = .634 mO/cm

0.648 mO/cm = (1.000 mO/cm)/(.978 mH/cm X (.634 mO/cm)

Discard the calibrator solution once the accuracy of the system has been determined. It has been contaminated and should not be reused. If system accuracy is out of specification, see Warranty and Shipping Information for repair instructions.

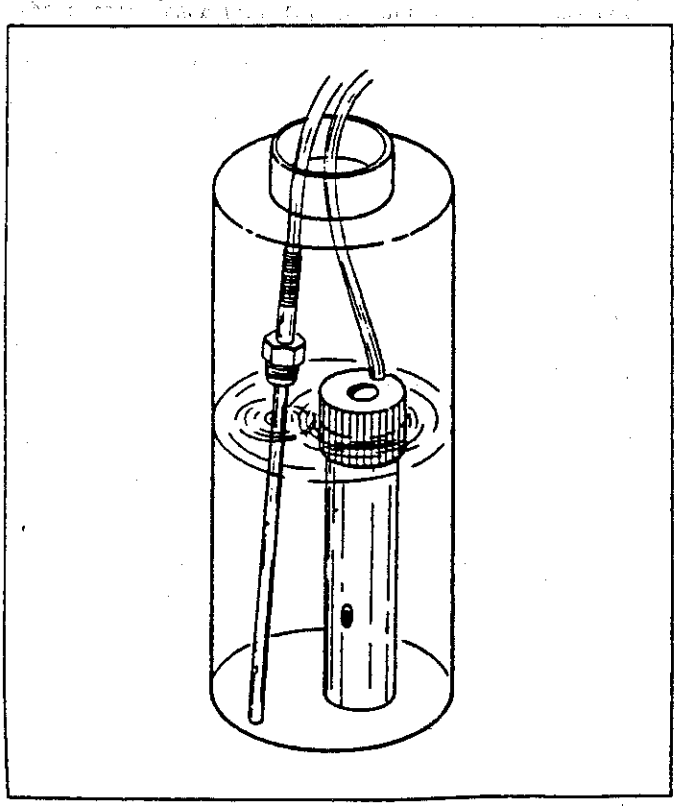

Figure 4. Sensor Level in Conductivity Calibrator Solution

pH

The frequency at which calibration is needed depends on the electrode, the pH monitor and the characteristics of the water to which the electrode is exposed. Since normal life of a pH electrode is only three to six months, it is advisable to calibrate the pH system before sampling at each site. The pH electrode [illegible]ld be tested for background noise and appropriately o[illegible]et on a weekly basis.

Before connecting the pH electrode, zero the electronics with the shorting cap attached to the 3500. Turn on the 3500 and set the pH function switch to pH. Next, connect the shorting cap to the pH input jack and set the manual temperature compensation knob to 25°C. Then, adjust the CAL control to indicate 7.00 ±0.01 on the pH-mV display. Disconnect the shorting cap from the pH input and connect it to the mV input jack. The monitor is now zeroed.

Test the 3530 pH Electrode for noise and offset as follows. Rinse the 3530 and a YSI 3510 Temperature Probe with pH 7.00 buffer to remove any contaminants. Connect the 3530 to the pH input jack and the 3510 to the TEMP input jack. Pour pH 7.00 buffer into a 50 ml sample cup, such as one from the YSI 3565 Sample Cup Pack, then immerse both of the sensors into the buffer at 25.0 ±0.1°C (use the °C display to confirm the temperature). Allow the sensors to equilibrate. A display value other than 7.00 shows electrode background noise and offset. The 3530 background noise and offset at pH 7.00 should not exceed ±0.2 pH units at 25°C.

Once it has been established that the electrode offset is functioning properly, a two point calibration should be performed. pH buffers of 7.00 and 4.00 or of 7.00 and 10.00, whichever two are closer to the expected sample value, should be used. Proceed as follows to make a two point calibration.

Rinse the 3530 and a YSI 3510 Temperature Probe w[illegible] pH 7.00 buffer to remove any contaminants. Connec[illegible]ne 3530 to the pH input jack and the 3510 to the TEMP input jack. Pour pH 7.00 buffer into a 50 ml sample cup, such as one from the YSI 3565 Sample Cup Pack, then immerse both of the sensors into the buffer. Allow the sensors to equilibrate in the buffer until a stable reading is obtained. Read the temperature and adjust the pH manual temperature compensation knob to the same value. Adjust the CAL control knob for 7.00 ±0.01 pH units on the display and discard the buffer. Rinse the sensors with deionized or distilled water, followed by a rinse of the next desired buffer (typically pH 4.00 or 10.00). Half fill another disposable 50 ml sample cup with the next buffer for calibration and immerse the sensors. Allow the sensors to equilibrate until a stable reading is obtained. The temperature of the two buffers should not differ by more than ±0.1°C. Adjust the SLOPE control until the display is within 0.01 pH units of the buffer's stated value. Discard the buffers. The pH system is now calibrated and ready for use.

Temperature Compensated pH

Follow the pH instructions above, with the following modifications:

Set the pH function switch to pH ATC. Connect the 3510 to the pH ATC input jack. While the 3510 can be used in either location, the pH ATC function will not work unless the 3510 is connected to the pH ATC input. It is recommended that a second YSI 3510 Temperature Probe be used for this operation. Manual temperature com[illegible]ation is not necessary since temperature compensat[illegible] is performed automatically in this mode.

mV

The frequency with which the mV function needs to be evaluated depends on the electrode, the monitor and characteristics of the ground water to which the electrode is exposed. It is wise to test the ORP system against a standard on a weekly basis. The YSI 3540 ORP Electrode comes with a bottle of YSI 3682 Zobell Solution which is used as a reference solution. To test the system with this standard, proceed as follows:

First, turn on the YSI 3500 Water Quality Monitor and set the pH function switch to mV. Next, connect the shorting cap attached to the 3500 to the mV input jack. The display should read 000 ±2 mV. This indicates that the 3500 electronics are zeroed. Detach the shorting cap and connect the 3540 to the mV input jack. If a pH electrode is not attached to the pH input jack, connect the shorting cap to it. Attach the 3510 to the TEMP input jack. Rinse the 3540 and 3510 with distilled or deionized water, followed by a rinse with a small amount of reconstituted YSI 3682 ZoBell Solution. Half fill a disposable 50 ml sample cup, such as one from the YSI 3565 Sample Cup Pack, with ZoBell Solution and fully immerse the bulb of the 3540 and the end of the sheath of the 3510. Allow the sensors to equilibrate, and note the reading. The displayed mV value is not temperature compensated and should be corrected to 25°C at 1.3 mV/°C. The temperature coefficient is in reverse proportion to the temperature. The calculated value for the ZoBell Solution should be 231 ±10 mV at 25°C.

Example: Displayed Temperature = 22.1°C
Displayed Value of ZoBell Solution = 236 mV

231 mV = Display Value + [(Display Temp. - 25°C) x (1.3 mV)]
231 mV = 236 mV + [(22.1°C - 25°C) x (1.3 mV)]
231 mV = 236 mV + [-3.8 mV]
231 mV = 232.2 mV, corrected to 25°C

The calculated value of the Zobell solution in this example is within its specified range of 231 ±10 mV. This confirms that the ORP system is functioning properly. Rinse the sensors with deionized or distilled water and discard the used Zobell solution.

NOTE: If a pH sensor such as the 3530 and another potentiometic sensor such as the 3540 are to be installed at the same time into the 3550 Sample Chamber, and if both have their own reference electrodes, both reference electrodes must be immersed in the calibration solution during calibration.

WARRANTY AND SHIPPING INFORMATION

The YSI 3560 is warranted for one year against defects in workmanship and materials exclusive of batteries when used for its intended purposes and maintained according to manufacturer's instructions. The YSI 3530 and 3540 are warranted for three months. Damage due to accidents, misuse, tampering, or failure to perform prescribed maintenance is not covered. The warranty period for chemicals and reagents is determined by the expiration date printed on their labels. This warranty is limited to repair or replacement at YSI's option.

IF SERVICE IS REQUIRED

Contact the YSI dealer from whom you bought the instrument, or the YSI Product Service Department. Report the date purchased, model, serial number, and the nature of the failure.

When shipping any instrument, be sure that it is properly packaged and insured for complete protection. When returning for repair, please note the requirements of the Cleaning Certificate. In communications regarding this instrument or accessories please mention the model and serial number.

Yellow Springs Instrument Co., Inc.
Product Service
1725 Brannum Lane
Yellow Springs, Ohio 45387

YSI Toll Free Number: 1-800-343-HELP

REQUIRED NOTICE

The Federal Communications Commission defines this product as a computing device and requires the following notice:

This equipment generates and uses radio frequency energy and if not installed and used properly, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class A or Class B computing device in accordance with the specification in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

a) reorient the receiving antenna
b) relocate the computer with respect to the receiver
c) move the computer away from the receiver
d) plug the computer into a different outlet so that the computer and receiver are on different branch circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 0004-000-00345-4.

TROUBLESHOOTING INFORMATION

Five basic assemblies make up the 3500: the conductivity-temperature board assembly, the pH-mV board assembly, the battery assembly, the meter assembly and a front panel assembly. The conductivity-temperature board provides references for the conductivity and temperature circuits as well as signal conditioning, timing, upper display drives and recorder output for all four monitor parameters.

Power is provided by the Battery Assembly and conditioned by the Cond-Temp board. +V is a constant 3.5 V to common and -V varies with the battery level. Power and timing are provided to the pH-mV board via a cable. The pH-mV board in turn provides signal conditioning, lower display drive and circuit isolation for the pH and mV circuits.

The Front Panel Assembly provides interfacing for the sensor inputs, front panel controls and Meter Assemblies.

With no sensors connected, the °C display will indicate -34.0 ±.2°C. The mO/cm display will indicate 000 ±002 mO/cm plus the appropriate decimal point in the 2, 20, and 100 ranges and an overrange condition (1___) in the 2 ATC, 20 ATC, and 100 ATC ranges with appropriate decimal point. With a temperature probe connected to the TEMP input, the overrange condition will turn off and the same display will appear as for the 2, 20, and 100 ranges.

With the function switch set to pH, and with the shorting cap on the pH input, the CAL knob can be adjusted so that the display shows from approximately 6.00 to 8.00 pH units, and the SLOPE and manual temperature compensation knobs will not affect the display value. With the shorting cap on the mV input, the display will indicate 000 ±002 mV in the mV function.

The pH electrode can be tested at the mV input. See Table IV for the electrode output in millivolts at different temperatures when the electrode is immersed in 4.00 and 10.00 pH buffers. The table shows the ideal mV outputs when the electrode is 100% efficient. Since the instrument SLOPE knob permits for adjustment from 100% down to 80%, the table value minus 20% is acceptable as an electrode output at any of the listed parameters. Before the electrode is tested for output, it should be evaluated for background noise and offset. At 25°C in pH 7.00 buffer, the electrode should indicate 0 ±11 mV.

TABLES

I. Temperature Correction Values Used for Automatic Temperature Compensation by the Model 3500 at 2%/°C

Temperature °C	Conductivity Ratios in mO/cm ATC to 25°C
-5	2.500
0	2.000
5	1.667
10	1.429
15	1.250
20	1.111
25	1.000
30	.909
35	.833
40	.769
45	.714
50	.667

II. Temperature Correction Values of Two Typical Solutions (0.007 Normal and 0.089 Normal Potassium Chloride)

Temperature °C	0.007 Normal KCl mO/cm at T°C	0.089 Normal KCl mO/cm at T°C
-5	.455	5.54
0	.541	5.54
5	.628	6.39
10	.718	7.26
15	.810	8.15
20	.904	9.07
25	1.000	10.00
30	1.098	10.96
35	1.199	11.93
40	1.302	12.93
45	1.406	13.95
50	1.513	14.99

III. Temperature Values for Zobell Solution used with Silver/Silver Chloride and Calomel Electrodes

Temperature °C	Ag/AgCl (4M KCl) Millivolts	Calomel Millivolts
-5	270.0	234.2
0	263.5	226.0
5	257.0	217.8
10	250.5	209.6
15	244.0	201.4
20	237.5	193.2
25	231.0	185.0
30	224.5	176.8
35	218.0	168.6
40	211.5	160.4
45	205.0	152.2
50	198.5	144.0

IV. Ideal pH Electrode Output in pH 4.00 and 10.0 Buffers

Temperature °C	pH 4.00 Millivolts	pH 10.00 Millivolts
-5	159.6	-159.6
0	162.6	-162.6
5	165.6	-165.6
10	168.6	-168.6
15	171.5	-171.5
20	174.5	-174.5
25	177.5	-177.5
30	180.4	-180.4
35	183.4	-183.4
40	186.4	-186.4
45	189.4	-189.4
50	192.4	-192.4

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YSI MODEL 3550 SAMPLE CHAMBER ASSEMBL
INSTRUCTION

The YSI Model 3550 Sample Chamber Assembly is shipped with 4 pH/ORP/Outlet/Inlet plugs, 2 temperature plugs, 2 elbows, a warranty card and a cleaning certificate.

DESCRIPTION

The YSI 3550 Sample Chamber Assembly is an integral part of the YSI 3560 Water Quality Monitoring System. It is designed to be attached to a pump outlet, but it can also be used as a non-flowing sample chamber. It will hold up to five sensors and provide inlet and outlet ports for fluid movement through the chamber. The sample circulates through the chamber at up to 1 1/2 gallons per minute. The chamber provides good mixing of fluids so residual sample is not a problem. Clear acrylic sides allow the user to see fluids flowing through the chamber.

Two black EPR gaskets keep fluids from leaking around the sensor mounting plate and base plate assemblies, and two orange silicone o-rings in each of the sensor ports provide excellent seals. The sensor mounting plate is permanently marked to indicate the port for each sensor. This sample chamber holds approximately one liter in volume and operates with flowing sample over a temperature range of -20 to 50°C. A convenient handle is provided for carrying the chamber between test sites.

OPERATION

To use the 3550, first install the sensors to be used with the system into their respective ports. Two o-rings in each port provide effective water seals. The sensor ports not in use should be plugged to close the system. Plugs are provided with the 3550 package. Next, connect the chamber to a pump. Push an adaptor onto the tubing provided, then press the adapter into an elbow. Insert the elbow into the top of the YSI 3520 Flow-Through Conductivity Cell and push down on the elbow until it stops (see 3560 Water Quality Monitoring System Instruction Manual). To finish the installation, insert the remaining tubing and adapter into the second elbow provided and install that assembly in the **OUT** port of the sensor mounting plate. Push the elbow down until it stops and place the other end of the tubing where the fluid under test is to be collected or drained. The pump can now be turned on and regulated so that it does not exceed the chamber maximum flow rate of 1 1/2 gallons per minute.

---WARNING---

Do not block the outlet port or crimp the outlet hose. Pressure within the sample chamber must not exceed 10 psi or else sample will leak or sensors will be pushed out of the sensor mounting plate.

MAINTENANCE

The 3550 is easy to disassemble and clean. The o-ri seals in the ports and the chamber gaskets should b replaced annually. Use the tweezers provided in th o-ring maintenance kit to remove the old o-rings a install new ones, making sure they are properly seate all the way in the backs of the grooves. When reasse bling the sample chamber after replacing the gaskets resecure the thumb screws only finger-tight. Use of a tool could cause the gaskets to be cut and fail t seal.

Clean the disassembled chamber and all of its associ ated parts with a mild soap solution or isopropy alcohol for tough stains. Thoroughly rinse the clean components with water to remove any residual soap alcohol which would cause interference with measur ments. The plugs and elbows of the 3550 may also b cleaned this way.

WARRANTY AND SHIPPING

The 3550 is warranted for one year against defects workmanship and materials when used for its intend purposes and maintained according to manufacturer instructions. Damage due to accidents, misuse, ta pering or failure to perform prescribed maintenance not covered. The warranty period for chemicals a reagents is determined by the expiration date print on their labels. The warranty is limited to repair replacement.

IF SERVICE IS REQUIRED:

Contact the YSI Dealer from whom you bought the cha her, or the YSI Product Service Department. Report t date purchased, model, serial number and the nature the failure. If the repair is not covered by warrant you will be notified of the charge for repair replacement.

When shipping any instrument or sensor, clean it required (see Cleaning Certificate) and be sure that is properly packaged and insured for complete prote tion. In communications regarding this instrument accessories please mention the model and serial numbe

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ITEM 061349 PN A35180 B Jan 89

YSI MODEL 3520 FLOW–THROUGH CONDUCTIVITY CELL INSTRUCTIONS

The YSI Model 3520 Flow-Through Conductivity Cell is shipped with a warranty card, a cleaning certificate, and a certificate of traceability.

DESCRIPTION

The YSI 3520 Flow-Through Conductivity Cell is designed for use with the YSI 3560 Water Quality Monitoring System. It is constructed of rigid and durable chlorinated polyvinyl chloride (CPVC).

Conductivity is measured using two stainless steel electrodes. The cell constant is K = 5.0/cm ±2% at 25°C (77°F) at 1.00, 50.0 and 100.0 millimhos/cm, referenced to YSI standards which have been calibrated with standard solutions prepared in accordance with recommendation 56-1981 of the Organisation Internationale De Metrologie Legale (OIML). Measurements above 100.0 millimhos/cm will not be within specification accuracy.

Attached to the cell body with a stainless steel bend relief is a three foot polyurethane jacketed cable terminated with a watertight MS type connector.

The time constant of the cell is 10 seconds for registering 95% of a change in conductivity. Measurement is accurate with flow rates up to 1 1/2 gallons per minute.

OPERATION

The YSI 3520 Flow-Through Conductivity Cell is designed to be used in the YSI 3550 Sample Chamber Assembly. For use of the 3550, see its instructions or the 3560 Water Quality Monitoring System instructions.

1. Insert the 3520 into the designated port on the 3550 Sample Chamber Assembly sensor mounting plate. Two sensor mounting plate o-rings provide a watertight seal.

2. Press the adapter provided (or a length of 1/2" OD hard plastic tubing) into the elbow until you reach the stop. Then, press the elbow into the top of the 3520 until you reach the stop. Another two o-rings inside the top port of the 3520 provide a watertight seal.

3. Attach the MS connector to the receptacle marked COND on the Model 3500 and fit the lead into the cable harness.

4. Begin fluid flow as described in the 3560 system instructions.

5. To use the 3520 as a conductivity cell other than in the 3550 Sample Chamber Assembly, it is necessary to immerse the cell body in the fluid under test up to the midpoint on the knurled portion of the cell. Do not immerse the entire cell body, as this will change the cell constant (K).

MAINTENANCE

Cleaning: The cell must be kept clean at all times to assure proper operation and accuracy. A dirty cell will contaminate the sample and cause the conductivity to change. Any of the foaming acid tile cleaners such as Dow Chemical "Bathroom Cleaner" will clean the cell adequately. When a stronger cleaning preparation is required, use a solution of 10 parts each of distilled water and isopropyl alcohol and one part 10 normal hydrochloric acid.

Dip the cell into the cleaning solution and agitate for two or three minutes. A small test tube brush may be used to gently clean the electrodes and flow-through port. Be careful not to scratch the stainless steel electrodes. Rinse the cell in several changes of distilled or deionized water.

Storage: It is best to store conductivity c[illegible] in deionized water. When the 3520 cell is stored d[illegible] it must be soaked in deionized water for a minimum of 1 hour before use.

The o-rings should be changed annually to maintain their sealing integrity. An o-ring replacement kit can be obtained from the YSI Product Service Department. See SERVICE below.

CALIBRATION

The YSI 3520 Flow-Through Conductivity Cell is calibrated at the factory. The cell constant may vary slightly with the conductivity of the solution being measured. Calibration may also be affected by electrode fouling, mechanical shock or scratched electrodes. The 3520 cell can be calibrated as a system with the Model 3500, using YSI 3160-3169 Conductivity Calibrator Solutions.

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YSI MODEL 3530 pH ELECTRODE ASSEMBLY INSTRUCTIONS

The YSI Model 3530 pH Electrode Assembly is shipped with a warranty card and a cleaning certificate.

DESCRIPTION

The YSI 3530 pH Electrode is designed for use with the YSI 3560 Water Quality Monitoring System, but it may also be used with other pH measuring systems that require pH probes with similar specifications. The rugged 5.5" long by .76" diameter polymer body will withstand demanding field and laboratory use. A spin-off bulb guard is provided for easy cleaning and protection. (The silver/silver chloride reference electrode and the silver working electrode are held within a porous Teflon® matrix, surrounded with a 4 molar potassium chloride gel, and sealed to eliminate the need for adding electrolyte and to prolong their working life.)

The 3530 has a 36 inch long black polyurethane cable and a retractable black BNC cover. A black end cap distinguishes it from the similar-appearing ORP probe, which has a yellow end cap. The unit is shipped in a soaker bottle containing pH 4.0 buffer. To prevent the probe from drying out, the soaker bottle should be used to store it whenever it is not in use.

SPECIFICATIONS

pH Range: 0 to 14.00 pH

Operating Temperature Range: -5 to 50°C

Accuracy: Accuracy is subject to calibration with available pH buffer solutions in the desired measurement range.

Sodium Error: .05 pH in 0.1 Molar Na+ Ion at 12.8 pH

Response Time: 95% of reading in 10 seconds

Zero Potential: 7.00 ±0.2 pH

Impedance: 60 megohms at 25°C

OPERATION

The 3530 is designed to be used in the YSI 3550 Sample Chamber Assembly. Once the 3530 is calibrated, install the electrode into the 3550 in the port marked pH. Set the pH function switch on the 3500 to pH if manual compensation is desired, and set the temperature compensation knob to the correct temperature in °C. Set the pH function switch to pH ATC if a pH ATC probe is in use, and disregard the manual compensation knob setting. See the 3500 instruction manual for further instructions.

MAINTENANCE

pH Electrode Aging: All pH electrodes age with time. The typical electrode begins to deteriorate after 3 to 6 months of use. Age is characterized by a lessened capacity for slope adjustment and slower speed of response. The best way to detect aging effects is when performing a slope adjustment. For example, if you calibrate with a pH 7.0 buffer and then cannot make the slope adjustment for a pH 4.0 or pH 10 buffer, the electrode should be cleaned and retested or reconditioned (see below). If performance is not restored, the electrode should be replaced.

pH Electrode Cleaning: If a coating forms on the bulb, erroneous readings and a shortened slope adjustment may result. The type of coating will determine the cleaning technique. First, remove the bulb guard. Soft coatings can be removed by vigorous stirring or by use of a squirt bottle. Organic chemicals or hard coatings should be chemically removed. A half an hour soaking in an industrial strength detergent is recommended. Only in extreme cases should the bulb be mechanically cleaned as abrasion can lead to permanent damage. If cleaning does not restore performance, reconditioning may be tried.

pH Electrode Reconditioning: When reconditioning is required due to electrode aging or severe fouling, the following chemical treatments can be tried. They are presented in the order of the severity of their attack on the glass bulb, and may not improve (and may in some cases actually further impair) electrode performance.

NOTE: USE PROPER PRECAUTIONS WHEN HANDLING THESE HAZARDOUS CHEMICALS.

1. Immerse the electrode tip in 0.1 normal hydrochloric acid for 15 seconds, rinse in tap water and then immerse the tip in 0.1 normal sodium hydroxide for 15 seconds and rinse in tap water. Repeat this sequence three times and then recheck the electrode. If performance has not been restored, try the next step.

2. Immerse the electrode tip in a solution of 20% ammonium bifluoride and 80% water for two to three minutes, rinse in tap water and recheck. If performance has not been restored, try the next step.

3. Immerse the electrode tip in a solution of 5% hydrofloric acid and 95% water for 10 to 15 seconds, rinse well in tap water, quickly rinse in 5 normal HCl, rinse well in tap water and recheck. If performance has not been restored, replace the electrode.

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YSI MODEL 3510 TEMPERATURE PROBE INSTRUCTIONS

The YSI Model 3510 Temperature Probe is shipped with a warranty card, a certificate of traceability, and a cleaning certificate.

DESCRIPTION

The YSI 3510 Temperature Probe is designed for use with the YSI 3560 Water Quality Monitoring System. When it is connected to the **TEMP** receptacle on the 3500, it provides a signal for both temperature measurement and for automatic temperature compensation (ATC) of conductivity measurements. When it is connected to the **pH ATC** receptacle, it provides automatic temperature compensation for pH measurements. One 3510 probe is provided with the 3560 system; two may be used at the same time to provide these functions simultaneously.

The 3510 can be used over a temperature range of -5 to 50°C with an accuracy of ±.2°C, traceable to the National Bureau of Standards. The black polyurethane cable is three feet long and is terminated at one end with a watertight MS connector. The sensor end of the probe contains a YSI Thermilinear® thermistor assembly mounted in an epoxy sealed sheath 3.25" long by .15" diameter. The time constant of the probe is less than 4 seconds for registering 95% of a change in temperature.

OPERATION

When using the 3510 in any ATC mode, be sure it is located beside the sensor for which it is to provide ATC measurement, whether in the YSI 3550 Sample Chamber Assembly or in any other container.

Insert the 3510 into either of the designated ports on the sensor mounting plate of the 3550. Two o-rings in each port provide a watertight seal.

MAINTENANCE

The 3510 requires very little maintenance when used in routine operations. The durable stainless steel sheath and polyurethane cable may be cleaned with a mild soap and water solution when required. Alcohol may be used to remove stains and mineral deposits.

When storing the 3510, it should be put into the shipping box provided and kept in a dry location.

CALIBRATION

The 3510 is assembled with a YSI Thermilinear thermistor assembly and may be checked with an ohmmeter. With the sheath submerged in a 0.0 ±.1°C ice bath, the thermistor resistances can be compared to the values in this table:

Across Pins A & B =	94.98 K	±482 Ohms
Across Pins B & C =	19.59 K	±103 Ohms
Across Pins A & C =	114.5 K	±585 Ohms
Across Pins B & D =	0	±1 Ohm

If any measurement is out of tolerance, see warranty and shipping instructions.

WARRANTY AND SHIPPING

The YSI 3510 is warranted for one year against defects in workmanship and materials when used for its intended purposes and maintained according to manufacturer's instructions. Damage due to accidents, misuse, tampering or failure to perform prescribed maintenance is not covered.

IF SERVICE IS REQUIRED:

Contact the YSI Dealer from whom you bought the probe, or the YSI Product Service Department. Report the date purchased, model, serial or lot number and the nature of the failure. If the repair is not covered [illegible] warranty, you will be notified of the charge for re[illegible] or replacement.

When shipping any instrument or sensor, clean it as required (see Cleaning Certificate) and be sure that it is properly packaged and insured for complete protection. In communications regarding this instrument or accessories please mention the model and serial or lot number.

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ITEM 061384 PN A35181 B

YSI Incorporated
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CLEANING INSTRUCTIONS

Before they can be serviced, instruments subjected to either biological or radioactive exposure, or to toxins, must be cleaned and disinfected. Biological contamination is presumed for any instrument, probe or other device that has been used with blood, body fluids or tissues, or with wastewater. Radioactive contamination is presumed for any instrument, probe or other device that has been used near any radioactive source.

When service is required, either at the user's facility or at YSI, the following steps must be taken to insure the safety of our service personnel.

1. Empty any containers or chambers, then thoroughly clean all matter from the device.

2. In a manner appropriate to each device, disinfect or decontaminate all exposed surfaces, including any containers. 70% isopropyl alcohol is suitable for most disinfection; any instrument used with wastewater should be cleaned with .5% Lysol or .1% glutaraldehyde. Allow the instrument to air dry. Protect any electronics from spillage and wetting.

3. The user shall take normal precautions to prevent radioactive contamination and must use appropriate decontamination procedures should exposure occur.

If exposure has occured, the customer must certify that decontamination has been accomplished and that no radioactivity is detectable by survey equipment.

4. Complete the Cleaning Certificate and return it with th product. If the unit is to be serviced at the user's facilit keep the certificate with it.

5. If the product is being returned to YSI's Product Se vice Department, pack it securely to prevent damage. If needle, probe, or Syringepet is being returned, it must b packed so it cannot cause an accidental puncture woun to the person unpacking it.

Our service personnel reserve the right to withhold servic from any product until proper cleaning and decontamin tion have been accomplished and certified.

CLEANING CERTIFICATE

Cleaning must be completed and certified on any product before returning it to the YSI Product Service Department, or before field service.

INSTITUTION_____ DEPARTMENT_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

NAME & MODEL NO. OF DEVICE_____

SERIAL NUMBER_____ LOT NUMBER_____

CLEANING CERTIFIED BY_____ DATE_____

CONTAMINANT (if known)_____

CLEANING AGENT(S) USED_____

IS RADIOACTIVE DECONTAMINATION HEREBY CERTIFIED? YES_____ NO_____
(Answer only if there has been radioactive exposure)

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ATTACHMENT K

QUALITY ASSURANCE/QUALITY CONTROL MANUAL

FOR

DLZ LABORATORIES, INC.

DETROIT*LANSING*COLUMBUS

(This manual is on file in the MDEQ, Waste Management Division Office in Lansing. For a copy, please contact the Hazardous Waste Program Section, Technical Unit.)

ATTACHMENT L

ATTACHMENT L.

STATISTICAL MONITORING PLAN FOR GROUNDWATER MONITORING DATA - ENVOTECH MANAGEMENT SERVICES, INC.

Statistical Procedures for Ground Water Monitoring Program
Envotech Management Services, Inc.

1.0 Introduction

The following "final" statistical procedures are used to analyze the statistical significance of measured concentrations of ground water monitoring parameters at Envotech Management Services, Inc. (EMSI). This program was developed in accordance with section A.5 of Part VI of the 1990 Act 64 operating license. This program replaces the originally proposed "final" statistical procedures outlined in part B of Attachment 16, which was included in the operating license upon its issuance.

In accordance with the provisions of the originally proposed "final" statistical procedures (i.e. those which are replaced by this document) background ground water quality data have been analyzed for degree of censorship, population distribution and for seasonality. The results of these analyses are contained in a document entitled Proposed Act 64 Statistical Program for the Evaluation of Ground Water Monitoring Data, which was submitted to and reviewed by the Michigan Department of Natural Resources (MDNR). In addition to the analysis of the background data, the above-referenced document also includes a detailed discussion of the statistical procedures contained herein.

2.0 Overview of Statistical Procedures

The statistical evaluation program for EMSI is designed to signal statistically significant concentrations of monitoring parameters measured in samples collected quarterly or semi-annually from the wells in the monitoring well network. Different statistical techniques are used for different monitoring parameters depending on the nature of the data. The statistical comparisons are either intrawell (each well is compared to its own background) or based on the detection limit, which is either the standard laboratory detection limit or a statistically defined detection limit which has been determined specifically for that parameter. When intrawell statistical comparisons are used, the statistical procedure is selected based on the degree that the background data are censored.

The monitoring parameters measured during each analysis are divided into four categories: primary parameters, secondary parameters, tertiary parameters, and field parameters (see Figure 1). The list of primary parameters is comprised of volatile organic compounds which are known to present within WDI landfill leachate, and therefore the wastes that have been handled by EMSI. As these compounds do not generally occur in nature at measurable concentrations, a confirmed

concentration above a statistically based detection limit for any single parameter will result in a statistically significant increase as defined by section A.5 of the operating license.

The secondary monitoring parameters are mainly inorganic parameters that are found in elevated concentrations within WDI leachate. As these parameters are naturally occurring, their presence in ground water may or may not be an indication of a release and it is often necessary to determine the significance of changes in concentration relative to estimates of the true background concentrations. In this program secondary parameters are used to detect a possible release in the following ways. First, a confirmed statistically significant change in the concentration of any two (or more) secondary parameters in a single well will result in a statistically significant increase as defined by Section A.11 of Part IV. ~~section A.5 of Part VI~~ of the operating license. This approach is designed to detect relatively subtle changes in ground water quality as evidenced by several parameters at once. In addition, a confirmed, order of magnitude increase (10 times the background concentration) in the concentration any single parameter will also result in a statistically significant increase. This will ensure that a large increase in one secondary parameter is appropriately investigated. modified by MDEQ 9/99.

The tertiary parameters are those parameters for which background has already been established either to meet statutory requirements or as part of the "interim" ground water monitoring program. They were not selected based on leachate concentrations. The tertiary parameters in this program are further subdivided into two groups: parameters that have an already established background but will not be measured during detection monitoring, and parameters that will continue to be measured during detection monitoring but will not be subjected to the statistical analyses described below. The former group is not being analyzed because they do not appear to be useful monitoring parameters based on WDI leachate data. The analytical results from the latter group will be used to evaluate potential non-release related ground water quality changes, such as might be caused by well corrosion and grout contamination. These parameters will not be analyzed statistically because they are poor indicators of a release due to low relative concentrations within the waste handled at the site.

Field parameters are those parameters measured in the field during sample collection, mainly for the purpose of showing that ground water quality has stabilized during well purging. These parameters will not be analyzed statistically.

3.0 Description of Statistics for Detection Monitoring

The statistical tests to be used for all detection monitoring events are described in the following section. This section includes the definition and procedures for calculating "background", and the procedures for conducting the statistical analyses.

3.1 Parameters

The parameter list for the ground water monitoring program is presented on Figure 1. The following descriptions of background calculation and statistical analyses are presented separately for the primary and secondary parameters, respectively.

3.2 Background

The background statistics for all monitoring parameters are to be calculated using the methods described below. The recalculation of the moving background for secondary parameters, as described below, will also follow these procedures. For new wells, or replacement wells that cannot utilize the data from the replaced well, an interim background as defined in section 3.3 will be used for applicable secondary parameters until eight samples are collected. Then the background described below will apply.

<u>Primary Parameters</u> - The decision of whether or not there is a statistically significant increase in a primary parameter is essentially the decision of whether or not the parameter is present in the ground water. For all of the primary parameters except methylene chloride, the occurrence of the parameter above the laboratory's reported detection limit is considered to be a statistically significant event and resampling must be initiated to confirm or refute the occurrence.

For some parameters, such as methylene chloride, 2-butanone and acetone, there are often background concentrations present in the laboratory environment and/or other difficulties in the analytical techniques unique to these compounds. Therefore, the "background" for methylene chloride will be more rigorously determined through experimentation. In this case the detection limit will be defined as the concentration at which there is a specified probability (0.05) of attaining a false positive and false negative result. The experimental methods and calculations used to determine these detection limits are summarized on Figure 2. The resulting detection limit, as determined from experimentation using ground water from the site, must be reviewed and approved by MDNR.

Secondary Parameters - Determination of the initial intrawell background statistics was completed utilizing the first eight sampling events beginning in 1988, except for well OB-47 which was installed in July of 1990. The current intrawell background data for each secondary parameter at each well is shown on Figure 3. However, beginning at the end of 1995, each time four new analyses are completed, the oldest four measurements will be dropped from the database, the next four will be added, and the background statistics will be recomputed. For instance, if the quarterly samples are collected during 1994 and 1995 will be compared to the original background established in 1988-89. At the end of 1995, the 1988 data (four samples) will be dropped from the background data and the 1990 data (four samples) will be added and the background statistics will be recomputed. Therefore the data in 1996 would then be compared to a background established in 1989 and 1990. This would be repeated each year keeping about a six year lag between the background period and the detection monitoring samples. Figure 4 shows the configuration of the background database over the next several years assuming quarterly monitoring is conducted until the year 2000.

If the program moves to semi-annual monitoring (such as in post-closure), the background will be updated every year until the moving background reaches the point where years with semi-annual sampling are to be included. Then the background will be updated every two years (after four new samples have been collected) and thus the moving background window will to lag at least six years behind the current detection monitoring sample. A description of what the moving background would look like after hypothetically beginning semi-annual sampling in the year 2000 is shown on Figure 4.

The nature of the background statistics and the method of calculation of these statistics for the secondary parameters is based on the degree of censorship of each parameter at each well. The secondary parameter list includes parameters which are highly censored (at least half of the values are below detection limits), those which are moderately censored (more than half the values are above detection) and those which are essentially all above method detection limits (the method detection limits are defined in the operating license). Some parameters exhibit varying degrees of censorship at different wells.

If the background data for a parameter contains at least five detectable background values, but contains some non-detects, the non-detects will be alternately assigned values of zero and the detection limit. If all of the background values are above detection, the background statistics will be calculated from the background data as is. The mean and standard deviations will be calculated using the standard

statistical equations for these quantities and the data will be analyzed using control charts as described below. In no case will a standard deviation of less than 10 percent of the mean be used in a statistical test. If the calculated background standard deviation is less than 10 percent of the mean, then 10 percent of the mean will be substituted for the background standard deviation.

If half or more of the intrawell background measurements are below detection limits (4 or more BDL values), then the background statistics will be calculated based on the proportion of values above method detection limits. This quantity will be used to conduct a test of proportions as described below.

3.3 Performance of Statistical Tests

The methods to be used for statistical analyses of all primary and secondary parameters that have a background as defined in Section 3.2 are described below. For new wells, the primary parameters will be evaluated as described below but the secondary parameters will be evaluated using the "interim" statistical procedures contained in Appendix A and the background that was established for these statistics, also found in Appendix A. For replacement wells, a decision must be made as to whether the existing background from the well replaced is appropriate for the new well. If it is, such as might be expected when a damaged well is replaced by a well screened in the same stratum, then the existing background can be used with the statistical tests described below. If the replacment well can not be placed in the same strata, or the old well is believed to have yielded unrepresentative results, then the replacement well is considered a new well for the purposes of statistical analyses and will be handled as described above.

<u>Primary Parameters</u> - For the primary parameters, any measured concentration of any parameter which is above the laboratory reported detection limit (or the statistically determined detection limit) will initiate quadruplicate resampling for confirmation of the affected parameter(s), in accordance with section A.5 of Part IV of the operating license. If the statistical failure is repeated, then a statistically significant increase is confirmed. If the apparent increase is not confirmed, then normal detection monitoring will be resumed.

<u>Secondary Parameters</u> - The statistical analysis of secondary parameters will be conducted by one of two statistical tests depending on the degree that the intrawell background data are censored. If more than half the data are above method detection limits then a control chart approach will be used. If at least half the background data are below detection

limits, a test of proportions will be used to analyze the data. There is also a default provision to investigate a dramatic increase in any single parameter regardless of the results of outcome of the statistics.

If there are statistically significant increases for any two secondary parameters at any single well, and the increases represent less than a ten-fold increase over background, then EMSI shall undertake the procedures identified under condition A.5 of the operating license, including resampling in quadruplicate. In this case, both failures must be verified by resampling in order to confirm the statistical increase. If any single secondary parameter exhibits a ten-fold increase over background, then this occurrence must be verified by quadruplicate resampling. If the increase is confirmed then a statistically significant increase has occurred.

The statistical evaluation of moderately censored or uncensored secondary parameters will be conducted using intrawell statistical comparisons via a control chart approach. The combined Shewhart-CUSUM control chart will be used to analyze the statistical significance of the measured concentrations of secondary parameters. This approach consists of two statistical tests designed to detect different types of evidence of a release. The Shewhart limit is designed to detect a sharp increase in the concentration of a monitoring parameter in a single sample. The CUSUM limit is designed to detect gradual increases in the concentration of a parameter over time. The two techniques will be used as separate statistical tests. That is, failure of either test alone (or both) will signal a statistically significant increase for a given parameter. Therefore, if one parameter fails the CUSUM test and another exceeds the Shewhart limit, then an apparent statistically significant increase will have occurred and confirmation of both failures must be undertaken. Confirmation of an apparent failure of one of the two tests must be confirmed by an additional failure of that particular test.

The Shewhart control chart compares a detection monitoring concentration of a parameter to the intrawell background mean plus a selected number of standard deviations. The test is performed by calculating the standardized mean, Z, for the detection monitoring concentration. As individual samples are collected during each detection monitoring event, the standardized mean for each measured parameter is calculated by:

$$Z = (x_m - x_b)/s_b$$

where: x_b is the intrawell background mean
x_m is the measured concentration during detection monitoring

s_b is the standard deviation of the intrawell background

The value of Z is then simply compared to a selected value, U, which represents the number of standard deviations from the intrawell mean. The Shewhart limit (U), or upper control limit will be 4.5, as recommended in the Interim Final Guidance for Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities (USEPA, 1989). The statistical test is performed by simply comparing the value of Z to the value of U. If Z is greater than U then it is concluded that a statistically significant increase has occurred.

The Shewhart control chart will be used in the following manner. If a secondary parameter(s) exceeds the Shewhart limit and at least two secondary parameters fail a statistical test at any given well during a given sampling event, the well would be resampled in quadruplicate for the offending parameters, and the mean(s) of the quadruplicate analyses would be used to confirm whether the Shewhart limit(s) is exceeded. If there is confirmation, then it would be concluded that there has been a statistically significant increase. If the increase is not confirmed, any unconfirmed measurements would be dropped from the control chart and replaced with the means of the quadruplicates.

The CUSUM control chart is designed to detect a trend of increasing concentrations over time, regardless of whether the Shewhart limit is exceeded or not. In the CUSUM procedure, the cumulative sum of the values for Z - k are tabulated over time, each time a round of samples are analyzed. The value for Z is computed as described above, and k is a selected parameter. During each analysis subsequent to the background determination period, a value for Z - k is computed and added to the previous total. As long as the cumulative total of Z - k is a negative number, the cumulative sum (S) remains zero. As positive values accumulate, the value for S is compared to a selected value, h. If S is greater than h, then a statistically significant event has occurred. The values used for k and h will be k = 1 and h = 5, respectively, as recommended (USEPA ,1989).

The CUSUM limit will be utilized in conjunction to the Shewhart limit and proportions test as follows. If the CUSUM limit is exceeded and at least two or more secondary parameters have failed a statistical test at any given well during any given sampling period, quadruplicate resampling of the well in question will be initiated. The mean values of the quadruplicate sample will then be used to recompute S. If S again exceeds h, then the increase is confirmed. If the increase is not confirmed then the mean values of the

quadruplicate sampling replace the results of the anomalous (unconfirmed) values within the CUSUM statistic for future analyses. These non-confirmed exceedances must be removed from the CUSUM control chart because their inclusion may cause additional false positive results when subsequent sample results are added to the cumulative sum.

For parameters that contain at least half non-detectable concentrations in the intrawell background data base, a statistical test to determine the significance of the proportion of detectable occurrences during detection monitoring will be used. The test of proportions, which is based on the binomial distribution, is a well known statistical test suited to this purpose. This statistical procedure analyzes the significance of an increase in the rate of detectable occurrences over time.

To implement the test of proportions, the proportion of detectable occurrences during the 8 background samples will be compared to the rate of detectable occurrences in the most recent 4 detection monitoring samples. The statistic is computed by the equation:

$$Z^* = \frac{P_m - P_b}{[\,p(1-p)(1/N_m + 1/N_b)]^{0.5}}$$

where: P_m = proportion of detectable concentrations in the last four detection monitoring samples
P_b = proportion of detectable concentrations in the eight intrawell background samples
N_m = number of detection monitoring samples (4)
N_b = number of background samples (8)
p = weighted proportion defined as:

$$p = \frac{n_m + n_b}{N_m + N_b}$$

where: n_m = number of detection monitoring samples above method detection limits
n_b = number of background samples above method detection limits

The value of Z* is then simple compared to a critical value, Z_c, obtained from standard tables for the normal variate, Z, at the desired level of significance. The test will be conducted at the 0.05 level of significance, therefore Z_c is equal to 1.645. Any value of Z* greater than Z_c signals a statistical failure for that parameter.

Each time a new detection monitoring sample is collected, the result would be added to the previous three samples for

determining the proportion of detectable occurrences. Thus, both the background and detection monitoring proportions involve a moving window, with the background lagging at least six years behind the window of detection monitoring. If detection limits are lowered during the monitoring program, the proportion of detectable occurrences will be the proportion of results above the older background detection limit until the background is updated to include the new lower detection limits. For example, if the old detection limit was 20 and the new detection limit is 10, then only concentrations above 20 (even though a concentration of 11 or above is now "detectable") will be considered detectable until the moving background window is based on samples with a detection limit of 10.

EMSI will use the proportions test as follows. If there is a statistically significant increase in any two secondary parameters at a particular monitoring well (i.e. two failures of the test of proportions or a combination of control chart and proportions test failures), then resampling in quadruplicate would be initiated to confirm the suspected increase. Confirmation would be completed if both failures are repeated.

To guard against the unlikely possibility of a large increase in a single secondary parameter going unflagged by the above statistical program, EMSI will consider any concentration of a secondary parameter that is greater than 10 times the background concentration (or the reported detection limit for highly censored parameters) as a default violation of the statistical tests described above. This will ensure that clearly anomalous data are evaluated even if only a single secondary parameter is affected.

Figure 1. Ground Water Monitoring Parameter List

A. Primary Parameters

Benzene	1,2 Dichlorobenzene	Xylene
1,2 Dichloroethane	1,2 Dichlorethene	Ethylbenzene
Methylene Chloride	Toluene	Trichloroethene
1,1,1 Trichloroethane	Vinyl Chloride	1,1 Dichloroethane

B. Secondary Parameters

Potassium	Sodium	Nickel
Chromium(t)	Lead	Molybdenum
Sulfate	Chloride	Bicarbonate
Carbonate	Arsenic	Cyanide
Nitrate	Nitrite	Fluoride
Total Phenolics	Total Organic Carbon	Iron

C. Tertiary Parameters

Calcium[1]	Magnesium[1]	Copper[1]
Manganese[1]	Zinc[1]	Cadmium[1]
Silver	Mercury	Selenium
Barium	2,4-D	Endrin
Silvex	Methoxychlor	Toxaphene

D. Field Monitoring Parameters[2]

Specific Conductance	Temperature	pH

Notes:

1. Tertiary parameter that will be measured during detection monitoring.

2. Parameter to be measured in field for all samples collected

Figure 2. Method for Computing Statistical MDL (Reproduced from Nielsen, 1991)

1. Select four concentrations in the range of the hypothesized MDL. For example, for Benzene we might select concentrations of 4, 8, 12, and 16 mg/L.

2. Prepare 16 samples; that is 4 replicates at each of the 4 spiking concentrations.

3. Multiple compounds may be examined simultaneously by including them in the same samples; however, the order of their concentrations should be randomized so that one sample does not contain all of the lowest concentrations and another sample all of the highest concentrations.

4. Introduce these 16 samples in the usual daily workload of two or more analysts (e.g., two analysts would receive eight samples each). It is essential that the analysts be *completely* blind to which compounds are present in the samples and their respective spiking concentrations, and that they simply be instructed to perform the standard analytic method in question (e.g., Method 624 VOC Scan).

5. The results of the analysis should be recorded as the square root of the ratio of the compound peak area to the internal standard; that is,

$$\text{response signal} = \sqrt{\frac{\text{peak area count}}{\text{internal standard area count}}} = yi \qquad (13.4a)$$

Transform the spiking concentration

$$xi = \sqrt{x^*_i - 0.1} - \sqrt{0.1} \qquad (13.4b)$$

Where x^* is the original spiking concentration

6. For each compound, compute the slope of the regression line of the instrument response signal (y) on the targeted concentration (x) as:

$$b = \frac{\sum_{i=1}^{16}(x_i - \bar{x})(y_i - y)}{\sum_{i=1}^{16}(x_i - \bar{x})^2} \qquad (13.5)$$

Where x is the average of the four target concentrations, and Y is the average of the 16 instrument response signals as defined above.

7. For each compound, compute the variance of deviations from the regression line as:

$$s^2_{y,x} = \sum_{i=1}^{16}(y_i - \hat{y}_i)^2/(16-2) \qquad (13.6)$$

Where $\hat{y}_i = y_i + b(x_i - \bar{x})$ is the predicted instrument response for target concentration x_i.

8. The method detection limit for n=16 samples is then computed as:

$$MDL^* = (3.46 s_{y,x}/b)\sqrt{1 + \frac{1}{16} + \bar{x}^2/\sum_{i=1}^{16}(x_i - \bar{x})^2} \qquad (13.7a)$$

Where 3.46 is the $\alpha = \beta = .95$ percentage of the noncentral t distribution on 16 − 2 = 14 degrees of freedom. To express MDL in the original metric (example μ/L), compute:

$$MDL = (MDL^*)^2 + 0.632456\ MDL^* \qquad (13.7b)$$

Background Statistics for Well OB-18 - Wayne Disposal Site #2 - 1999

Parameter	# of Samples	Det Lim (mg/L)	Prop ADL	Max	Min	Mean	St Dev	Coeff of Var
Arsenic	8	0.002	0.000	0.002	0.002	n.a.	n.a.	n.a.
Chromium	8	0.02	0.000	0.02	0.02	n.a.	n.a.	n.a.
Flouride	8	0.1	1.000	2	1.9	1.92	0.19	0.024
Iron	8	0.02	0.250	0.04	0.02	n.a.	n.a.	n.a.
Lead	8	0.04	0.000	0.04	0.04	n.a.	n.a.	n.a.
Molybdenum	6	0.1	0.000	0.1	0.1	n.a.	n.a.	n.a.
Nickel	8	0.05	0.000	0.05	0.02	n.a.	n.a.	n.a.
Potassium	8	0.1	1.000	2	1.4	1.69	0.19	0.11
Sodium	8	1	1.000	98	15	83.5	27.82	0.33
Alkalinity, Bicarbonate	8	10	1.000	220	170	207.5	20.75	0.08
Alkalinity, Carbonate	8	10	0.375	40	10	n.a.	n.a.	n.a.
Nitrogen, Nitrite	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Nitrogen, Nitrate	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Chloride	8	1	1.000	12	9.8	11.6	1.16	0.07
Cyanide, Total	8	0.01	0.000	0.01	0.01	n.a.	n.a.	n.a.
Sulfate	8	2	0.125	5	1	n.a.	n.a.	n.a.
Organic Carbon, Total	8	0.5	1.000	2.2	1.3	1.61	0.34	0.21
Phenolics, Total	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.

Background Statistics for Well OB-19R - Wayne Disposal Site #2 - 1999

Parameter	# of Samples	Det Lim (mg/L)	Prop ADL	Max	Min	Mean	St Dev	Coeff of Var
Arsenic	8	0.002	0.000	0.002	0.002	n.a.	n.a.	n.a.
Chromium	8	0.02	0.000	0.02	0.02	n.a.	n.a.	n.a.
Flouride	8	0.1	1.000	1.9	1.7	1.77	0.18	0.04
Iron	8	0.02	0.125	0.04	0.02	n.a.	n.a.	n.a.
Lead	8	0.04	0.000	0.04	0.04	n.a.	n.a.	n.a.
Molybdenum	7	0.1	0.000	0.1	0.1	n.a.	n.a.	n.a.
Nickel	8	0.05	0.000	0.02	0.02	n.a.	n.a.	n.a.
Potassium	8	0.1	1.000	1.3	1.2	1.26	0.13	0.041
Sodium	8	1	1.000	92	83	86.88	8.69	0.034
Alkalinity, Bicarbonate	8	10	1.000	220	120	200	32.95	0.16
Alkalinity, Carbonate	8	10	0.125	72	10	n.a.	n.a.	n.a.
Nitrogen, Nitrite	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Nitrogen, Nitrate	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Chloride	8	1	1.000	12	9.6	11.32	1.13	0.075
Cyanide, Total	8	0.01	0.000	0.01	0.01	n.a.	n.a.	n.a.
Sulfate	8	2	0.125	2	1	n.a.	n.a.	n.a.
Organic Carbon, Total	8	0.5	1.000	2.4	1.6	1.94	0.28	0.14
Phenolics, Total	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.

Background Statistics for Well OB-21 - Wayne Disposal Site #2 - 1999

Parameter	# of Samples	Det Lim (mg/L)	Prop ADL	Max	Min	Mean	St Dev	Coeff of Var
Arsenic	8	0.002	0.000	0.002	0.002	n.a.	n.a.	n.a.
Chromium	8	0.02	0.000	0.02	0.02	n.a.	n.a.	n.a.
Flouride	8	0.1	1.000	0.7	0.6	0.66	0.066	0.078
Iron	8	0.02	0.750	0.52	0.02	0.14	0.19	1.44
Lead	8	0.04	0.000	0.04	0.04	n.a.	n.a.	n.a.
Molybdenum	7	0.1	0.000	0.1	0.1	n.a.	n.a.	n.a.
Nickel	8	0.05	0.000	0.02	0.02	n.a.	n.a.	n.a.
Potassium	8	0.1	1.000	1.5	1.1	1.27	0.13	0.1
Sodium	8	1	1.000	16	15	15.38	1.54	0.034
Alkalinity, Bicarbonate	8	10	1.000	240	220	228.75	22.88	0.028
Alkalinity, Carbonate	8	10	0.000	10	10	n.a.	n.a.	n.a.
Nitrogen, Nitrite	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Nitrogen, Nitrate	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Chloride	8	1	1.000	16	1.8	3.95	4.88	1.24
Cyanide, Total	8	0.01	0.000	0.01	0.01	n.a.	n.a.	n.a.
Sulfate	8	2	1.000	100	47	68.88	16.81	0.24
Organic Carbon, Total	8	0.5	1.000	2.8	0.8	1.38	0.68	0.5
Phenolics, Total	8	0.05	0.125	0.1	0.05	n.a.	n.a.	n.a.

Background Statistics for Well OB-23R - Wayne Disposal Site #2 - 1999

Parameter	# of Samples	Det Lim (mg/L)	Prop ADL	Max	Min	Mean	St Dev	Coeff of Var
Arsenic	8	0.002	0.000	0.002	0.002	n.a.	n.a.	n.a.
Chromium	8	0.02	0.000	0.02	0.02	n.a.	n.a.	n.a.
Flouride	8	0.1	1.000	0.6	0.5	0.59	0.059	0.06
Iron	8	0.02	0.750	0.81	0.02	0.17	0.27	1.6
Lead	8	0.04	0.125	0.04	0.002	n.a.	n.a.	n.a.
Molybdenum	7	0.1	0.000	0.1	0.1	n.a.	n.a.	n.a.
Nickel	8	0.05	0.000	0.02	0.02	n.a.	n.a.	n.a.
Potassium	8	0.1	1.000	1.4	1	1.15	0.12	0.1
Sodium	8	1	1.000	15	13	14.25	1.42	0.05
Alkalinity, Bicarbonat	8	10	1.000	250	220	238.75	23.88	0.057
Alkalinity, Carbonate	8	10	0.000	10	10	n.a.	n.a.	n.a.
Nitrogen, Nitrite	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Nitrogen, Nitrate	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Chloride	8	1	1.000	6.1	5	5.41	0.54	0.081
Cyanide, Total	8	0.01	0.250	0.01	0.01	n.a.	n.a.	n.a.
Sulfate	8	2	1.000	120	65	97.75	17.7	0.18
Organic Carbon, Total	8	0.5	1.000	2.2	0.7	1.11	0.49	0.44
Phenolics, Total	8	0.05	0.125	0.08	0.05	n.a.	n.a.	n.a.

Background Statistics for Well OB-36 - Wayne Disposal Site #2 - 1999

Parameter	# of Samples	Det Lim (mg/L)	Prop ADL	Max	Min	Mean	St Dev	Coeff of Var
Arsenic	8	0.002	0.000	0.002	0.002	n.a.	n.a.	n.a.
Chromium	8	0.02	0.000	0.02	0.02	n.a.	n.a.	n.a.
Flouride	8	0.1	1.000	0.8	0.6	0.69	0.069	0.093
Iron	8	0.02	0.250	0.17	0.02	n.a.	n.a.	n.a.
Lead	8	0.04	0.000	0.04	0.04	n.a.	n.a.	n.a.
Molybdenum	7	0.1	1.000	0.1	0.1	0.1	0.01	0
Nickel	7	0.05	0.000	0.02	0.02	n.a.	n.a.	n.a.
Potassium	8	0.1	1.000	1.6	1.4	1.49	0.15	0.043
Sodium	8	1	1.000	17	16	16.63	1.66	0.031
Alkalinity, Bicarbonate	8	10	1.000	250	230	240	24	0.031
Alkalinity, Carbonate	8	10	0.000	10	10	n.a.	n.a.	n.a.
Nitrogen, Nitrite	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Nitrogen, Nitrate	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.
Chloride	8	1	1.000	3	2	2.46	0.35	0.14
Cyanide, Total	8	0.01	0.000	0.01	0.01	n.a.	n.a.	n.a.
Sulfate	8	2	0.375	5	1	n.a.	n.a.	n.a.
Organic Carbon, Total	8	0.5	1.000	1.9	0.5	0.89	0.46	0.51
Phenolics, Total	8	0.05	0.000	0.05	0.05	n.a.	n.a.	n.a.

Background Statistics for Well OB-47 - Wayne Disposal Site #2 - 1999

Parameter	# of Samples	Det Lim (mg/L)	Prop ADL	Max	Min	Mean	St Dev	Coeff of Var
Arsenic	8	0.002	0.125	0.002	0.001	n.a.	n.a.	n.a.
Chromium	8	0.02	0.000	0.02	0.02	n.a.	n.a.	n.a.
Flouride	8	0.1	1.000	1.1	0.9	0.97	0.097	0.072
Iron	8	0.02	0.125	0.02	0.02	n.a.	n.a.	n.a.
Lead	8	0.04	0.000	0.04	0.001	n.a.	n.a.	n.a.
Molybdenum	6	0.1	1.000	0.1	0.1	0.1	0.01	0
Nickel	8	0.05	0.000	0.05	0.02	n.a.	n.a.	n.a.
Potassium	8	0.1	1.000	9.2	3.4	5.94	2.24	0.38
Sodium	8	1	1.000	31	24	28.38	2.84	0.092
Alkalinity, Bicarbonate	8	10	1.000	240	160	178.75	26.96	0.15
Alkalinity, Carbonate	8	10	0.250	20	5	n.a.	n.a.	n.a.
Nitrogen, Nitrite	8	0.05	0.000	0.05	0.01	n.a.	n.a.	n.a.
Nitrogen, Nitrate	8	0.05	0.000	0.05	0.01	n.a.	n.a.	n.a.
Chloride	8	1	1.000	1.8	1	1.36	0.35	0.26
Cyanide, Total	8	0.01	0.000	0.01	0.005	n.a.	n.a.	n.a.
Sulfate	8	2	1.000	5.3	2.1	3.13	1.12	0.36
Organic Carbon, Total	8	0.5	1.000	1.8	1.3	1.5	0.2	0.13
Phenolics, Total	8	0.05	0.000	0.05	0.005	n.a.	n.a.	n.a.

Appendix A. Interim Statistical Procedures and Background Data for New Monitoring Wells

ATTACHMENT

STATISTICAL PROCEDURE

Two statistical tests will be used to determine if the concentrations of hazardous waste constituents exceed their respective background in a given monitoring well or sump. The sign-test will be used to determine if there is an increase in the concentrations of a significant number of parameters, independent of the magnitude of the changes. The t-test with Continuity Correction will be used to detect a significant increase in the concentration of any individual parameters. This attachment describes the sign-test, the t-test with Continuity Correction, and then the application of these tests at the

A. The Sign-Test

The sign-test does not assume any particular distribution for the parameter data. Any data below the limit of quantification will be treated having a value of one-half the limit of quantification. Starting with the first sampling period, a comparison is made for each parameter between the mean of its background values and the mean of its foreground values. If the mean of the foreground values is greater than the mean of the background values, a plus (+) is assigned to that measurement data. If the mean of the foreground values is less than the mean of the background values, a minus (-) is assigned. A zero (0) is assigned for equivalent means.

The hypothesis tested is the null hypothesis, H_0, that background values are greater than or equal to foreground values, against the alternative hypothesis, H_1, that the foreground values are greater than background values. The test statistic for this test is:

$$T = \text{total number of pluses}$$

Large values of T indicate that a plus is more probable than a minus, stated by the alternative hypothesis. The critical region corresponds to a value of T greater than or equal to (n-t), where n is the total amount

of pluses and minuses. The term t is found from Table 1 by entering the table at n and finding the largest tabled value of alpha that is less than or equal to the significance (0.05 in this case). The value of y corresponding to alpha is t.

In the case where there are no table entries, alpha, which are less than or equal to the significance (0.05 in this case), it is necessary to set t = -1; the RCRA Permit Writer's Manual describes this situation thusly:

> "At a level of significance of 0.05, this test requires that five sample events be compared before the test is appropriate (before trends can be deduced)."[1]

The procedure is concluded by comparing the quantity T with the quantity n-t. If T is greater or equal to n-t, the null hypothesis, H_0, is rejected and the alternate hypothesis, H_1, accepted, establishing significance. On the other hand, when T is less than n-t, the null hypothesis H_0 is maintained and no significance is demonstrated.

The RCRA Permit Writer's Manual describes the sign-test as "well-known".[2] Indeed, the sign-test is described in many statistics texts. The RCRA Permit Writer's Manual, for example, mentions[3] Conover (1971)[4]. A treatment of the sign-test may also be found in Siegel[5].

The basic concept behind the sign test is the reduction of two sets of continuous data (i.e., the background and foreground observations) to one set of dichotomous data (i.e., the set of pluses and minuses), and the subsequent application of the binomial test to the dichotomous data set.

This approach is noted for its great power. Siegel writes about the power of this approach, the application of the binomial test to continuous data that have been dichotomized:

> "...if the data are basically dichotomous, even though the variable has an underlying continuous distribution, the binomial test may have no more powerful alternative."[6]

TABLE 1

BINOMIAL DISTRIBUTION

Alpha = P[X≤y] for b(X;n,0.50)

n	y	Alpha
1	0	0.5000
1	1	1.0000
2	0	0.2500
2	1	0.7500
2	2	1.0000
3	0	0.1250
3	1	0.5000
3	2	0.8750
3	3	1.0000
4	0	0.0625
4	1	0.3125
4	2	0.6875
4	3	0.9375
4	4	1.0000
5	0	0.0313
5	1	0.1875
5	2	0.5000
5	3	0.8125
5	4	0.9687
5	5	1.0000
6	0	0.0156
6	1	0.1094
6	2	0.3437
6	3	0.6562
6	4	0.8906
6	5	0.9844
6	6	1.0000
7	0	0.0078
7	1	0.0625
7	2	0.2266
7	3	0.5000
7	4	0.7734
7	5	0.9375
7	6	0.9922
7	7	1.0000
8	0	0.0039
8	1	0.0352
8	2	0.1445
8	3	0.3633
8	4	0.6367
8	5	0.8555
8	6	0.9648
8	7	0.9961
8	8	1.0000
9	0	0.0028
9	1	0.0195
9	2	0.0898
9	3	0.2539
9	4	0.5000
9	5	0.7461
9	6	0.9102
9	7	0.9805
9	8	0.9980
9	9	1.0000
10	0	0.0010
10	1	0.0107
10	2	0.0547
10	3	0.1719
10	4	0.3770
10	5	0.6230
10	6	0.8281
10	7	0.9453
10	8	0.9893
10	9	0.9990
10	10	1.0000
11	0	0.0005
11	1	0.0059
11	2	0.0327
11	3	0.1133
11	4	0.2744
11	5	0.5000
11	6	0.7256
11	7	0.8867
11	8	0.9673
11	9	0.9941
11	10	0.9995
11	11	1.0000
12	0	0.0002
12	1	0.0032
12	2	0.0193
12	3	0.0730
12	4	0.1938
12	5	0.3872
12	6	0.6128
12	7	0.8062
12	8	0.9270
12	9	0.9807
12	10	0.9968
12	11	0.9998
12	12	1.0000
13	0	0.0001
13	1	0.0017
13	2	0.0112
13	3	0.0461
13	4	0.1334
13	5	0.2905
13	6	0.5000
13	7	0.7095
13	8	0.8666
13	9	0.9539
13	10	0.9888
13	11	0.9983
13	12	0.9999
13	13	1.0000
14	0	0.0001
14	1	0.0009
14	2	0.0065
14	3	0.0287
14	4	0.0898
14	5	0.2120
14	6	0.3953
14	7	0.6047
14	8	0.7880
14	9	0.9102
14	10	0.9713
14	11	0.9935
14	12	0.9991
14	13	0.9999
14	14	1.0000
15	0	0.0000
15	1	0.0005
15	2	0.0037
15	3	0.0176
15	4	0.0592
15	5	0.1509
15	6	0.3036
15	7	0.5000
15	8	0.6964
15	9	0.8491
15	10	0.9408
15	11	0.9824
15	12	0.9963
15	13	0.9995
15	14	1.0000
15	15	1.0000

B. The t-Test with Continuity Correction

Statistical Concept: This section describes the application of Continuity Correction to Cochran's Approximation to the Behrens-Fisher Student's t-test (i.e., the RCRA t-test, or "Basic Statistical Procedure") in order to correct several of the difficulties with the RCRA version. Continuity Correction, to some extent, alleviates the following difficulties with the t-test:

1. Parameters at or near detection limit.
2. Data too discrete.
3. Observations nearly constant

Continuity Correction does not alleviate the other difficulties associated with mis-application of the t-test:

4. Mis-representative variance (i.e., observations not independent)
5. Imbalance between risk of false positives and failure to detect changes that are actually present (caused by too many applications of the test).
6. Inappropriateness of the t-test when there are only very small numbers of observations.

Although the employment of Continuity Correction does not provide relief from Problems 4, 5 and 6, the circumstances of data collection and application of the t-test partially mollify problems 4 and 5. The problem of the lack of independent observations still exists when four samples are taken from the same well in resampling. The use of the t-test in limited situations, rather than as an initial exploratory tool, mitigates problem 5.

We will use Cochran's Approximation to the Behrens-Fisher Student's t-test (i.e., the RCRA t-test, or "Basic Statistical Procedure") with two adjustments for continuity:

1. The variance, s^2, of each data set will be computed in a manner that takes into account the fact that each data point represents a range of possible values rather than a single precisely determined real number.

2. The standard error of the mean (used in the denominator of the equation for the t-statistic) acts as an indicator of the precision with which the mean of a data set has been determined. A lower limit to the standard error of the mean will be used to prevent it from decreasing beyond the precision of the analytical precision, thus inflating the t-statistic.

Continuity Correction is appropriate when data observations do not represent precisely determined real numbers but a range of possible values. Suppose, for example, that the laboratory test for a chemical parameter has a limit of quantification of 30 units and that the test is able to generate results with a precision of 10 units. The test has a discrete set of possible outcomes:

<30 units (i.e., below limit of quantification)
30 units (i.e., at limit of quantification)
40 units
50 units
60 units
etc.

Each of these outcomes does not represent a specific point on the real number line but rather a range of possible values established by the laboratory techniques and instrumentation. The outcome "<30 units" indicates any value from 0 units up to 30 units. The outcome 50 units indicates any value from 45 units to 55 units. The outcome 30 units probably indicates any value from 25 to 35 units. Each of these outcomes thus represents a range of possible values.

Continuity Correction involves doing computations in a way that acknowledges that the data represent ranges on the real number lines, not specific points.

The t-test requires the calculation of the mean of each of two sets of data (the background set and the foreground set). The mean = $(x_1 + \ldots + x_n)/n$. If we regard each x_i as representing a range, in finding the mean using this formula we should use the midpoint of the range for x_i. For

example, if the limit of quantification is 30 units, an observation of "<30 units" would be treated as 15 units in calculating the mean.

The t-test also requires the calculation of the variance of each of the two data sets. The equation for the variance is

$$s^2 = \frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2$$

Each of the terms of the summation has the form $(x_i - \bar{x})^2$. To apply Continuity Correction it is necessary to treat each observation as representing a range of values from $x_i - \Delta_i$ through $x_i + \Delta_i$, and compute each term of the form $(x_i - \bar{x})^2$ as the mean of all possible values that would result if x_i were replaced by each real number from $x_i - \Delta_i$ up to $x_i + \Delta_i$.

Specifically, instead of $(x_i - \bar{x})^2$, we use

$$\frac{1}{2\Delta} \int_{x_i - \Delta_i}^{x_i + \Delta_i} (u - \bar{x})^2 \, du.$$

This expression simplifies, through calculation of the integral, to

$$(x_i - \bar{x})^2 + (1/3)\, \Delta_i^2.$$

Using this expression in the place of $(x_i - \bar{x})^2$ gives us a modified equation for the variance

$$s^2 = \frac{1}{n-1} \sum_{i=1}^{n} \left[(x_i - \bar{x})^2 + (1/3)\Delta_i^2\right]$$

In the example considered earlier, where the limit of quantification was 30 units and values above 30 units were obtained to the closest 10-unit level, we would treat an observation "<30 units" as having $x_i = 15$ and $\Delta_i = 15$. An observation of "30 units" would be treated as having $x_i = 30$ and $\Delta_i = 5$. An observation of "40 units" would be treated as having $x_i = 40$. $\Delta_i = 5$.

The expression for the variance s^2 has a very natural interpretation. The numerator of the expression, i.e.,

$$\sum_{i=1}^{n} \left[(x_i - \bar{x})^2 + (1/3)\,\Delta_i^2\right]$$

represents the sum of the second moments of the various observations about the mean. Each of the summands,

$$(x_i - \bar{x})^2 + (1/3)\Delta_i^2,$$

consists of two terms:

a. The quantity $(1/3)\Delta_i^2$ is the second moment of the uniformly distributed range of points from $x_i - \Delta_i$ up to $x_i + \Delta_i$ about its mean x_i.

b. The quantity $(x_i - \bar{x})^2$ represents the contribution made by observation x_i to the second moment about $\bar{x}$ if the observation were concentrated at the single point x_i.

That the expression $(x_i - \bar{x})^2 + (1/3)\Delta_i^2$ gives the second moment of the range of values from $x_i - \Delta_i$ through $x_i + \Delta_i$ about $\bar{x}$ is the consequence of the theorem that the second moment of a set of points about an arbitrary real number is equal to the sum of (1) the second moments of the points about their own mean and (2) the second moment the points would have about the real number if the set of points concentrated into a single point located at their mean.

The t-test requires calculation of the t-statistic

$$t^* = (\bar{x}_m - \bar{x}_b) \;/\; (s_m^2/n_m + s_b^2/n_b)^{0.5},$$

Where:

n_m = the number of foreground observations,

n_b = the number of background observations,

$\bar{x}_m$ = the mean of the foreground observations,

$\bar{x}_b$ = the mean of the background observations,

s_m^2 = the variance of the foreground observations, and

s_b^2 = the variance of the background observations.

In this equation for t*, the numerator is the difference between the means of the two data sets. The size of the difference is evaluated in terms of the denominator, which is the standard error of the difference of the two means. This standard error of the difference of the means is computed as the square root of the sum of the squares of the standard errors of each of the two means. The standard error expressions are:

$s_m/\sqrt{n_m}$ = the standard error of the foreground mean, and

$s_b/\sqrt{n_b}$ = the standard error of the background mean.

The standard error quantities are intended as indicators of how precisely each mean has been established. As a general rule of thumb, we would expect that there is a probability of about 95% that the true mean (i.e., the mean of the population from which the sample was drawn) differs from the sample mean by less than two standard errors.

The square of the standard error of the estimator of the mean may be called the "variance of the mean". Thus:

$W_m = s_m^2/n_m$ = the variance of the foreground mean, and

$W_b = s_b^2/n_b$ = the variance of the background mean.

Suppose in the example described above, where the limit of detection was 30 units, that one data set consisted of a series of identical observations "<30 units". In this situation, the precision with which the mean is determined is not increased by having a great number of observations. No matter how many observations of "<30 units" we have, all we know about the mean is that it probably lies between 0 units and 30 units. It would be appropriate in this situation to regard the mean, $\bar{x}$, as 15 units (i.e., one-half the limit of quantification), and to regard the standard error of the mean as 7.5 units (i.e., one quarter the limit of quantification, or one-half of Δ_1). To say that the true mean (i.e., the mean of the population from which the sample was drawn) lies between 0 units and 30 units would then be equivalent to saying that it lies within two standard errors of the sample mean, $\bar{x}$.

Suppose, again as in the example described above, that the precision of the analytical procedure was 10 units, so that 30 units, 40 units, 50 units, etc., were the possible observed values. Suppose that one data set consisted entirely of observations of "50 units". No matter how many observations of "50 units" we have, all we know about the mean is that it probably lies between 45 units and 55 units. It would be appropriate in this situation to regard the mean, $\overline{x}$, as 50 units and to regard the standard error of the mean as 2.5 units (i.e., one-quarter of the precision, or one-half of Δ_i). To say that the true mean (i.e., the mean of the population from which the sample was drawn) lies between 45 units and 55 units would then be equivalent to saying that it lies within two standard errors of the sample mean $\overline{x}$.

For each of the two data sets, when the variance of the mean is computed, care should be taken that its square root, the standard error of the mean, is not less than precision of the analytical procedure is able to establish.

Specifically, a Lower Limit for the Variance of the Mean (LLVOM) should be computed:

$$\text{LLVOM} = \frac{1}{n}\sum_{i=1}^{n}\left[\frac{\Delta_i}{2}\right]^2 \text{, where}$$

Δ_i = one half the limit of quantification if the observation x_i is below the limit of quantification, or one-half the precision of the analytical procedure otherwise.

If the variance of the mean ($W = s^2/n$) is less than LLVOM, it should be replaced by the quantity LLVOM.

In the case where all the observations of a data set are below the level of quantification, the standard error of the mean will thus be treated as one quarter of the limit of quantification. In the case where all the observations of a data set are at a constant value at or above the level

of quantification, the standard error of the mean will thus be treated as one quarter of the precision.

Statistical Procedure: The null hypothesis, H_0, to be tested states that the background mean is greater than or equal to the foreground mean. The alternate hypothesis, H_1, states that the foreground mean exceeds the background mean.

In general, when an observation is below the minimum detection limit (MDL), we will use x_i = MDL/2 and Δ_i = MDL/2. If an observation is at or above the level of quantification, we will set x_i = the observed value and Δ_i = one-half the difference between the next possible higher observed value and x_i (determined by the analytical process and instrumentation).

The mean of a set of values $x_1, \ldots, x_n$ will be computed by $\bar{x} = (x_1 + \ldots + x_n)/n$ and the variance s^2 will be computed by:

$$s^2 = \frac{1}{n-1} \sum_{i=1}^{n} \left[(x_i - \bar{x})^2 + (1/3)\Delta_i^2\right]$$

The variance of the mean, W, will be computed as s^2/n. W will be compared with the quantity

$$\text{LLVOM} = \frac{1}{n} \sum_{i=1}^{n} \left[\frac{\Delta_i}{2}\right]^2$$

If the computed W is less than LLVOM it will be replaced by LLVOM.

Except for these modifications, the RCRA t-test computational procedure will be unchanged. After the mean and variance have been computed as described, the Cochran's Approximation to the Behrens-Fisher Student's t-test will be used.

Let n_b = the number of background observations and n_m = the number of foreground observations. From the background and foreground data calculate the background mean. $\bar{x}_b$, the foreground mean, $\bar{x}_m$, the background variance, s_b^2, the foreground variance, s_m^2, the variance of the estimator

of the background mean, W_b, and the variance of the estimator of the foreground mean, W_m. From this information, the t-statistic is computed as:

$$t^* = \frac{\bar{x}_m - \bar{x}_b}{\sqrt{W_m + W_b}}$$

Calculation of the comparison t-statistic (t_c) against which t* will be compared necessitates first computing t_b and t_m from standard one-tailed tables where

t_b = value of t from t-table with n_b - 1 degree of freedom and confidence level 0.01;

t_m = value of t from t-table with n_m - 1 degree of freedom and confidence level 0.01.

A copy of the appropriate t-table is included here as Table 2. The comparison t-statistic t_c is:

$$t_c = \frac{W_b t_b + W_m t_m}{W_b + W_M}$$

The t-statistic, t*, is now compared with the comparison t-statistic, t_c, using the following decision rule:

If t* is greater than or equal to t_c then the null hypothesis, H_0, is rejected, H_1 is accepted, and the foreground mean is found to be greater than the background mean.

However, if t* is less than t_c then the foreground mean is not found to exceed the background mean and the null hypothesis, H_0, is maintained.

TABLE 2

t-TABLE FOR PROPOSED STATISTICAL TEST

Degress of Freedom	t for Alpha = 0.01
1	31.821
2	6.965
3	4.541
4	3.747
5	3.365
6	3.143
7	2.998
8	2.896
9	2.821
10	2.764
11	2.718
12	2.681
13	2.650
14	2.624
15	2.602
16	2.583
17	2.567
18	2.552
19	2.539
20	2.528
21	2.518
22	2.508
23	2.500
24	2.492
25	2.485
26	2.479
27	2.473
28	2.467
29	2.462
30	2.457
40	2.423
60	2.390
120	2.358
Infinity	2.326

References

1. Geo-Trans, Inc., Draft RCRA Permit Writer's Manual, Ground-Water Protection, 40 CFR Part 264 Subpart F, submitted October 4, 1983 to the U.S. EPA, sec. 6.3.1, "Basic Statistical Procedure", pp. 149.
2. ibid., p. 148.
3. ibid., p. 149 and p. 156
4. Conover, W.J., 1971, Practical Nonparametric Statistics,, John Wiley, New York.
5. Siegel, Sidney, Nonparametric Statistics for the Behavioral Sciences, McGraw-Hill, 1956, pp. 68-75 and 36-42.
6. ibid., p. 42.

Interim Statistics

MID 048 090 633
MID 000 724 831
February 28, 1989

SUMMARY OF SECONDARY PARAMETER BACKGROUND STATISTICS FOR t - TEST SCREENING PROCEDURE

Parameter	Units	Background Mean	Number of Bkgd. Values	W_b	t_b	Maximum Downgradient Mean
Ag	mg/l	0.00969	16	2.03E-05	1.753	0.0176
As	mg/l	0.00379	19	4.04E-06	1.734	0.00728
Ba	mg/l	0.0919	16	1.60E-03	1.753	0.162
Cd	ug/l	9.74	19	1.81E+01	1.734	17.1
CN	mg/l	0.0136	7	4.73E-05	1.943	0.0270
Cr(H)	ug/l	10.0	7	2.50E+01	1.943	19.7
Cr(T)	ug/l	16.8	19	7.14E+01	1.734	31.5
Cu	mg/l	0.00500	4	6.25E-06	2.353	0.0109
Hg	mg/l	0.000559	16	4.98E-08	1.753	0.000950
Mn	mg/l	0.0314	22	1.40E-04	1.721	0.0518
Pb	ug/l	42.4	19	4.12E+02	1.734	77.6
Se	mg/l	0.00387	16	4.70E-06	1.753	0.00767
Zn	mg/l	0.217	19	1.66E-02	1.734	0.440

The values in the rightmost column are the allowable maximum downgradient mean values as determined by equation 4 in the screening procedure, after substituting t_b for t_c. For those instances in which only one downgradient measurement for any well and parameter is obtained, and it exceeds the corresponding value in the rightmost column above, a statistically significant exceedance has been found. For those instances in which multiple downgradient replicates for any particular well and parameter are obtained, and the mean of these replicate measurements exceeds the corresponding value in this column, then a more complete statistical comparison is necessary using equations 1 and 5 from the screening procedure.

SECONDARY PARAMETERS
BACKGROUND CONCENTRATIONS IN UPGRADIENT WELLS
WAYNE DISPOSAL SITE NO. 2
MID 048 090 633

PARA	UNITS	MEAN	VAR	COUNT	MODIFIED** VARIANCE	VARIANCE OF MEAN	MODIFIED** VAR OF MEAN	LLVOM***
Ag	mg/l	0.00969	1.16E-05	16	4.05E-05	7.23E-07	2.53E-06	2.03E-05
* Alk	mg/l	175	1.23E+03	4				
As	mg/l	0.00379	6.06E-06	19	1.17E-05	3.19E-07	6.18E-07	4.04E-06
Ba	mg/l	0.0919	1.03E-03	16	3.31E-03	6.43E-05	2.07E-04	1.60E-03
* Ca	mg/l	9.46	6.68E+00	13				
Cd	ug/l	9.74	1.80E+01	19	4.34E+01	9.46E-01	2.29E+00	1.81E+01
* Cl	mg/l	7.02	4.25E+01	31				
CN	mg/l	0.0136	5.95E-06	7	7.96E-05	8.50E-07	1.14E-05	4.73E-05
* CO3	mg/l	55.0	2.57E+03	4				
Cr(H)	ug/l	10.0	0.00E+00	7	3.89E+01	0.00E+00	5.55E+00	2.50E+01
Cr(T)	ug/l	16.8	2.28E+01	19	1.23E+02	1.20E+00	6.49E+00	7.14E+01
Cu	mg/l	0.00500	0.00E+00	4	1.11E-05	0.00E+00	2.78E-06	6.25E-06
* Fe	ug/l	739	3.49E+06	31				
* HCO3	mg/l	187	4.82E+02	13				
Hg	mg/l	0.000559	2.01E-07	16	2.72E-07	1.26E-08	1.70E-08	4.98E-08
* Mg	mg/l	4.8634375	6.22E+00	16				
Mn	mg/l	0.0314	3.01E-03	22	3.07E-03	1.37E-04	1.40E-04	4.12E-05
* Na	mg/l	68.9	9.58E+02	31				
Pb	ug/l	42.4	3.98E+02	19	9.78E+02	2.10E+01	5.15E+01	4.12E+02
Se	mg/l	0.00387	4.05E-06	16	1.07E-05	2.53E-07	6.71E-07	4.70E-06
* SO4	mg/l	5.62	4.22E+01	31				
Zn	mg/l	0.217	3.16E-01	19	3.16E-01	1.66E-02	1.66E-02	4.28E-05

* Major ions for sign test evaluation only

** Calculated according to draft operating license, Attachment 11A

*** Alternative form of W according to draft operating license, Attachment 11A

NOTE: Parameter list is taken from Table 3b of the draft operating license. Background data is from wells 7, 18, 19 and 31 for the period 1985-1987, including the spring of 1988 for Well 7. Background for carbonate and total alkalinity is from wells 18, 19 and 40 from spring 1988.

ATTACHMENT 14

AMBIENT AIR MONITORING PLAN

AMBIENT AIR MONITORING PROGRAM

MI Act 64 R611

Ambient air quality will be monitored at six stations around the perimeter of the site. These locations are noted on the attached Figure 1. All six sites are monitored using organic samplers and high volume TSP (metals), PM_{10} (particulates), and polyurethane foam (PUF) samplers. Site 9 (82983) is a collocated site that has pairs of each sampling device.

The high volume TSP, PM_{10}, PUF[1] and organic samplers operate every 6th day for a 24 hour period. The PUF samplers will operate every third day during June, July and August of 1997. Samples collected from the high volume TSP samplers are analyzed for the compounds listed in Table 6. Organic samples will be analyzed for the parameters in Table 7. PUF samplers are used to monitor PCBs and are shown in Table 7.

Metal concentrations will be determined from the samples collected in the high volume TSP samplers. Analysis will be performed using USEPA Reference Method for the Determination of Suspended Particulates in the Atmosphere (high volume method). Samples will be collected for a twenty-four (24) hour period with a nominal flow rate of 50 cfm $\pm$ 10 cfm. Quality control and assurance requirements specified in the method will be incorporated in the sampling protocol. Respirable particulate, less than ten microns in diameter, will be collected with PM_{10} air samplers equipped with ten micron cutoff inlet head. These samplers will be operated for a twenty-four (24) hour period at a flow rate of 40 cfm $\pm$ 10 cfm. The organic samplers will employ a system of

[1] PUF sampling will be performed after the TSCA permit is obtained and PCB receipt is ongoing.

sorbent tubes capable of effectively collecting the listed compounds, and a constant flow sampling pump operated at approximately 0.10 lpm. Samples will be collected at a flow rate adequate to reach the required limits of detection. Respirable particulate analysis is a gravimetric determination measured to $\pm$ 1 mg and employing all appropriate quality control and quality assurance requirements. The PUF samplers will be operated at an air sampling rate of approximately 200 to 280 lpm.

Within 30 days after the end of the month in which it was collected, ambient air monitoring data will be reported to the Wayne County Air Pollution Control Division in the AIRS format. Precision and accuracy data will be reported within 30 days after the end of each quarter.

Michigan Disposal Waste Treatment Plant may petition the Chief of the Waste Management Division and the Wayne County Air Pollution Control Division to discontinue sampling for any organic parameter listed in Table 7 if one year of sampling events show non-detectable levels of that parameter.

The ambient air monitoring program described will be used to characterize the ambient air quality associated with both Michigan Disposal Waste Treatment Plant and Wayne Disposal Site #2 Landfill.

MICHIGAN DISPOSAL WASTE TREA 'NT PLANT

WAYNE DISPOSAL SITE #2 LANDFILL

SITE LOCATIONS

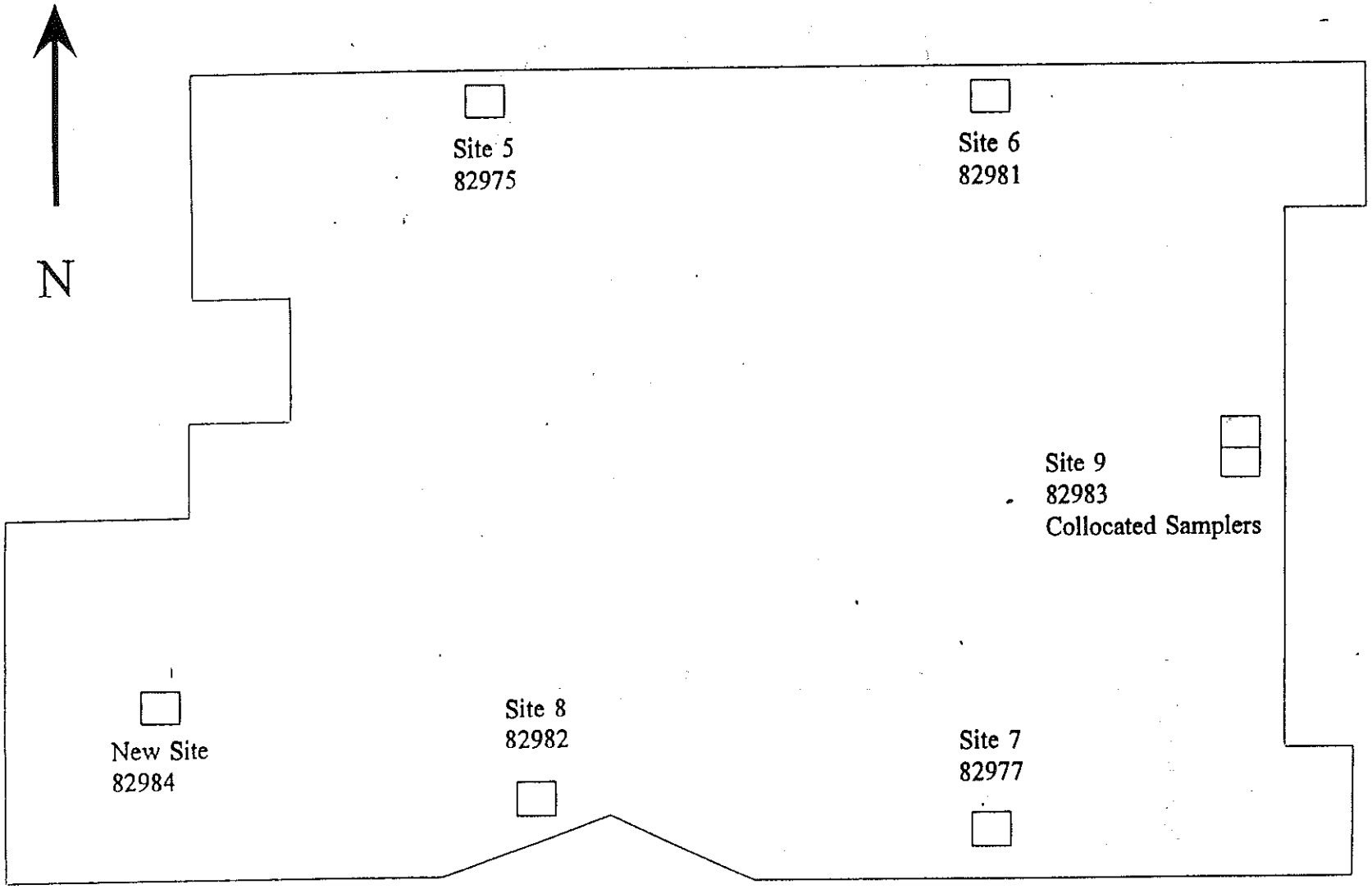

FIGURE 1

TABLE 6

AIR MONITORING PARAMETERS
(METALS and PARTICULATES)

COMPOUND	DETECTION LIMIT (ug/m^3)
CADMIUM	0.005
CHROMIUM	0.009
LEAD	0.025
PM_{10}	1.0

TABLE 7

AIR MONITORING PARAMETERS
(ORGANIC COMPOUNDS)

ORGANIC COMPOUND	DETECTION LIMIT (ug/m^3)
BENZENE	0.04
CARBON TETRACHLORIDE	0.25
CHLOROFORM	0.05
ETHYLBENZENE	1.0
METHYLENE CHLORIDE	1.0
1,1,1-TRICHLOROETHANE	1.0
TETRACHLOROETHENE	0.1
TRICHLOROETHENE	0.1
TOLUENE	1.0
XYLENE (TOTAL)	1.0
PCBs (TOTAL)	0.1

ATTACHMENT 15

RCRA FACILITY INVESTIGATION

ATTACHMENT 15

RCRA FACILITY INVESTIGATION

Michigan Disposal Waste Treatment Plant
Belleville, Michigan

MID 000 724 831

PURPOSE

The corrective action requirements for the licensee are specified in Part VI of the license. The purpose of the RCRA Facility Investigation (RFI) is to determine the nature and extent of releases of contaminants from all waste management units at the facility, and to gather all necessary data to support determinations regarding further corrective action requirements and the Corrective Measures Study, if applicable.

SCOPE

The RFI consists of three tasks:

		Page
TASK I:	**RFI WORK PLAN**	1
	A. Description of Current Conditions	1
	B. Identification of Potential Corrective Measures Technologies	3
	C. Project Management Plan	3
	D. Facility Investigation Plan	4
	E. Quality Assurance/Quality Control Plan	13
	F. Data Management Plan	19
	G. Health and Safety Plan	20
	H. Public Involvement Plan	21
	I. RFI Final Report Outline	21
TASK II:	**RFI IMPLEMENTATION**	21
TASK III:	**RFI REPORTING**	21

I. TASK I: RFI WORK PLAN

[Note: Information required under the Description of Current Conditions or Potential Corrective Measures Technologies may already be provided in the RCRA Facility Assessment Report for the facility.]

The licensee shall prepare an RFI Work Plan. The licensee may reference the RCRA Facility Assessment (RFA) Report for the facility or the hazardous waste management facility operating license application. To the extent that the required information is not provided in the RFA Report, the licensee shall provide it in the RFI Work Plan. During the RFI, it may be necessary to revise the RFI Work Plan to accommodate facility-specific needs. The RFI Work Plan shall include the following:

A. Description of Current Conditions

The RFI Work Plan shall summarize existing information about the facility that will aid in determining the nature and extent of contamination at the facility and beyond the facility boundary. The Description of Current Conditions shall include the following information:

1. A historical description of ownership and operation, and waste and hazardous waste generation, treatment, storage and disposal activities at the facility;

2. A summary of the facility's regional location, pertinent boundary features, topography, drainage basin, and general facility physiography;

3. A summary of the environmental setting at and adjacent to the facility, including geology, hydrogeology, hydrology, meteorology, wildlife, and vegetative community;

4. A summary of past permits or licenses requested and/or received, any enforcement actions related to releases of contaminants to the environment and the subsequent responses, and a list of documents and studies prepared for the facility along with a brief summary of their findings;

5. A summary of all possible source areas of contamination. At a minimum, this should include all regulated units, waste management units identified in Condition VI.C. of the license, any additional waste management units, release areas, and other suspected source areas of contamination including any observed effects to biota. For each potential area of contamination, the RFI Work Plan shall include a summary of the following information:

   a. Location of unit/area;

   b. Current and historic quantities of waste and hazardous wastes;

   c. Hazardous waste or constituents, to the extent known;

   d. Approximate dates or periods of past releases, identification of the materials released, the amount released, the location, and a description of the response actions, including any inspection reports or technical reports generated as a result of the releases;

   e. Available monitoring data and qualitative information on locations and levels of contamination at the facility; and

   f. Habitats and species, including threatened and endangered species, potentially exposed to contaminants, and any known or observed effects of facility contaminants on biota, such as fish kills or other obvious impacts. Habitat description should be based on available information and a field reconnaissance by a trained ecologist. Experts on local flora and fauna should also be consulted.

6. Maps, prepared consistent with the requirements of 40 Code of Federal Regulations (CFR) §270.14 and of sufficient detail and accuracy to allow the location of and the reporting of all current and future work performed at the facility, depicting the following:

   a. General geographic location;

   b. Property lines, with the owners of all adjacent property clearly indicated;

   c. Topography and surface drainage depicting all soil profiles, waterways, wetlands, floodplains, water features, drainage patterns, and surface water areas;

   d. All tanks, buildings, utilities, paved areas, easements, rights-of-way, and other features;

   e. All waste or hazardous waste treatment, storage or disposal units active after November 19, 1980;

   f. All known past waste or hazardous waste treatment, storage or disposal areas regardless of their dates of operation;

   g. All known past and present product and waste underground tanks or piping;

h. Surrounding land uses;

i. The location of all domestic, municipal production, recovery, oil and gas, and groundwater monitoring wells on-site and within a one-mile radius of the facility boundary. The wells shall be clearly labeled and ground and top of casing elevations and construction details provided (may be included as supplement to the map);

j. Terrestrial habitat cover - types (i.e., vegetation communities) with emphasis on locating natural (undisturbed) areas; and

k. Wildlife nesting and foraging locations for locally "uncommon" mammals, birds, fish, benthos, etc. Threatened and endangered species possibly on or near the facility should be identified as early as possible.

7. A description of all interim measures which were or are being undertaken at the facility. This description shall include:

a. Objectives of the interim measures: how the measure is mitigating a potential threat to human health, safety, and welfare, and the environment and/or is consistent with and integrated into any long-term solution at the facility;

b. Design, construction, operation, and maintenance requirements;

c. Schedules for design, construction, and monitoring; and

d. Schedule for progress reports.

B. Identification of Potential Corrective Measures Technologies

Based on the information contained in the Description of Current Conditions, the RFI Work Plan shall include:

1. A description of the potential corrective measure technologies that may be used at the facility or beyond the facility boundary to respond to releases of contaminants at or from any waste management unit at the facility; and

2. If applicable, any field, laboratory, bench-scale or pilot-scale data that needs to be collected during the RFI to facilitate the evaluation and selection of the final corrective measure(s), if any, for releases at or from the facility (e.g., compatibility of waste and construction materials, information to evaluate effectiveness, treatability of waste, etc.).

C. Project Management Plan

The RFI Work Plan shall include a Project Management Plan which documents the overall management approach to the RFI. The Project Management Plan shall include:

1. A discussion of the technical approach outlining how each waste management unit will be evaluated and investigatory and/or remedial measures will be prioritized based on actual or potential threats to human health, safety, and welfare, and the environment;

2. Schedules of activities;

3. A description of the qualifications of personnel directing the RFI, including contractor personnel;

4. Budget considerations; and

5. Provisions for submittal of periodic progress reports which shall, at a minimum, include:

   a. A description and estimate of the percentage of the RFI completed;

   b. Summaries of all findings;

   c. Summaries of all changes made in the RFI during the reporting period;

   d. Summaries of all contacts with the public or state government regarding the RFI during the reporting period;

   e. Summaries of all problems or potential problems encountered during the reporting period;

   f. Actions being taken to rectify problems;

   g. Changes in personnel during the reporting period;

   h. Projected work for the next reporting period; and

   i. Copies of daily reports, inspection reports, laboratory and monitoring data, etc.

   [The need for this information should be evaluated based on the frequency upon which the progress reports are required.]

D. Facility Investigation Plan

The RFI Work Plan shall include a Facility Investigation Plan which discusses those investigations necessary to: characterize the environmental setting at the facility; define the source of contamination; define the degree and extent of contamination; and identify actual or potential receptors. The investigations should result in data of adequate technical quality to support the development and evaluation of the corrective measures alternative(s). The licensee shall characterize the following:

1. Environmental Setting Investigation

   The licensee shall collect information to supplement and verify the existing information described in Section I.A.3. of this attachment on the environmental setting at the facility.

a. Hydrogeology

The licensee shall conduct a program as necessary to fully evaluate the hydrogeologic conditions at the facility. This program shall provide the following information, as appropriate:

(1) A description of the regional and facility-specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the facility, including:

(a) Regional and facility-specific stratigraphy;

(b) Structural geology: description of local and regional structural features;

(c) Depositional history;

(d) Identification and characterization of areas and amount of recharge and discharge;

(e) Regional and facility-specific groundwater flow patterns; and

(f) Temporal variations in the groundwater flow regime.

(2) An analysis of any topographic features that might influence the groundwater flow system;

(3) Based on field data, tests, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the facility, including:

(a) Hydraulic conductivity (horizontal and vertical), intrinsic permeability, and porosity (total and effective);

(b) Lithology, grain size, sorting, degree of cementation;

(c) An interpretation of hydraulic interconnection between saturated zones;

(d) The attenuation capacity and mechanisms of the natural earth materials;

(e) Location, depth, and construction details of all groundwater monitoring wells, piezometers, and production wells; and

(f) Boring logs for all groundwater monitoring wells, piezometers, and production wells.

(4) Based on field studies and cores, cross-sections of structural geology and hydrogeologic units which may be part of the migration pathways, identifying:

(a) Sand and gravel deposits in unconsolidated deposits;

(b) Zones of fracturing or channeling in consolidated or unconsolidated deposits;

(c) Zones of higher or lower permeability that might direct or restrict the flow of contaminants;

(d) Aquifers; and

(e) Water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration including perched zones of saturation.

(5) Based on data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring, including:

(a) Water level contour and/or potentiometric maps;

(b) Hydrologic cross-sections showing vertical gradients;

(c) The flow system, including the vertical and horizontal components of flow; and

(d) Any temporal changes in hydraulic gradients due to seasonal or other influences.

(6) A description of man-made influences that may affect the hydrogeology of the facility, identifying:

(a) Active and inactive local water supply and production wells with an approximate schedule of pumping; and

(b) Man-made hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, National Pollutant Discharge Elimination System (NPDES) outfalls, etc.).

b. Soils

The licensee shall conduct a program as necessary to fully characterize the soil and rock units potentially affected by contaminant release(s). Such characterization shall consider, but not be limited to, the following information, as appropriate:

(1) Extent of contamination;

(2) Depth to groundwater;

(3) Depth to bedrock;

(4) Soil Conservation Service (SCS) and Unified Soil Classification System (USCS) soil classifications, and boring logs;

(5) Surface soil distribution;

(6) Cross-sections showing stratifications or zones which may affect or direct subsurface flow;

(7) Hydraulic conductivity (saturated and unsaturated);

(8) Relative permeability;

(9) Storage capacity;

(10) Shrink-swell potential;

(11) Potential for contaminant transport via erosion;

(12) Soil sorptive capacity;

(13) Cation exchange capacity;

(14) Soil organic content;

(15) Soil pH;

(16) Bulk density;

(17) Porosity;

(18) Particle size distribution;

(19) Mineral content;

(20) Moisture content;

(21) Effect of stratification on unsaturated flow;

(22) Infiltration;

(23) Evapotranspiration; and

(24) Vertical flow rate.

c. Surface Water and Sediment

The licensee shall conduct a program as necessary to fully characterize the surface water bodies in the vicinity of the facility that may be affected by releases from the facility. Such characterization shall include, but not be limited to, the following activities and information, as appropriate:

(1) Description of the temporal and permanent surface water bodies including:

(a) For lakes and estuaries: location, elevation, surface area, inflow, outflow, depth, temperature or chemical stratification and volume;

(b) For streams, ditches, drains, swamps and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies;

(c) For impoundments: location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment;

(d) For wetlands: available delineations;

(e) Any containment measures such as levees, concrete lining, etc.; and

(f) Drainage patterns.

(2) Description of the chemistry of the natural surface water and sediments, including pH, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients, chemical oxygen demand, total organic carbon, specific contaminant concentrations; and

(3) Description of sediment characteristics, including the deposition area, thickness profile, physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.).

d. Air

The licensee shall provide information characterizing the climate in the vicinity of the facility. This information shall include, but not be limited to, as appropriate:

(1) Annual and monthly rainfall averages;

(2) Monthly temperature averages and extremes;

(3) Wind speed and direction;

(4) Climate extremes that have been known to occur in the vicinity of the facility, and the frequency of occurrence; and

(5) A description of topographic and man-made features which affect air flow and emission patterns, including:

(a) Ridges, hills, mountain areas, or valleys;

(b) Surface water bodies;

(c) Wind breaks and forests; and

(d) Buildings.

2. Source Characterization

The licensee shall collect analytical data as necessary to fully characterize the wastes and areas where wastes have been placed, collected, or removed. This shall include, but not be limited to, qualification of the following specific characteristics at each source area and documentation of the procedures used in making the determinations:

a. Unit/Disposal Area Characteristics:

(1) Location of unit/disposal area;

(2) Type of unit/disposal area;

(3) Design features;

(4) Operating practices (past and present);

(5) Period of operation;

(6) Age of unit/disposal area;

(7) General physical conditions;

(8) Method used to close the unit; and

(9) History of releases.

b. Waste Characteristics:

(1) Type of waste placed in the units;

(a) Hazardous classification;

(b) Quantity; and

(c) Chemical composition.

(2) Physical and chemical characteristics; and

(a) Physical form (solid, liquid, gas);

(b) Physical description;

(c) pH;

(d) General chemical class (e.g., acid, solvent);

(e) Density;

(f) Boiling point;

(g) Viscosity;

(h) Solubility in water;

(i) Cohesiveness of the waste;

(j) Vapor pressure; and

(k) Flash point.

(3) Migration and dispersal characteristics of the waste.

(a) Sorption;

(b) Biodegradability;

(c) Bioconcentration;

(d) Biotransformation;

(e) Photodegradation rates;

(f) Hydrolysis rates; and

(g) Chemical transformations.

3. Contamination Characterization

The licensee shall collect analytical data as necessary on groundwater, soils, surface water, sediment, subsurface gas and air contamination at the facility and in the vicinity of the facility. These data shall be sufficient to define the extent, origin, direction, and rate of movement of plumes of contamination. Data shall include the time and location of sampling, media sampled, concentrations found, conditions during sampling, and the identity of the individuals performing the sampling and analysis. In developing strategies for collecting this information under Sections I.D.1. and I.D.2. of this attachment, the licensee shall address the following types of contamination at the facility, as appropriate:

a. Groundwater Contamination

The licensee shall conduct a groundwater investigation as necessary to fully characterize any plumes of contamination at or originating from the facility. This investigation shall, at a minimum, provide the following information:

(1) A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility;

(2) The horizontal and vertical direction of contaminant movement;

(3) The velocity of contaminant movement;

(4) The horizontal and vertical concentration profiles of 40 CFR Part 261, Appendix IX constituents in the plume(s);

(5) An evaluation of factors influencing the plume movement; and

(6) An extrapolation of future contaminant movement.

The licensee shall document the procedures used in making the above determinations.

b. Soil Contamination

The licensee shall conduct an investigation as necessary to fully characterize the contamination of the soil and rock units in vicinity of the contaminant release(s) at or from the facility. The investigation shall, at a minimum, provide the following information:

(1) A description of the vertical and horizontal extent of contamination;

(2) A description of contaminant and soil chemical properties within the source area and contaminant plume that might affect contaminant migration and transformation;

(3) Specific contaminant concentrations;

(4) The velocity and direction of contaminant movement; and

(5) An extrapolation of future contaminant movement.

The licensee shall document the procedures used in making the above determinations.

c. Surface Water and Sediment Contamination

The licensee shall conduct a surface water investigation as necessary to fully characterize contamination in surface water bodies resulting from contaminant releases at or from the facility. The investigation shall, at a minimum, provide, the following information:

(1) A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility and the extent of contamination in underlying sediments;

(2) A description of the chemical, physical, and biological properties of the contaminated surface waters and sediments that might affect contaminant movement;

(3) Specific contaminant concentrations;

(4) The velocity and direction of contaminant movement; and

(5) An extrapolation of future contaminant movement, taking into account times of flood.

The licensee shall document the procedures used to make the above determinations.

d. Air Contamination

The licensee shall conduct an investigation as necessary to fully characterize the particulate and gaseous contaminants released into the atmosphere at or from the facility. This investigation shall, at a minimum, provide the following information:

(1) The chemical and physical composition of the contaminants released;

(2) The rate and amount of release; and

(3) A description of the contaminant dispersion.

e. Subsurface Gas Contamination

The licensee shall conduct an investigation as necessary to fully characterize subsurface gases emitted from contaminants. This investigation shall, at a minimum, provide the following information:

(1) A description of the horizontal and vertical extent of subsurface gases;

(2) The chemical composition of the gases being emitted;

(3) The rate, amount, and density of the gases being emitted; and

(4) Horizontal and vertical concentration profiles of the subsurface gases emitted.

The licensee shall document the procedures used in making the above determinations.

4. Potential Receptors Identification

The licensee shall collect data describing the human populations and environmental systems that are susceptible to contaminant exposure from the facility. Chemical analyses of biological samples may be needed. Data on observable effects in ecosystems or from bioassays may also be needed. The following characteristics shall be identified, as appropriate:

a. Local uses and possible future uses of groundwater:

(1) Type of use (e.g., municipal or residential drinking water source, industrial, etc.); and

(2) Location of groundwater users, including wells and discharge areas.

b. Local uses and possible future uses of surface waters draining the facility, including:

(1) Domestic and municipal;

(2) Recreational;

(3) Fish and wildlife propagation;

(4) Agricultural; and

(5) Industrial.

c. Authorized or unauthorized human use of, or access to, the facility and adjacent lands, including, but not limited to:

(1) Recreation;

(2) Agriculture;

(3) Residential;

(4) Commercial;

(5) Zoning; and

(6) Relationship between population locations and prevailing wind direction.

d. A demographic profile of the people who use or have access to the facility and adjacent land; including, but not limited to: age, sex, and sensitive subgroups.

e. A description of the biota in surface water bodies, including benthic macroinvertebrates and fish communities on, adjacent to, or affected by the facility. The aquatic biota expected in these water bodies in the absence of facility-related contamination, based on physical habitat characteristics, should also be described.

f. A description of terrestrial habitats on or potentially affected by the facility and a description of potential terrestrial animal receptors seen or expected in those habitats, including, birds, mammals, amphibians, and reptiles.

g. A description of endangered or threatened species at or near the facility.

E. Quality Assurance/Quality Control Plan

The RFI Work Plan shall include a Quality Assurance/Quality Control (QA/QC) Plan to document all monitoring, including sampling procedures, field measurements, and sample analysis, performed during the RFI. The QA/QC Plan shall be designed to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. The QA/QC Plan shall include, but not be limited to:

1. Pages with the facility name, section number, revision number, date, and section page number on each page.

2. A table of contents which includes:

   a. A list of each section of the QA/QC Plan;

   b. A list of appendices; and

   c. A list of any tables and figures.

3. Project Description

   A project description which defines the project objectives and how the project will be designed to obtain the information necessary to meet the project objectives. The project description shall include:

   a. An introduction which contains a succinct description of the project, including a brief statement regarding the phase(s) of the work and general objectives of the RFI;

   b. A discussion of important facility contaminants or target compounds, including required detection limits for RFI and subsequent corrective action;

c. The project objectives, including:

(1) Specific objectives;

(2) An outline of the usage of all data, including any data generated from field screening and/or field measurements. These data usages include, but are not limited to the following:

(a) Qualitative or semi-quantitative analyses for selection of sample and/or sampling locations;

(b) Definition of extent of environmental contamination;

(c) Data for remedial action alternatives;

(d) Determination of hazardous waste characteristics for remedial removals; and

(e) Protection of public health.

(3) Data quality objective (DQO) summaries from RCRA DQO preparation guidance.

d. A description of the sampling and monitoring network design and rationale. This may be referenced to readily available work and sampling plans. The description shall include:

(1) Diagrams or facility maps of sampling locations;

(2) Rationale for selected sampling locations; and

(3) Summary table listing matrices, parameters, both field and laboratory, and their frequency of collection. The field parameters may include field screening, field measurements, and hydrogeologic investigations, as applicable. The sample matrices and parameters should be listed in groups for a remedial activity site as follows:

(a) On-site contaminated materials. These types of sampling and analyses are often done to determine disposal methods.

(b) Ambient monitoring of air, groundwater, surface water, soils, drinking water, river sediments, and fish. Specifications of filtered or unfiltered sample aliquot for groundwater and surface water must be included as part of the definition of parameters. These types of analyses usually are intended to measure the extent of environmental contamination and to assess public health risks.

e. A description of dates anticipated for start, milestones, and completion of the project, and sampling and monitoring activities. A milestone table or a bar chart consisting of project tasks and time lines is appropriate.

4. Project Organization and Responsibility

A description and table, chart, or figure of the overall project organization and lines of responsibility for quality assurance organization, showing how execution and direct management of the technical and administrative aspects of this project have been assigned as shown in the following table.

Tasks		Responsible Organization/Personnel
a.	Final review and approval of QA/QC Plan	Department
b.	QA review and approval of reports, standard operating procedures (SOPs), and field activities, and audits of reports, procedures, and activities for identifying, controlling nonconformance for corrective actions	Licensee
c.	Evidence audits of field records	Licensee
d.	Data assessment	Licensee
e.	Performance and system audits of field activities and laboratories	Oepartment
f.	Analysis	Licensee

5. QA Objectives

A description of the QA objectives of the project in terms of precision, accuracy, completeness, representativeness, and comparability for both field activities (sampling, measurements, and screening) and laboratory analyses, including the project acceptance limits and means to achieve these QA objectives.

Trip blanks are required at a frequency of one per cooler in which aqueous matrix volatile organic compound samples are shipped. Field blanks are required for all aqueous matrix parameters (e.g., at a frequency of one for every ten or fewer investigative samples). Field duplicates are also required for all parameters and matrices (e.g., at a frequency of one for every ten or fewer investigative samples). These field QC samples must be treated as regular investigative samples concerning sample volume, containers, and preservation. Field duplicates must not be composited prior to placing them in the sample containers.

6. Sampling Procedures

[Note: If a separate sampling and analysis plan (SAP) will be written, the QA/QC Plan may reference the SAP.]

A detailed description of the sampling procedures, including:

a. Procedures, criteria, or guidelines used for sampling location and sampling frequency selection, including background sampling locations and frequency;

b. Procedures for static water level measurement for groundwater sampling. The procedures shall address the measurement point, measurement method, and level of accuracy;

c. Procedures for well purging for groundwater sampling. The procedures shall address purge volume determination calculations, purge volume measurement, purge method, and fate of purge water;

d. Procedures, criteria, or guidelines for sample collection of each sample matrix or parameters. The procedures shall address the sampling method(s), the method(s) of operation, and compatibility with the parameters analyzed;

e. Sample containers, reagents, preservatives, and holding time requirements;

f. Special conditions for the preparation of field measured parameters (e.g., pH and conductivity), including sampling containers, sampling methods, and time requirements;

g. Decontamination procedures;

h. Procedures for preparing and collecting trip blank samples, field blank samples, and field duplicate samples;

i. Procedures for sample packaging, handling, and shipment, including time considerations and field filtration requirements;

j. Documentation of sampling activities, including forms, notebooks, bound logbook(s), and procedures to record sample history, sampling conditions, etc., and analyses to be taken; and

k. Chain-of-custody procedures for field activities, including sample labels and chain-of-custody forms.

7. Calibration Procedures and Frequency

A description of the calibration procedures and their frequency for both field and laboratory instruments. The description shall include the following:

a. Field instruments:

(1) Calibration standards and devices;

(2) Initial calibration, including multilevel calibration for determination of usable range;

(3) Continuing calibration check and acceptable control limits; and

(4) Conditions triggering recalibration.

b. Laboratory instruments:

(1) Calibration standards and devices;

(2) Initial calibration for each instrument;

(3) Initial calibration verification;

(4) Continuing calibration check; and

(5) Conditions to trigger the recalibration.

8. Analytical Procedures

Methods from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA Publication SW-846, Third Edition, and its Updates I (July 1992), II (September 1994), IIA (August 1993), and IIB (January 1995) are preferred. Other U.S. EPA methods from the Clean Water Act (CWA), Superfund Contract Laboratory Program (CLP), Clean Air Act Program, or Safe Drinking Water Act (SDWA) are acceptable when appropriate for the constituent of interest. The following shall be addressed in the QA/QC Plan:

a. For SW-846 analytical methods, the method for analysis (by number).

b. For parameters to be analyzed by methods other than those found in SW-846, the following shall be provided:

(1) For non-U.S. EPA approved methods, an SOP.

(2) For SW-846 or other U.S. EPA approved methods that are modified (i.e., Appendix IX or facility-specific contaminants), an SOP.

(3) A reference to the method manual and procedure number(s).

c. Chain-of-custody procedure for field and laboratory activities, including sample receiving, log-in, storage, tracking of custody-transfer during sample preparation and analysis, and maintenance of chain-of-custody records.

9. Internal QC Checks

A description of the specific QC check methods to be followed for both laboratory and field activities. Items to be considered include the following:

a. Field Measurements and Screening:

(1) Replicate analyses;

(2) Spike sample analyses;

(3) Blanks (trip blank, field blank, etc.); and

(4) QC samples.

b. Laboratory Analyses:

(1) Method blanks;

(2) Reagent/preparation blanks;

(3) Matrix spike and matrix spike duplicates;

(4) Internal standards;

(5) Surrogate standards; and

(6) Laboratory duplicate/replicate analysis.

10. Data Reduction, Validation, and Reporting

A description of the data reduction, validation, and reporting, including:

a. Methods to be used for reducing both field and laboratory data.

b. The criteria, guidelines, and procedures to be used for data validation shall be described. This function must be performed independently of the laboratory.

c. The data reporting format, including all forms and reporting units, shall be described. The description shall include the listing of data package contents (deliverables from the laboratory).

11. Performance and System Audits

A description of the procedures and mechanisms used to ensure that the sampling and analysis are performed per specifications of the QA/QC Plan and that measurement data meet project requirements. A description of the internal audit for the field activity, as well as laboratory analysis, shall be provided as follows:

a. The responsible party for the audits;

b. The frequency of these audits to be conducted; and

c. Methods/procedures to be used for conducting the audits.

12. Preventive Maintenance

A description of the preventive maintenance procedures to be used for both field and laboratory instruments.

13. Procedures Used to Assess Data Precision, Accuracy, and Completeness

The procedures and equations to be used to aid in assessing the accuracy and precision of analytical data, and completeness of data collection shall be documented or referenced.

14. Correction of QA/QC Problems

The QA/QC plan shall address how QA/QC problems will be assessed and corrected.

15. Laboratory QA/QC Reports

QA/QC reports shall be done on a periodic basis to ensure that problems, if any, identified during sampling and/or analysis are investigated, and corrective actions are properly taken.

F. Data Management Plan

The RFI Work Plan shall include a Data Management Plan to document and track RFI data and results. The Data Management Plan shall identify and set up data documentation materials and procedures, project file requirements, and progress reporting procedures. The Data Management Plan shall also provide the format to be used to present the raw data and conclusions of the investigation. The Data Management Plan shall include the following information:

1. Data Record

The data record shall include the following:

a. Unique sample or field measurement code;

b. Sampling or field measurement location and sample or measurement type;

c. Sampling or field measurement raw data;

d. Laboratory analysis ID number;

e. Property or component measured; and

f. Result of analysis (e.g., concentration).

2. Tabular Displays

The following data shall be presented in tabular displays:

a. Unsorted (raw) data;

b. Results for each medium, or for each contaminant monitored;

c. Data reduction for statistical analysis;

d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and

e. Summary data.

3. Graphical Displays

The following data shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three-dimensional graphs, etc.):

a. Display sampling location and sampling grid;

b. Indicate boundaries of sampling area and areas where more data are required;

c. Display levels of contamination at each sampling location;

d. Display geographical extent of contamination;

e. Display contamination levels, averages, and maxima;

f. Illustrate changes in concentration in relation to distance from the source, time, depth or other parameters; and

g. Indicate features affecting intramedia transport and show potential receptors.

G. Health and Safety Plan

The RFI Work Plan shall include a Health and Safety Plan which covers activities to be conducted during the RFI. The Health and Safety Plan shall be submitted for informational purposes and not for specific approval by the Department. The Health and Safety Plan shall be consistent with all applicable U.S. EPA, Occupational Safety and Health Administration, National Institute for Occupational Safety and Health, state, and local requirements and regulations, and the conditions of this license. The Health and Safety Plan shall include:

1. A facility description including availability of resources such as roads, water supply, electricity, and telephone service;

2. A description of the known hazards and an evaluation of the risks associated with each activity to be conducted;

3. A list of key personnel and alternates responsible for site safety, response operations, and protection of public health;

4. A map delineating the work area;

5. A description of the protective clothing or other protective items to be worn or used by personnel in the work area;

6. Information regarding the procedures to be used to control site access;

7. A description of the decontamination procedures for personnel and equipment;

8. Site emergency procedures;

9. Information regarding emergency medical care needed for injuries and toxicological problems;

10. A description of requirements for an environmental surveillance program;

11. A description of the routine and special training required for response personnel; and

12. Information regarding the procedures for protecting workers from weather-related problems.

H. Public Involvement Plan

The RFI Work Plan shall include a Public Involvement Plan for dissemination of information to the public regarding RFI activities and results. The Public Involvement Plan shall address information regarding open houses, informal meetings, fact sheets, other methods of communication, and information repositories. The Public Involvement Plan shall include a schedule for all public involvement activities.

I. RFI Final Report Outline

The RFI Work Plan shall include an outline of the contents of the RFI Final Report. The RFI Final Report shall include the following:

1. A summary of all investigations conducted during the RFI;

2. An analysis of all data developed during the RFI;

3. A description of the nature and extent of contamination, both qualitative or quantitative, at or from the facility, including:

   a. The release source(s);

   b. The release mechanism(s);

   c. Specific contaminant concentrations and the distribution of contamination;

   d. Pathways of contamination migration; and

   e. Actual or potential receptors, including exposure routes.

4. Identification of all relevant and applicable standards, including background values, for the protection of human health, safety, and welfare, and the environment, and comparison of those standards to the extent of contamination found at the facility; and

5. Recommendations of which waste management units require a corrective measure study, and the identification of those corrective action alternatives that may be further investigated.

II. TASK II: RFI IMPLEMENTATION

The RFI shall be implemented in accordance with the terms and schedules in the RFI Work Plan, as approved by the Department.

III. TASK III: RFI REPORTING

A. The licensee shall prepare and submit progress reports in accordance with the requirements of Section I.C.5. of this attachment and Conditions VI.D.6. and VI.J. of the license.

B. The licensee shall prepare and submit a RFI Final Report in accordance with Section I.I and Conditions VI.E.4., VI.E.5., and VI.J. of the license.

ATTACHMENT 16

CORRECTIVE MEASURES STUDY

ATTACHMENT16

CORRECTIVE MEASURES STUDY

Michigan Disposal Waste Treatment Plant
Belleville, Michigan

MID 000 724 831

PURPOSE

The corrective action requirements for the licensee are specified in Part VI of the license. The purpose of the Corrective Measures Study (CMS) is to identify, screen, and evaluate potential corrective measures alternatives for releases of contaminants from waste management units at the facility.

SCOPE

The CMS consists of three tasks:

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TASK I: CMS WORK PLAN 1
- A. Introduction 1
- B. Findings of the RCRA Facility Investigation (RFI) 2
- C. Media Cleanup Standards 2
- D. Identification of Corrective Measures Alternative(s) 2
- E. Screening of Corrective Measures Alternative(s) 2
- F. Evaluation of Corrective Measures Alternative(s) 2
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TASK II: CMS IMPLEMENTATION 8

TASK III: CMS REPORTING 8

I. TASK I: CMS WORK PLAN

If required under Condition VI.F. of the license, the licensee shall prepare a CMS Work Plan. The licensee may elect either to identify and screen a number of potential corrective measures alternatives prior to evaluating a smaller number of potential alternatives or, based on justification and prior approval by the Department, delete the screening step and proceed with evaluation of the expected alternative(s). The CMS Work Plan shall include the following:

A. Introduction

A description of the CMS Work Plan and summary of the project, including corrective action objectives.

B. Findings of the RCRA Facility Investigation (RFI)

A brief summary of the findings of the RFI, highlighting the description of the nature and extent of contamination, and the identification of waste management units requiring corrective measures. Any updates to facility conditions since the RFI was conducted, including implementation of interim measures, shall be provided in this section of the CMS Work Plan.

C. Media Cleanup Standards

An outline of the proposed facility-specific media cleanup levels. The media cleanup levels shall be based on information gathered during the RFI and the cleanup criteria specified in R 299.9629. The licensee shall recommend final media cleanup standards when the final corrective measure is selected.

D. Identification of Corrective Measures Alternative(s)

Identification of the potential corrective measures alternative(s) for each affected media based on the media cleanup levels and an analysis of available technologies. The licensee shall rely on sound engineering practice to determine which of the identified technologies appear most suitable for the facility. Technologies can be combined to form the overall corrective action alternative(s). The corrective measures alternative(s) developed should represent a workable number of options that appear to adequately address all facility problems and corrective action objectives. The reasons for excluding technologies that might be feasible up front shall be documented in the CMS Work Plan.

E. Screening of Corrective Measures Alternative(s)

A description of the screening process, including a discussion of the corrective measures alternative identified and screened and documentation of the reasons for eliminating any technology based on the waste characteristics, facility characteristics, and technology limitations. The licensee may screen the corrective measures alternative(s) identified under Section I.D. of this attachment to eliminate those that may prove infeasible to implement, or that rely on technologies that are unlikely to, or do not, achieve the media cleanup standards within a reasonable period of time. The screening process shall include a review of facility data to identify conditions that may limit or promote the use of certain technologies and focus on eliminating those technologies which have severe limitations for a given set of waste or facility-specific conditions or have inherent technology limitations. During the screening process, the level of technological development, performance record, inherent construction, and operation and maintenance problems should be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process.

F. Evaluation of Corrective Measures Alternative(s)

A description of how each corrective measures alternative that passes through the initial identification and screening process shall be evaluated for compliance with the corrective action objectives. The evaluation shall consider technical, environmental, human health, safety, and welfare, and institutional concerns as outlined below. In addition, the evaluation shall consider the cost for each corrective measures alternative.

1. Evaluation Criteria

The evaluation criteria shall include the following:

a. Technical:

An evaluation of each corrective measures alternative based on performance, reliability, implementability, and safety.

(1) Performance shall be based on the effectiveness and useful life of the measure:

(a) Effectiveness shall be evaluated in terms of the ability to perform intended functions, such as containment, separation, removal, destruction, or treatment. The effectiveness of each measure shall be determined either through design specifications or by performance evaluation. Any specific waste or facility characteristics which could impede effectiveness shall be considered; and

(b) Useful life is defined as the length of time the level of effectiveness can be maintained. Each measure shall be evaluated in terms of the projected service lives of its components.

(2) Information on the reliability of each corrective measures alternative, including the operation and maintenance requirements and its demonstrated reliability:

(a) Operation and maintenance requirements include the frequency and complexity of the operation and maintenance. Technologies requiring frequent or complex operation and maintenance should be regarded as less reliable. The availability of labor and materials to meet these requirements shall also be considered; and

(b) Demonstrated reliability is a way of estimating the risk and effect of failure. The licensee should evaluate the technology's reliability under analogous facility conditions, its flexibility to deal with uncontrollable changes at the site, and the impact of a failure.

(3) A description of the implementability of each corrective measures alternative, including the administrative actions necessary to implement each alternative, the ease of installation, and the time required to achieve a given level of response:

(a) Constructability is determined by both internal and external facility conditions (e.g., location, depth to water table, availability of utilities, need for special permits, etc.). The licensee shall evaluate what measures will facilitate construction under these conditions; and

(b) The time it takes to implement a corrective measure and the time it takes to see beneficial results.

(4) Safety information for each corrective measures alternative, including threats to the safety of nearby communities and environments, as well as to workers during the implementation. Factors to consider are fire, explosion, and exposure to hazardous substances.

b. Environmental

An assessment of each corrective measures alternative to determine its short- and long-term beneficial and adverse effects on the environment. Each alternative will be evaluated for its impact on habitat types and plant and animal receptors located in,

adjacent to, or affected by the facility. Receptor impacts should include those occurrir at the individual level (e.g., mortality, growth and reproductive impairments) and those occurring at higher levels of biological organization (i.e., at population, community, and ecosystem levels). The assessment should include proposed measures for mitigating adverse impacts.

c. Human Health, Safety, and Welfare

An assessment of each corrective measures alternative in terms of the extent to which it mitigates short- and long-term potential or actual exposure to any residual contamination and protects human health, safety, and welfare both during and after implementation of the corrective measure. Each corrective measures alternative will be evaluated to determine the level of contaminants through various media, and the reduction over time. The residual levels from each corrective measures alternative must be compared with the media cleanup standards.

d. Institutional

An assessment of the institutional needs for each corrective measures alternative, including the ability of the alternative to control the source of the release(s) so as to substantially reduce or eliminate, to the extent practical, further releases or other risks. Additionally, the effects of federal, state and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operations, and timing of each corrective measures alternative shall be addressed.

2. Cost Estimate

A description of how a preliminary estimate of the cost of each corrective measures alternative, and for all phases of the action, shall be developed. The cost estimate shall include both capital, and operation and maintenance costs, as appropriate.

a. Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs.

(1) Direct capital costs include, but are not limited to, the following:

(a) Construction costs: materials, labor, and equipment required to install the corrective measure;

(b) Equipment costs: treatment, containment, disposal and/or service equipment necessary to implement the action;

(c) Site development costs: expenses associated with the purchase of land and development of existing property; and

(d) Buildings and service costs: process and non-process buildings, utility connections, purchased services, and disposal costs.

(2) Indirect capital costs include, but are not limited to, the following:

(a) Engineering expenses: costs of administration, design, construction supervision, drafting, and testing of the corrective measure;

(b) Legal fees and license or permit costs;

(c) Startup and shakedown costs; and

(d) Contingency allowances: funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate facility characterization.

b. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. Consideration shall be given to the following operation and maintenance cost components:

(1) Operating labor costs: wages, salaries, training, overhead, and fringe benefits associated with the labor necessary for continued operation;

(2) Maintenance materials and labor costs: costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;

(3) Auxiliary materials and energy: costs of items such as chemicals, electricity, water and sewer service, and fuel;

(4) Purchased services: sampling costs, laboratory fees, and professional fees;

(5) Disposal and treatment costs: costs of transporting, treating and disposing of waste materials and residues;

(6) Administrative costs;

(7) Insurance, taxes and licensing costs; and

(8) Other costs: items that do not fit into any of the above categories.

G. Recommendation of Corrective Measures Alternative(s)

A detailed description of how the final corrective measures alternative recommendation(s) for each waste management unit at the facility will be made. The recommendation(s) shall be based on the overall corrective action objectives using technical, environmental, human health, safety, and welfare, and institutional criteria. The recommendation(s) shall include summary tables and supporting rationale which allow the corrective measures alternative(s) to be understood easily. Tradeoffs among health risks, environmental effects, and other pertinent factors shall be highlighted. At a minimum, the following criteria will be used to justify the final corrective measures alternative(s):

1. Technical

a. Performance - corrective measures alternative(s) which are most effective at performing their intended functions and maintaining the performance over extended periods of time shall be given preference;

b. Reliability - corrective measures alternative(s) which do not require frequent or complex operation and maintenance activities and that have proven effective under waste and facility conditions similar to those anticipated shall be given preference;

c. Implementability - corrective measures alternative(s) which can be constructed and operating to reduce levels of contamination to attain or exceed applicable cleanup standards in the shortest period of time shall be preferred; and

d. Safety - corrective measures alternative(s) which pose the least threat to the health, safety, and welfare of nearby residents and environments, as well as workers, during implementation shall be preferred.

2. Environmental

The corrective measures alternative(s) posing the least adverse impact (or greatest improvement) over the shortest period of time on the environment shall be favored.

3. Human Health, Safety, and Welfare

The corrective measures alternative(s) shall comply with existing federal and state standards for the protection of human health, safety, and welfare. Corrective measures alternative(s) which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time shall be preferred.

4. Institutional

The corrective measures alternatives shall comply with applicable institutional requirements.

H. Reporting Requirements

1. Provisions for the submittal of periodic progress reports which shall, at a minimum, include:

a. A description and estimate of the percentage of the CMS completed;

b. Summaries of all findings, including the results of any pilot studies;

c. Summaries of all changes made in the CMS during the reporting period;

d. Summaries of all contacts with representatives of the local community, public interest groups, or state government during the reporting period;

e. Summaries of all contacts made regarding access to off-site property;

f. Summaries of all problems or potential problems encountered during the reporting period;

g. Actions being taken to rectify problems;

h. Changes in relevant personnel during the reporting period;

i. Projected work for the next reporting period; and

j. Copies of daily reports, inspection reports, laboratory and monitoring data, etc.

2. An outline of the contents of the CMS final report. The CMS final report shall include the following:

a. An updated description of the findings of the RFI, highlighting the nature and extent of the contamination as documented by the RFI final report;

b. Recommended media cleanup standards for corrective measures for each waste management unit at the facility;

c. A summary of the results of the screening of corrective measures alternative(s);

d. A description of the evaluation of corrective measures alternative(s) using the criteria in Section I.F. of this attachment. The description shall include summary tables which allow the corrective measures alternative(s) to be understood easily. Comparisons of health risks, environmental effects, and other pertinent factors among the corrective measures alternative(s) evaluated shall be highlighted. Information on all evaluated potential corrective measures alternative(s) shall also be presented;

e. A description and justification of the recommended corrective measures for each waste management unit at the facility, including recommended media cleanup standards that can be achieved by the corrective measures alternative(s), using the criteria in Section I.G. of this attachment;

f. A description of design and implementation considerations for the recommended corrective measures, including:

(1) Special technical problems;

(2) Additional engineering data required;

(3) Permits and regulatory requirements;

(4) Access, easements, rights-of-way;

(5) Health and safety requirements;

(6) Community relations activities; and

(7) Long-term monitoring requirements to assess attainment of media cleanup standards (including ecological integrity).

g. The preliminary cost estimates and supporting documentation for the recommended corrective measures alternative(s), including;

(1) Capital cost estimates; and

(2) Dperation and maintenance cost estimates.

h. Projected schedule for implementation of the recommended corrective measures alternative(s).

I. Schedule for Completion of the CMS

The CMS Work Plan shall include a schedule for completion of all tasks described in Section I of this attachment.

II. TASK II: CMS IMPLEMENTATION

The CMS shall be implemented in accordance with the terms and schedules in the CMS Work Plan, as approved by the Department.

III. TASK III: CMS REPORTING

A. The licensee shall prepare and submit progress reports in accordance with the requirements of Section I.H. of this attachment and Conditions VI.F.6. and VI.J. of the license.

B. The licensee shall prepare and submit a CMS final report in accordance with the requirements of Section I.H. of this attachment and Conditions VI.F.4., VII.F.5., and VI.J. of the license.

ATTACHMENT 17

CORRECTIVE MEASURES IMPLEMENTATION

ATTACHMENT 17

CORRECTIVE MEASURES IMPLEMENTATION

Michigan Disposal Waste Treatment Plant
Belleville, Michigan

MID 000 724 831

PURPOSE

The corrective action requirements for the licensee are specified in Part VI of the license. The purpose of Corrective Measures Implementation (CMI) is to design, construct, operate, refine, maintain, and monitor the performance of the corrective measures approved by the Department to protect human health, safety, and welfare, and the environment from releases of contaminants from any waste management units at the facility. The CMI shall include the development and implementation of several plans which require concurrent preparation. It may be necessary to revise the plans as the work is performed to accommodate facility-specific needs.

SCOPE

The CMI consists of three tasks:

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I. TASK I: CMI WORK PLAN

The licensee shall prepare a CMI Work Plan. The CMI Work Plan shall include the following:

A. Program Management Plan

The CMI Work Plan shall include a Program Management Plan which provides a summary of the project and its objectives, and documents the overall management strategy for performing the design, construction, operation, maintenance, and monitoring of corrective measures. The Program Management Plan shall document the responsibility and authority of all organizations and key personnel involved with the CMI. The Program Management Plan shall include:

1. A personnel organizational chart and description of the responsibilities and qualifications of key personnel directing the CMI, including contractor personnel;

2. Provisions for submittal of periodic progress reports during the construction phase and semi-annual progress reports for operation and maintenance (D&M) activities. The progress reports shall, at a minimum, include:

a. A description and estimate of the percentage of the CMI completed;

b. Summaries of all findings;

c. Summaries of all changes made in the CMI during the reporting period;

d. Summaries of all contacts with representatives of the public or state government regarding the CMI during the reporting period;

e. Summaries of all significant problems or potential problems encountered during the reporting period;

f. Actions being taken to rectify problems;

g. Changes in personnel during the reporting period;

h. Projected work for the next reporting period; and

i. Copies of daily reports, inspection reports, laboratory and monitoring data, etc.

B. Design Plans and Specifications

The CMI Work Plan shall include clear and comprehensive design plans and specifications to implement corrective measures at the facility, as defined in the Corrective Measure Study (CMS). The design plans and specifications shall include:

1. Discussion of the design criteria, including specific performance requirements for each major component of the corrective measures and the overall corrective measures;

2. Discussion of the design strategy and the design basis, including:

   a. Compliance with all applicable and relevant environmental and public health standards; and

   b. Minimization of negative environmental and public impacts.

3. Discussion of any additional technical factors of importance, including:

   a. Use of currently acceptable environmental control measures and technology;

   b. The constructability of the design; and

   c. Use of currently acceptable construction practices and techniques.

4. Description of assumptions made and detailed justification of these assumptions;

5. Discussion of the possible sources of error and reference to possible operation and maintenance problems;

6. Detailed plans, diagrams, and drawings, including the following, as applicable:

   a. General site plans;

   b. Process flow diagrams, both qualitative and quantitative;

   c. Structural drawings, including plan views, elevations, sections, and supplementary views;

   d. Piping and instrumentation;

   e. Mechanical drawings;

   f. Electrical drawings;

   g. Site preparation and field work standards;

   h. Equipment lists; and

   i. Detailed specifications for equipment and materials.

   General correlation between plans, diagrams, and drawings, and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the technical specifications, the licensee shall coordinate and cross-check the specifications and plans, diagrams and drawings.

7. Tables listing equipment and specifications;

8. Tables giving material and energy balances; and

9. Appendices, including:

   a. Tabulations of significant design data used in design effort;

   b. Sample calculations (present and explain one example for significant or unique design calculations);

   c. Derivation of equations essential to understanding the report; and

   d. Results of laboratory and field tests.

C. Construction Plan

The CMI Work Plan shall include a Construction Plan based on the final design plans. The Construction Plan shall include:

1. A Construction Quality Assurance (CQA) Program to ensure, with a reasonable degree of certainty, that completed corrective measures meet or exceed all design criteria, plans, and specifications;

2. A description of all inspection activities, including observations and tests, that will be used to monitor the construction and installation of the components of the corrective measures,

and verify compliance with all environmental and health and safety requirements. The plan shall include the scope and frequency of each type of inspection. The inspections shall include, but not be limited to, pre-construction inspections, air quality and emissions monitoring records inspections, waste disposal records inspections, and final walk-through inspection of the project site;

3. A quality assurance/quality control (QA/QC) plan for all of the sampling and monitoring activities needed for QA/QC control or other construction related purposes. The QA/QC plan shall include the sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems;

4. Reporting requirements for construction activities. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, and final documentation. Provisions for the evaluation, documentation, and final storage of all records shall also be specified;

5. Procedures to address the need for changes to the design or specifications to address unforeseen problems encountered in the field, including provisions for notifying the Department;

6. Provisions for notification of the Department in the event of a construction emergency, including verbal notification within 24 hours of the event, followed by written notification within five days of the event. The written report shall specify the nature of the emergency, the response action, and potential impacts to human health, safety, and welfare, and the environment; and

7. Procedures to be implemented if unforeseen events prevent the corrective measures construction, including provisions for notifying the Department.

D. Operation and Maintenance Plan

The CMI Work Plan shall include an O&M Plan to cover both implementation and long-term maintenance and monitoring of the corrective measures. The O&M Plan shall include:

1. A description of the training process for O&M personnel. The description shall include the technical specifications for treatment systems, the contractor requirements for providing appropriate service visits to supervise the installation, adjustment, start-up, and operation of treatment systems, and training covering operational procedures once the start-up has been successfully accomplished;

2. A description of system start-up procedures, including any operational testing;

3. A description of normal O&M procedures, including tasks for operation, tasks for maintenance, prescribed treatment or operation conditions, and a schedule showing the frequency of each O&M task;

4. A description of routine sampling, monitoring, and laboratory testing to ensure effective operation and maintenance of the corrective measures and the required QA/QC;

5. A description of the equipment, including equipment specifications, monitoring components, maintenance requirements, and replacement schedule for equipment and installed components;

6. A description of the process and criteria for determining when corrective measures have achieved goals and when maintenance and monitoring may cease;

7. A description and analysis of potential operating problems and system breakdowns, including sources of information regarding problems, and common and/or anticipated remedies. In the event of a major breakdown and failure of the corrective measures, verbal notification to the Department is required within 24 hours of the event, followed by written notification within five days of the event. The written report shall specify the nature of the emergency, the response action, and potential impacts to human health, safety, and welfare, and the environment;

8. A description of alternate O&M procedures to be implemented in the event of failure of the corrective measures to prevent a release or threatened release of contaminants which may endanger human health, safety, or welfare, or the environment, or which may exceed the applicable cleanup standards; and

9. The records and reporting mechanisms required, including:

   a. Daily operating logs;

   b. Monitoring and laboratory data;

   c. Maintenance and inspection records;

   d. Records for operating costs;

   e. Personnel records;

   f. Mechanism for reporting emergencies; and

   g. Progress reports.

E. Waste Management

A description of the wastes generated by the construction, operation, and maintenance of the corrective measures and how the wastes will be managed shall be included in the CMI Work Plan. Site drainage and how the runoff will be managed shall also be addressed.

F. Other Information

1. A list and description of permits needed to construct and operate the corrective measures shall be included in the CMI Work Plan; and

2. A list of any elements or components of the corrective measures that require custom fabrication or for other reasons are considered long-term procurement items shall be included in the CMI Work Plan. The list shall include the reason that the items are considered long-term procurement items, the length of time for procurement, and the sources of procurement.

G. Project Schedule

A Project Schedule for construction and implementation of the corrective measures which identifies timing for initiation and completion of all project and interim milestones in the CMI process, including submission dates for all CMI deliverables, dates that all necessary permit applications will be submitted to the appropriate agencies and the estimated issuance dates, and the timing of key elements of bidding process, shall be included in the CMI Work Plan.

H. Cost Estimate

A detailed written estimate of the costs to construct and implement the corrective measures shall be included in the CMI Work Plan. The cost estimate developed in the CMS shall be refined to reflect the final design plans and specifications. The cost estimate shall include both capital and operation and maintenance costs.

I. Health and Safety Plan

The licensee shall modify the Health and Safety Plan developed for the RCRA Facility Investigation (RFI), as necessary, to address activities to be performed at the facility to construct, operate, and maintain the corrective measures, and include it in the CMI Work Plan. The updated Health and Safety Plan shall provide information regarding hazard assessment, including inhalation, dermal, ingestion, and physical hazards, personal protective and monitoring equipment, a map of the facility denoting the CMI work areas and associated levels of personal protection required, a list of the emergency contacts and phone numbers, and a map denoting the locations of the facilities providing emergency services. Health and safety issues in the event of a failure of the corrective measures shall also be addressed.

J. Public Involvement Plan

The licensee shall revise the Public Involvement Plan developed during the RFI to include any changes with respect to the public's informational needs during the design and construction activities, and include it in the CMI Work Plan. The Public Involvement Plan shall address specific public involvement activities that will be conducted, including a schedule for the activities.

1. Specific public involvement activities which shall be conducted during the design stage of the CMI include:

   a. Revision of the Public Involvement Plan to reflect public concerns and involvement at this stage of the process; and

   b. Preparation and distribution of a public notice and an updated fact sheet at the completion of the engineering design process.

2. Depending on public interest in a facility at this point in the process, specific public involvement activities which may be conducted during the construction stage of the CMI could include open houses, group meetings, fact sheets on the technical status of the CMI, and maintenance of a public information repository.

K. Report Outlines

The CMI Work Plan shall include an outline of the contents of the Construction Completion Report and the CMI Final Report.

1. The Construction Completion Report shall include the following:

   a. Synopsis of the corrective measures and design criteria, and certification that the corrective measures were constructed in accordance with the approved design plans and specifications;

   b. Listing of the performance criteria, established before the corrective measures were initiated, for judging the functioning of the corrective measures.

   c. Explanation and description of any modifications to the plans, specifications, or performance criteria, and why these were necessary for the project;

   d. Results of operational testing and monitoring, indicating how the initial operation of the corrective measures will meet or exceed the performance criteria;

   e. Summary of significant activities that occurred during construction, including a discussion of problems encountered and how the problems were addressed;

   f. Summary of any inspection findings, including copies of pertinent daily inspection documents, inspection summary reports, and the design engineer's acceptance reports (all of which may be placed in an appendix to Construction Completion Report);

   g. As-built drawings and photographs; and

   h. Schedule indicating when any treatment systems will begin full-scale operation.

2. The CMI Final Report shall include the following:

   a. Synopsis of the corrective measures;

   b. Description of the process and criteria for determining when corrective measures, maintenance, and monitoring, may cease.

   c. Demonstration that the corrective measures completion criteria have been met. The demonstration shall include the results of testing or monitoring indicating how the operation of the corrective measures compares to the corrective measures completion criteria;

   d. Summary of work accomplishments, including performance levels achieved, total hours of treatment operation, total volume of material treated or excavated, nature and volume of waste generated;

e. Summary of significant activities that occurred during operation, including discussion of problems encountered and how the problems were addressed;

f. Summary of inspection findings, including copies of pertinent inspection documents (may be placed in an appendix to the Final CMI Report); and

g. Summary of the total O&M costs.

II. TASK II: CMI IMPLEMENTATION

The licensee shall construct, implement, and operate the corrective measures in accordance with the terms and schedules in the CMI Work Plan, as approved by the Department.

III. TASK III: CMI REPORTING

A. The licensee shall prepare and submit progress reports in accordance with the requirements of Section I.A.2. of this attachment and Conditions VI.G.9. and VI.J. of the license.

B. The licensee shall prepare and submit a Construction Completion Report in accordance with Section K.1. of this attachment and Conditions VI.G.4., VI.G.5., and VII.J. of the license.

C. The licensee shall prepare and submit a CMI Final Report in accordance with Section K.2. of this attachment and Conditions VI.G.7., VI.G.8., and VI.J. of the license.

DEQ

State of Michigan
Department of Environmental Quality
HAZARDOUS WASTE MANAGEMENT FACILITY OPERATING LICENSE

NAME OF LICENSEE: Michigan Disposal Waste Treatment Plant

NAME OF OWNER: EQ - The Environmental Quality Company

NAME OF OPERATOR: EQ - The Environmental Quality Company

NAME OF TITLEHOLDER OF LAND: Wayne Disposal, Incorporated

FACILITY NAME: Michigan Disposal Waste Treatment Plant

FACILITY LOCATION: 49350 North I-94 Service Drive
Belleville, Michigan 48111

EPA IDENTIFICATION NUMBER: MID 000 724 831 EFFECTIVE DATE: September _, 1999

REAPPLICATION DATE: March __, 2004 EXPIRATION DATE: September __, 2004

AUTHORIZED ACTIVITIES

Pursuant to Part 111 of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), being §§324.11101 to 324.11152 of the Michigan Compiled Laws, and the hazardous waste management administrative rules (hereafter called the "rules") promulgated thereunder, being R 299.9101 et. seq. of the Michigan Administrative Code, by the Michigan Department of Environmental Quality (MDEQ), an operating license (hereafter called the "license") is issued to Michigan Disposal Waste Treatment Plant (MDWTP) (hereafter called the "licensee") to operate a hazardous waste storage and treatment facility located in Belleville, Michigan, at latitude 42°13'30"N and longitude 083°31'00"W. The licensee is authorized to conduct the following hazardous waste management activities:

☒ STORAGE	☒ TREATMENT	☐ DISPOSAL	☐ POST CLOSURE
☒ Container	☒ Container	☐ Landfill	☐ Tank
☒ Tank	☒ Tank	☐ Land Application	☐ Surface Impoundment
☐ Waste Pile	☐ Surface Impoundment	☐ Surface Impoundment	☐ Landfill
☐ Surface Impoundment	☐ Incinerator		☐ Waste Pile
☐ Drip Pad	☐ Other:		

APPLICABLE REGULATIONS AND LICENSE APPROVAL

The conditions of this license were developed in accordance with the applicable provisions of the rules, effective September 22, 1998. The licensee shall comply with all terms and conditions of this license. This license consists of the ____ pages of conditions attached hereto (including those in any Attachments 1 through 17) and the applicable regulations contained in R 299.9101 through R 299.11008 as specified in the license. For purposes of compliance with this license, applicable rules are those which are in effect on the date of issuance of this license in accordance with R 299.9521(3)(a).

This license is based on the information submitted in the license application submitted on March 15, 1995 and any subsequent amendments (hereafter referred to as "the application"). Pursuant to R 299.9519(11)(c), the license may be revoked if the licensee fails, in the application or during the license issuance process, to disclose fully all relevant facts or, at any time, misrepresents any relevant facts. As specified in R 299.9519(1), the facility shall be constructed, operated, and maintained in accordance with Part 111 of Act 451, the rules, and this license.

This license is effective on the date of issuance and shall remain in effect for five years from the date of issuance, unless revoked pursuant to R 299.9519 or continued in effect as provided by the Michigan Administrative Procedures Act, 1969 PA 306, as amended (Act 306).

Issued this __ day of September, 1999

by _____
Jim Sygo, Chief

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MICHIGAN DISPOSAL WASTE TREATMENT PLANT
MID 000 724 831

HAZARDOUS WASTE MANAGEMENT FACILITY OPERATING LICENSE

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PART I

STANDARD CONDITIONS

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Throughout this license, "Act 451" means Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and "rules" means the hazardous waste management administrative rules promulgated pursuant to Part 111, Hazardous Waste Management, of Act 451, as in effect on the date of issuance of this license. The term "Waste Management Division" means the division within the Michigan Department of Environmental Quality (MDEQ) responsible for administering Part 111 of Act 451 and the rules. Throughout this license, "Director" means the Director of the MDEQ or the Director's duly authorized designee such as the Chief of the Waste Management Division of the MDEQ.

B. EFFECT OF LICENSE

Except as otherwise provided by law, any treatment, storage, or disposal of hazardous waste not specifically authorized in this license is prohibited. Issuance of this license does not convey property rights of any sort or any exclusive privilege {R 299.9516(7) and 40 Code of Federal Regulations (CFR) §270.30(g), which is adopted by reference (ABR) in R 299.11003}; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of federal, state, or local law or regulations {R 299.9516(8)}; nor does it obviate the necessity of obtaining such permits or approvals from other units of government as may be required by law. Compliance with the terms of this license does not constitute a warranty or representation of any kind by the MDEQ, nor does the MDEQ intend that compliance with this license constitutes a defense to any order issued or any action brought under Act 451 and any other applicable state statute and Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) {42 USC 9606(a)}, the Resource Conservation and Recovery Act of 1976, as amended (RCRA), and its rules, and any other applicable federal statute. The licensee, however, does not represent that it will not argue that compliance with the terms of this license may be a defense to such future regulatory actions. Each attachment to this license is a part of, and is incorporated into, this license and is deemed an enforceable part of the license.

C. LICENSE ACTIONS

This license may be modified or revoked in accordance with R 299.9519. The filing of a request for a license modification or revocation, or the notification of planned changes or anticipated noncompliance on the part of the licensee does not stay the applicability or enforceability of any license condition. {R 299.9519, R 299.9521(1)(a) and 40 CFR §270.30(f), which is ABR in R 299.11003}

D. SEVERABILITY

The provisions of this license are severable, and if any provision of this license, or the application of any provision of this license to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this license shall not be affected thereby.

E. **RESPONSIBILITIES**

1. The licensee shall comply with Part 111 of Act 451, the rules, and all conditions of this license, except to the extent authorized by the MDEQ pursuant to the terms of an emergency operating license. {R 299.9521(1)(a) and (3)(a) and (b), and 40 CFR §270.30(a), which is ABR in R 299.11003}

   (a) Duty to Reapply. If the licensee wishes to continue an activity regulated by this license after the expiration date of this license, the licensee shall submit a complete application for a new license to the Chief of the Waste Management Division at least 180 days before this license expires, September [redacted], 2004, unless an extension is granted pursuant to R 299.9510(5). {R 299.9521(1)(a) and (c) and (3)(a), and 40 CFR §270.30(b), which is ABR in R 299.11003}

   (b) License Expiration. To the extent consistent with Section 91(2) of Act 306, this license and all conditions herein will remain in effect beyond the license expiration date if the licensee has submitted a timely, complete application and the Chief of the Waste Management Division has not issued a new license. {Section 91 of Act 306, R 299.9521(1)(c) and (3)(a)

   (c) Inspection and Entry. The licensee shall allow the Chief of the Waste Management Division, or any authorized representative, including, but not limited to, a contractor, upon the presentation of credentials and other documents as may be required by law, to sample or monitor, at reasonable times, any substances or parameters at any location for the purpose of determining:

      (i) Whether the management of hazardous waste may present an imminent and substantial hazard to the health of persons or to the natural resources, or is endangering or causing danger to public health or the environment;

      (ii) Whether cause exists for an enforcement action, license revocation, license modification, denial of a license renewal application, or to determine compliance with this license.

      If samples are taken for analysis, duplicate samples and a copy of the analytical results shall be furnished to the licensee upon request.

      {Sections 11146(1) and (2) and 11148(1) of Act 451, R 299.9521(1)(a), and 40 CFR §270.30(i), which is ABR in R 299.11003}

   (d) Specific Monitoring Requirements. The Chief of the Waste Management Division reserves authority to require specific monitoring for hazardous wastes or hazardous waste constituents, in addition to those requirements detailed in this license, if the Chief of the Waste Management Division finds that additional monitoring is needed to demonstrate compliance with this license, Part 111 of Act 451, and the rules. {R 299.9611(5)}

   (e) Notice of Facility Modifications. The licensee shall give notice to the Chief of the Waste Management Division as soon as possible prior to any planned physical alterations or additions to the licensed facility. {R 299.9519(1)}

   (f) License Amendments for Facility Modifications. The licensee shall request and obtain a license amendment prior to undertaking any modifications to the facility. Except as

otherwise authorized by Part 111 of Act 451 and the rules, the licensee shall obtain a construction permit prior to expanding, enlarging, or altering the facility. {R 299.9501(1), R 299.9519, and R 299.9521(1)(b)(i)}

(g) Submission of Statements and Certifications for Construction and Capability. The licensee shall submit to the Chief of the Waste Management Division, by certified mail or hand delivery, a letter signed by the licensee and a registered professional engineer stating that the facility has been constructed or modified in compliance with the license and approved plans and the certifications of construction and capability required pursuant to Section 11123(3) of Act 451. The licensee shall not treat, store, or dispose of hazardous waste in the modified portion of the facility until one of the following conditions is met:

(i) The Chief of the Waste Management Division, or the authorized representative, has inspected the modified facility and finds it is in compliance with the conditions of the license;

(ii) If within 15 days of the date of submission of the letter in Condition I.E.1.(g) of this license, the licensee has not received notice from the Chief of the Waste Management Division of his or her intent to inspect, prior inspection is waived, and the licensee may commence treatment, storage, or disposal of hazardous waste.

{R 299.9521(1)(b)(ii)}

(h) Anticipated Noncompliance. The licensee shall give advance notice to the Chief of the Waste Management Division as soon as the licensee becomes aware of any planned changes or activity in the licensed facility which may result in noncompliance with license requirements. {R 299.9521(1)(a) and 40 CFR §270.30(l)(2), which is ABR in R 299.11003}

(i) Transfer of License. The licensee shall obtain the approval of the Chief of the Waste Management Division, by a modification to the license, prior to transferring ownership or operation of the facility to another person. In addition, the licensee shall comply with the requirements of R 299.9605 when transferring the ownership of the facility. The new owner/operator shall not accept hazardous waste at the facility unless the license modification has been issued by the Chief of the Waste Management Division. {R 299.9522}

(j) Other Information. Whenever the licensee becomes aware that he/she failed to submit any relevant facts in the license application, or submitted incorrect information in a license application or in any report to the Chief of the Waste Management Division, the licensee shall promptly submit such facts or information. {R 299.9521(1)(a) and 40 CFR §270.30(l)(11), which is ABR in R 299.11003}

2. The licensee shall comply with the requirements of 40 CFR §270.30(c)-(e) and (h)-(j), including those requirements pertaining to:

(a) Need to halt or reduce activity not a defense,

(b) Duty to mitigate,

(c) Proper operation and maintenance,

(d) Duty to provide information,

(e) Inspection and entry,

(f) Monitoring and records.

{R 299.9521(1)(a) and 40 CFR §270.30(c)-(e) and (h)-(j), which are ABR in R 299.11003}

3. Any license noncompliance, except to the extent authorized by the MDEQ pursuant to the terms of an emergency operating license, constitutes a violation of Part 111 of Act 451 and is grounds for enforcement action, license revocation, license modification, or denial of a license renewal application. {R 299.9521(1)(a) and 40 CFR §270.30(a), which is ABR in R 299.11003}

F. SIGNATORY REQUIREMENT

The licensee shall ensure that all reports required by this license or other information requested by the Chief of the Waste Management Division, or authorized representative, are signed and certified in accordance with R 299.9610(4), by a responsible corporate officer, as defined in 40 CFR §270.11, which is ABR in R 299.11003. {R 299.9521(1)(a) and 40 CFR §270.30(k), which is ABR in R 299.11003}

G. SUBMITTAL DUE DATES AND DEADLINES

When the due date or deadline for submission of applications, reports, records, and monitoring results required under this license falls on a weekend or legal state holiday, the due date or deadline shall be extended to the next regular business day, and reports, records, and monitoring results shall be considered submitted on a timely basis if submitted by the next regular business day. This extension does not apply to the submittal due date or deadline for financial mechanisms, and associated renewals, replacements, and continuations of financial mechanisms required under this license.

The licensee may request extension of the due dates or deadlines for submittals required under this license. The licensee shall submit such requests at least five business days prior to the existing due date or deadline for review and approval by the Chief of the Waste Management Division. Written extension requests shall include justification for each extension. {R 299.9521(3)(a)}

PART II

GENERAL OPERATING CONDITIONS

A. DESIGN AND OPERATION OF FACILITY

The licensee shall maintain and operate the facility to minimize the possibility of a fire, explosion, or any sudden or non-sudden release of hazardous waste or hazardous waste constituents to the environment, including air, soil, or waters of the State which could threaten human health or welfare or the environment. {R 299.9602, R 299.9606, R 299.9607, and 40 CFR §§264.31 and 264.51, which are ABR in R 299.11003}

B. REQUIRED NOTICE

1. The licensee shall notify the Chief of the Waste Management Division in writing at least four weeks in advance of the date the licensee expects to receive hazardous waste from a foreign source. Notice of subsequent shipments of the same waste from the same foreign source is not required. When receiving such hazardous waste, the licensee shall comply with applicable laws, including, but not limited to, any treaties or other agreements entered into between the country in which the foreign source is located and the United States. {R 299.9605(1) and 40 CFR §264.12(a), which is ABR in R 299.11003}

2. When the licensee is to receive hazardous waste from an off-site source (except where the licensee is also the generator), he must inform the generator in writing that he has the appropriate license for, and will accept, the waste the generator is shipping. The licensee must keep a copy of this written notice as part of the operating record (see Condition II.L.1. of this license). {R 299.9605(1) and 40 CFR §264.12(b), which is ABR in R 299.11003}

C. GENERAL WASTE ANALYSIS

1. The licensee shall ensure that any waste stored, treated, or disposed at the facility has been properly characterized pursuant to R 299.9302, and comply with the procedures described in the attached waste analysis plan, Attachment 1 of this license, and the following conditions which modify the referenced sections in Attachment 1:

   (a) All combustible containers, supports, and packaging not integral to waste or reagent packaging and added to a batch treatment process shall be recorded on the batch ticket. The batch ticket is a log used to document the description and quantity of waste and reagents in a batch treatment process. The licensee shall add to each mock compatibility test tank at least one percent combustible materials to simulate the containers, supports and packagings that are integral to waste and reagent packagings. The licensee shall record and maintain the results of the laboratory simulations in accordance with Condition II.L.1 of this license. [Section 3.2.3]

   (b) Wastes that are bulked and mixed, excluding empty containers, site generated debris or closed and intact containers of non-hazardous waste, shall be subjected to the same compatibility and waste code evaluations as applied to wastes that are mixed in the treatment tanks. Waste treatment shall only be conducted in accordance with the procedures specific in Conditions III.C. and IV.C. of this license. [Section 3.3.2]

   (c) The sampling techniques described herein are performed in accordance with the techniques outlined in US EPA's SW-846. [Section 6.1]

(d) All sampling equipment used in the collection of waste samples shall either be disposable (i.e., scoops or drum thieves) or sufficiently cleaned to remove observable contamination prior to sampling prior to reuse. [Section 6.4]

(e) The compatibility test as described in Appendix B of the waste analysis plan shall be modified pursuant to Condition VII.B. of this license. Upon receipt of written approval, the compatibility test workplan shall become a part of the waste analysis plan, Attachment 1 of this license, and an enforceable part of this license. [Appendix B]

{R 299.9605(1), and 40 CFR §264.13, which is ABR in R 299.11003}

D. QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

The licensee shall ensure that all samples collected for the purposes of waste characterization and environmental monitoring are collected, transported, analyzed, stored, and disposed of by trained and qualified individuals in accordance with their Quality Assurance/Quality Control (QA/QC) Plan. The QA/QC Plan shall at a minimum include the written procedures outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. Environmental Protection Agency (U.S. EPA) Publication SW-846, Third Edition, Chapter 1, and its Updates I (July 1992), II (September 1994), IIA (August 1993), and IIB (January 1995), and any facility or contractor's written standard operating procedures (SOPs) which are equivalent or more stringent than SW-846, Chapter 1. The licensee shall make the written QA/QC Plan available to the Chief of the Waste Management Division or an authorized representative upon request. {R 299.9521(3)(a) and (b) and R 299.9611(2)}

E. SECURITY

The licensee shall comply with the security requirements of R 299.9605(1) and 40 CFR §264.14, which is ABR in R 299.11003.

F. GENERAL INSPECTION REQUIREMENTS

1. The licensee shall inspect the hazardous waste management facility, remedy any deterioration or malfunction of equipment or structures, and document inspections and remedies in accordance with the attached inspection schedule, Attachment 2 of this license, and the provisions of 40 CFR §264.15 which is ABR in R 299.11003. {R 299.9605(1)}

2. The licensee shall develop and implement a procedure to ensure compliance with the requirements of R 299.9605(2).

G. **PERSONNEL TRAINING**

The licensee shall conduct personnel training as required by R 299.9605(1) and 40 CFR §264.16, which is ABR in R 299.11003. This training program shall, at a minimum, cover all items in the attached outline, Attachment 3 of this license. The licensee shall maintain training documents and records as required by R 299.9605 and 40 CFR §264.16(d), which is ABR in R 299.11003.

H. **PREPAREDNESS AND PREVENTION**

The licensee shall comply with the preparedness and prevention requirements of R 299.9606, including, but not limited to, required equipment, testing, and maintenance of equipment, access to communications and alarm systems, required aisle space, and arrangements with emergency response teams. {R 299.9606 and 40 CFR Part 264, Subpart C, which is ABR in R 299.11003}

I. **CONTINGENCY PLAN**

The licensee shall comply with the contingency plan requirements of R 299.9607. The contingency plan, Attachment 4 of this license, and the prescribed emergency procedures shall be immediately implemented by the licensee whenever there is a fire, explosion, or other release of hazardous waste or hazardous waste constituents which threatens or could threaten human health or the environment, or if the licensee has knowledge that a spill has reached surface water or groundwater. {R 299.9607 and 40 CFR Part 264, Subpart D, which is ABR in R 299.11003}

J. **DUTY TO MITIGATE**

Upon notification from the Chief of the Waste Management Division or his or her designee that an activity at the facility may present an imminent and substantial endangerment to human health or the environment the licensee shall immediately comply with an order issued by the Chief of the Waste Management Division pursuant to Section 11148(1) of Act 451 to halt such activity and conduct other activities as required by the Chief of the Waste Management Division to eliminate the said endangerment. The licensee shall not resume the halted activity without the prior written approval from the Chief of the Waste Management Division. {Section 11148 of Act 451 and R 299.9521(3)(b)}

K. **MANIFEST SYSTEM**

1. The licensee shall comply with the manifest requirements of R 299.9304, R 299.9305, and R 299.9608.

2. The licensee shall follow the MDEQ, Waste Management Division, rejected load procedures included in waste analysis plan, Attachment 1 of this license.

L. **RECORDKEEPING AND REPORTING**

1. Operating Record. The licensee shall maintain a written operating record at the facility, until closure of the facility. {R 299.9609 and 40 CFR §264.73 and Part 264, Appendix I, which are ABR in R 299.11003}

2. Biennial Report. The licensee shall comply with the biennial report requirements of R 299.9610. A single copy of the biennial report shall be submitted to the Chief of the Waste Management Division by March 1 of each even numbered year. {R 299.9521(1)(a) and R 299.9610 and 40 CFR §270.30(l)(9), which is ABR in R 299.11003}

3. Monthly Report. The licensee shall comply with the monthly reporting requirements of R 299.9610(3) for waste shipped to the Wayne Disposal, Inc. facility. The monthly report shall be submitted on a form provided by the Chief of the Waste Management Division, or an equivalent form which has been approved by the Chief of the Waste Management Division.

4. Environmental Monitoring Reports. The licensee shall submit the results of all environmental monitoring required by this license in the form of an Environmental Monitoring Report to the Chief of the Waste Management Division within 60 days after sample collection. In addition, the licensee shall submit air monitoring results to the Wayne County Department of Environment, Air Quality Management Division. {R 299.9521(1)(a) and 40 CFR §270.30(l)(4), which is ABR in R 299.11003}

5 Environmental Monitoring Data Availability. The licensee shall provide environmental monitoring information or data which it generates to any local public official requesting such information or data. Such information or data shall be made available on the same day the licensee forwards this information to the Chief of the Waste Management Division. {R 299.9521(3)(b)}

6. Additional Environmental Sampling and Analysis. If the licensee conducts any additional environmental sampling or analysis beyond that required by this license, the results of such sampling or analysis shall be reported in accordance with Condition II.L.4. of this license. Such increased frequency shall also be indicated in the Environmental Monitoring Report. {R 299.9521(3)(a), R 299.9521(1)(a) and 40 CFR §270.30(l)(4), which is ABR in R 299.11003}

7. Reporting of Noncompliance. The licensee shall immediately report to the Chief of the Waste Management Division any noncompliance with the license that may endanger human health or the environment. The licensee shall fulfill this reporting requirement by doing both of the following:

(a) The licensee shall immediately contact the Chief of the Waste Management Division at 517-373-2730, if the noncompliance occurs during the period 8:00 a.m. to 5:00 p.m., Monday through Friday, except State holidays, or by calling the Department of Environmental Quality Pollution Emergency Alerting System (PEAS) telephone number 1-800-292-4706 during all other times. This report shall include the following:

(i) Information concerning the release or discharge of any hazardous waste or hazardous waste constituent which may endanger public drinking water supplies or the environment;

(ii) Information concerning the fire, explosion, or other release or discharge of any hazardous waste or hazardous waste constituent which could threaten human health or the environment or a spill that has reached surface water or groundwater;

(iii) A description of the occurrence and its cause, including all of the information outlined in R 299.9607(2)(a)-(i).

(b) The licensee shall also follow-up the verbal report by providing a written report to the Chief of the Waste Management Division within five days after the time the licensee becomes aware of the circumstances. The written report shall contain all of the information in Condition II.L.7.(a)(i)-(iii) of this license along with a description of the noncompliance and its cause; the periods of noncompliance (including exact dates and times); whether the noncompliance has been corrected and, if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance and when those activities occurred or will occur. The licensee need not comply with the five-day written notice requirement if the Chief of the Waste Management

Division waives the requirement and the licensee submits a written report containing this information within 15 days after the time the licensee becomes aware of the circumstances.

{R 299.9521(1)(a) and R 299.9607 and 40 CFR §270.30(l)(10), which is ABR in R 299.11003}

7. Other Noncompliance. The licensee shall report all other instances of noncompliance with this license, Part 111 of Act 451, the rules, and any other applicable environmental laws or rules that apply to the licensed facility, at the time monitoring reports required by this license are submitted or within 30 days, whichever is sooner. The reports shall contain the information listed in Condition I.L.7. of this license. {R 299.9521(1)(a) and 40 CFR §270.30(l)(10), which is ABR in R 299.11003}

8. Form Modification. The licensee may make minor modifications to the forms contained in the attachments to this license. The modifications may include changing the format, updating existing references and information, adding necessary information, and changing certification and notification information in accordance with Part 111 of Act 451 and its rules, and RCRA and its regulations. The licensee shall submit the modifications to the Chief of the Waste Management Division prior to implementing the use of the modified form(s). If the Chief of the Waste Management Division does not reject or require revision of the modified form(s) within 14 days after receipt, the licensee shall implement use of the modified form(s) and the form(s) shall be incorporated into this license as a replacement for the existing form(s).

M. CLOSURE

The licensee shall comply with the closure requirements of R 299.9613, including, but not limited to, performance standards, amendment of closure plans, notification of closure, time allowed for closure, disposal or decontamination of equipment, and certification of closure. The licensee shall close the facility in accordance with the closure plan, Attachment 5 of this license, all other applicable requirements of this license, and all other applicable laws. The licensee shall submit a proposed amended copy of the closure plan to the Chief of the Waste Management Division at the same time such a license modification is requested. {R 299.9613 and 40 CFR Part 264, Subpart G, except 40 CFR §§264.112(d)(1), 264.115, and 264.120, which is ABR in R 299.11003}

N. COST ESTIMATE FOR FACILITY CLOSURE

1. At the time of issuance of this license, the closure cost estimate is $939,131.

2. The licensee shall comply with the closure cost estimate requirements of R 299.9702, including, but not limited to, adjustment of the closure cost estimate and maintenance of the latest cost estimate at the facility. {R 299.9702 and 40 CFR §264.142, which is ABR in R 299.11003}.

O. FINANCIAL ASSURANCE FOR FACILITY CLOSURE

1. The licensee shall provide and continuously maintain closure financial assurance in accordance with R 299.9703 in an amount at least equal to the cost estimate required by Condition II.N. of this license. The licensee shall submit all proposed changes in the mechanism(s), other than renewals, extensions, or increases in the amount of assurance, to the Chief of the Waste Management Division and obtain his approval prior to implementation. The licensee shall provide the Chief of the Waste Management Division with a signed original of all revisions and renewals within 60 days after such revision or renewal, by the applicable deadlines specified in R 299.9704 through R 299.9709, and prior to the anniversary of the establishment of the financial mechanism(s) provided to satisfy the requirements of this condition.

2. Whenever the current closure cost estimate increases to an amount greater than the current amount of the associated financial mechanism, the licensee shall, within 60 days after the increase, either increase the amount of the mechanism to an amount at least equal to the increased closure cost estimate, or provide an additional financial mechanism approved by the Chief of the Waste Management Division for an amount at least equal to the difference between the current amount of financial assurance and the increased closure cost estimate. Evidence of such increased financial assurance must be submitted to the Chief of the Waste Management Division during the 60-day period.

P. LIABILITY REQUIREMENTS

The licensee shall continuously maintain liability coverage for sudden and accidental occurrences, as required by R 299.9710, except as otherwise allowed by that rule. The licensee shall submit to the Chief of the Waste Management Division a signed original pollution liability insurance amendatory endorsement or other financial mechanism approved by the Chief of the Waste Management Division prior to the anniversary date of the establishment of the mechanism(s) used to satisfy the requirements of this condition. In the case of the financial test or corporate guarantee, the licensee shall submit the updated financial information within 90 days after the close of each succeeding fiscal year.

Q. WASTE MINIMIZATION

The licensee shall certify at least annually that the licensee has a program in place to reduce the volume and toxicity of hazardous waste that the licensee generates to the degree determined by the licensee to be economically practicable; and the proposed method of treatment, storage, or disposal is the practicable method currently available to the licensee which minimizes the present and future threat to human health and the environment. The certification shall be recorded, as it becomes available, and maintained in the operating record until closure of the facility. {R 299.9609(1)(a), 40 CFR §264.73(b)(9), which is ABR in R 299.11003, and Section 3005(h) of RCRA, 42 U.S.C. Section 6925(h)}

R. LAND DISPOSAL RESTRICTIONS

The licensee shall comply with all of the requirements of 40 CFR Part 268. {R 299.9627 and 40 CFR Part 268, which is ABR in R 299.11003}

S. AIR EMISSION STANDARDS

1. The licensee shall notify the Chief of the Waste Management Division of any waste management units which become subject to the requirements of 40 CFR Part 264, Subparts AA and BB, within 30 days of the start of the regulated activity. {R 299.9630, R 299.9631, and 40 CFR Part 264, Subparts AA and BB, which are ABR in R 299.11003}

2. The licensee shall comply with the requirements of 40 CFR Part 264, Subpart CC regarding air emission standards for tanks and containers. {R 299.9634 and 40 CFR Part 264 Subpart CC, which is ABR in R 299.11003}

3. The licensee shall operate the facility in a manner that minimizes odors emanating from the facility and that prevents odors which violate Part 55 of Act 451 and the rules promulgated pursuant to that part. A violation of Part 55 and its rules, including the issuance of a Violation Notice by the Wayne County Department of Environment or MDEQ, is a violation of this condition.

   Upon receipt of a Part 55 Violation Notice from Wayne County Department of Environment or the MDEQ, the licensee shall:

(a) investigate the operations of the facility which caused the violation,

(b) take such actions as may be necessary to eliminate the cause of the violation provided such actions do not otherwise violate the terms and conditions of this license,

(c) determine the changes in operations necessary to prevent a recurrence of the odor violation,

(d) submit a written report to the Chief of the Waste Management Division which documents the results of the investigation and the changes needed in the operations to avoid a recurrence, and

(e) complete such additional steps as the Chief of the Waste Management Division determines are necessary to prevent recurrence of the odor.

Failure to comply with any of these steps is a violation of this license.

{R 299.9521(3)(b) and R 299.9602(1)(b)}.

T. HAZARDOUS WASTE DELIVERY AND ON-SITE WASTE TRANSPORT REQUIREMENTS

1. All deliveries of hazardous waste to the facility shall be made in accordance with the procedures specified in Attachment 6 of this license. {R 299.9521(3)(b)}

2. The licensee shall provide written notification to the transportation companies regularly frequenting the facility that:

   a) Wastes shipped to the facility must be placed into closed containers or covered during transportation. The structural integrity of the waste containers must prevent leakage while in transit.

   b) All trucks transporting hazardous waste to or from the facility shall use Rawsonville Road to enter and exit the facility.

   c) Trucks transporting hazardous waste to or from the facility shall neither park nor stand on the North I-94 Service Drive.

   {R 299.9521(3)(b)}

3. All vehicles transporting or holding hazardous or decharacterized waste or waste constituents, treated or untreated, while at the facility, shall be covered at all times except when sampling, loading, or unloading. The vehicles in question shall only be uncovered no more than 15 minutes before such activities, and shall be covered no more than 15 minutes after such activities.

4. The licensee shall maintain adequate access for ingress and egress to any portion of the facility to allow unobstructed movement of personnel and equipment in case of an emergency. {R 299.9606 and 40 CFR §264.34, which is ABR in R 299.11003}

U. GENERAL HOUSEKEEPING

1. If any visible contamination remains on the exterior of a vehicle, the licensee shall decontaminate that vehicle to prevent the vehicle from tracking the contamination through the facility or outside

the facility. {R 299.9521(3)(b)}

2. The licensee shall remove any spilled or leaked waste at the facility immediately upon detection and manage it in accordance with the requirements of Part 111 of Act 451 and its rules.

V. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The licensee shall maintain at the facility the following documents and amendments required by this license, until closure is completed, certified by an independent registered professional engineer, and the facility is released from financial assurance requirements for closure by the Director:

1. Waste analysis plan, including QA/QC plan.
2. Inspection schedules.
3. Personnel training documents and records.
4. Contingency plan.
5. Closure plan.
6. Cost estimates for facility closure and copies of related financial assurance documents.
7. Operating record.
8. Site security plan.
9. Facility engineering plans and specifications.
10. Recordkeeping procedures.
11. Environmental monitoring plans, including sampling and analysis plans and QA/QC plans.
12. Environmental monitoring data and statistical records.
13. Preventative procedures (personnel protection plan).

{R 299.9521(3)(a)}

PART III
CONTAINER STORAGE AND TREATMENT CONDITIONS

A. COVERAGE OF LICENSE

1. The hazardous waste container storage areas at the facility shown on Drawings entitled Site Plan, Facility Drawing, and S.E. Storage Area are covered by this license. Any expansion or enlargement beyond the facility boundary shown on previously referenced drawings or beyond the 264,300 gallon hazardous waste storage design capacity requires a construction permit from the Chief of the Waste Management Division. {R 299.9521(1)(b)}

2. Drawings entitled Site Plan, Facility Drawing, and S.E. Storage Area are incorporated into this license as part of Attachment 7.

B. WASTE IDENTIFICATION AND QUANTITY

1. The licensee may store no more than a total volume of 264,300 gallons of the hazardous wastes listed in Attachment 8 in containers at the facility, subject to the terms of this license. For the purposes of converting gallons to pounds, the conversion factor shall be 8.34 pounds equal 1 gallon of water. {R 299.9521(2)(d)}

2. A maximum of 82,500 gallons or 1500, 55-gallon container equivalents may be stored in the North Container Storage Area (see figure 1) subject to the terms of this license. {R 299.9521(3)(b)}

3. A maximum of 33,000 gallons or 600, 55-gallon container equivalents may be stored in the East Container Staging Area (see figure 1) subject to the terms of this license. {R 299.9521(3)(b)}

4. The licensee may temporarily store a maximum of 11,000 gallons or 200, 55-gallon contain equivalents of untreated waste or 500 cubic yards of treated waste in the west and east treatment bays (see figure 1), subject to the terms of this license. Containers of untreated waste may be stored in this area for no more than one eight hour shift. {R 299.9521(3)(b)}

5. At no time shall the total number of containers in storage in the North Container Storage Area, the East Container Staging Area, and within the bays of the treatment building exceed a maximum of 82,500 gallons or 1500, 55-gallon container equivalents. {R 299.9521(3)(b)}

6. A maximum of 181,800 gallons or 900 cubic yards of hazardous waste in containers may be stored in the Southeast Container Storage Area (see figure 2) subject to the terms of this license. {R 299.9521(3)(b)}

C. WASTE TREATMENT METHODS

The licensee may treat hazardous debris contaminated with the hazardous waste codes listed in Attachment 8 of this license in macroencapsulation units at the facility, subject to the terms of this license. Placement of hazardous debris directly into a macroencapsulation unit shall occur only inside the treatment building under the confines of the air pollution control equipment. {R 299.9521(2)(d), R 299.9627, and 40 CFR §268.45, which is ABR in R 299.11003}

D. CONDITION OF CONTAINERS

If a container holding hazardous waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the licensee shall either transfer the hazardous waste from such container to a container that is in good condition, place the container of concern into an overpack container, or otherwise

manage the waste in compliance with the conditions of this license. {R 299.9614(1)(a) and 40 CFR §264.171, which is ABR in R 299.11003}

E. **COMPATIBILITY OF WASTE WITH CONTAINERS**

The licensee shall assure that the ability of the containers to contain the waste is not impaired. {R 299.9614 and 40 CFR §264.172, which is ABR in R 299.11003}

F. **MANAGEMENT OF CONTAINERS**

1. The licensee shall keep all containers holding hazardous waste closed during storage except when it is necessary to add or remove waste, and shall not open, handle, or store containers in a manner which may rupture the containers or cause them to leak. {R 299.9614 and 40 CFR §264.173, which is ABR in R 299.11003}

2. The licensee shall ensure that each container of hazardous waste in the container storage area is labeled or clearly marked with the words "Hazardous Waste" and the hazardous waste number, and the date it was accepted for storage so that compliance with the one-year storage limit can be assessed. The labels on each container shall be clearly visible for inspection. {R 299.9521(3)(b), R 299.9614, R 299.9627, and 40 CFR §268.50(a)(2)(i), which is ABR in R 299.11003}

3. The licensee shall not stack containers of hazardous waste unless approved by the Chief of the Waste Management Division. {R 299.9521(3)(b)}

4. The licensee shall not store any container of hazardous waste for more than one year in the container storage areas referenced in Condition III.A. of this license prior to treatment of its contents on site or shipment off-site to another appropriately licensed hazardous waste treatment or disposal facility, except as approved by the Chief of the Waste Management Division based on a petition demonstrating that such storage is solely for the purpose of accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment, or disposal. {R 299.9521(3)(b), R 299.9627, and 40 CFR Part 268, which is ABR in R 299.11003}

5. The licensee shall not store containers holding liquid hazardous waste in the Southeast Container Storage Area unless Conditions VII.A.1.- VII.A.7. of this license are complied with. {R 299.9614 and 40 CFR §264.175, which is ABR in R 299.11003}

6. The licensee shall store containers of treated hazardous or decharacterized waste that meet land disposal restrictions standards only in the North and Southeast Container Storage Areas in compliance with Conditions VII.A.1. - VII.A.7. of this license until such time as the waste is removed for retreatment or disposal off-site.

   The licensee may store containers of treated hazardous or decharacterized waste that meet land disposal restrictions standards in the North and the Southeast Container Storage Areas only when in compliance with Conditions IV.C.8. and 9 of this license. Storage of treated hazardous or decharacterized waste may also occur in the treatment bays in accordance with Condition III.B.4. of this license. {R 299.9602(1)(b) and R 299.9521(3)(b)}

   Decharacterized waste is a characteristic waste as defined by R 299.9212 whose ignitable, corrosive, reactive, or toxic characteristic has been removed through treatment. Any waste that is in compliance with R 299.9203(5) is not subject to regulation as a hazardous waste.

G. **CONTAINMENT**

The licensee shall operate and maintain the containment system in accordance with the requirements of R 299.9614 and 40 CFR §264.175, which is ABR in R 299.11003, and the attached plans and specifications in Attachment 7 of this license.

H. **SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTES**

1. The licensee shall not locate containers holding ignitable or reactive wastes within 15 meters (50 feet) of the facility's property line. {R 299.9614 and 40 CFR §264.176, which is ABR in R 299.11003}

2. The licensee shall take precautions to prevent accidental ignition of ignitable wastes by following the procedures specified in Attachment 9 of this license. {R 299.9605 and 40 CFR §264.17(a), which is ABR in R 299.11003}

3. The licensee shall document compliance with Condition III.H.2. of this license and place this documentation in the operating record (Condition II.L.1. of this license). {R 299.9605 and 40 CFR §264.17(c), which is ABR in R 299.11003}

4. The licensee is prohibited from storing reactive wastes in the hazardous waste container storage areas referenced in Condition III.A. of this license. The licensee may store deactivated reactive waste that does not exhibit the characteristic of reactivity as defined in R 299.9212. {R 299.9521(2)(d) and (3)(b)}]

5. The licensee is prohibited from storing ignitable wastes having a flashpoint less than 90°F. {R 299.9521(2)(d) and (3)(b)}

6. Containers holding ignitable hazardous waste shall be stored only in the North, East, and Southeast Container Storage Areas. Storage of ignitable liquid hazardous waste shall not occur in the Southeast Container Storage Area unless Conditions VII.A.1.- VII.A.7. of this license are complied with.

I. **SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES OR MATERIALS**

1. The licensee is prohibited from placing incompatible wastes or incompatible wastes and materials in the same container. {R 299.9521(2)(d) and (3)(b)}]

2. The licensee shall prevent the placement of hazardous waste in an unwashed container that previously held an incompatible waste or material. {R 299.9614 and 40 CFR §264.177(b), which is ABR in R 299.11003}

3. The licensee shall separate containers of incompatible wastes as required by R 299.9614 and 40 CFR §264.177(c), which is ABR in R 299.11003.

4. The licensee shall document compliance with Conditions III.I.1. and III.I.2. of this license and place this documentation in the operating record (Condition II.L.1. of this license). {R 299.9605 and 40 CFR §264.17(c), which is ABR in R 299.11003}

J. **DISPOSITION OF ACCUMULATED LIQUIDS AND SOLIDS**

The licensee shall remove liquids and pumpable solids from the containment system within 24 hours of detection. Non-pumpable solids shall be removed every 60 days. For high precipitation conditions, where

removal cannot be completed within 24 hours, removal of the spilled or leaked waste and accumulated precipitation must begin within 24 hours of detection and continue until that removal is complete. Removed spilled and leaked waste and accumulated precipitation shall be managed in accordance with the requirements of Part 111 of Act 451 and the rules, as specified in Attachment 7 of this license. {R 299.9521(3)(b), R 299.9614(1)(a) and 40 CFR §264.175(b)(5), which is ABR in R 299.11003}

K. COMPLIANCE WITH AIR EMISSION AND WASTE MANAGEMENT REQUIREMENTS FOR STORAGE IN CONTAINERS

The licensee shall operate the facility in a manner that will prevent air emissions in violation of Part 55 of Act 451. {R 299.9602(1)(b)}

PART IV

TANK SYSTEM STORAGE AND TREATMENT CONDITIONS

A. COVERAGE OF LICENSE

1. The hazardous waste tank system storage and treatment areas at the facility shown on the Facility Drawing are covered by this license. Any expansion or enlargement beyond the facility boundary shown on the Facility Drawing or beyond the 649,880 gallon tank system storage design capacity or beyond the 576,000 gallon per day treatment design capacity requires a construction permit from the Chief of the Waste Management Division. {R 299.9521(1)(b)}

2. The Facility Drawing is incorporated into this license as Attachment 10.

B. WASTE IDENTIFICATION AND QUANTITY

1. The licensee may store no more than a total volume of 649,880 gallons of the hazardous wastes listed in Attachment 8 in the tank systems identified as Tanks #1, #2, #3, #7A, #7B, #8A, #8B, #9A, #9B, #10A, #10B, #11, #12, #16, #17, #18, #19, #25, and #27 in Attachment 10, subject to the terms of this license. For the purposes of converting gallons to pounds, the conversion factor shall be 8.34 pounds equal 1 gallon of water. {R 299.9521(2)(d) and (3)(a) and (b)}

2. The licensee may store a maximum of 60,000 gallons of dry hazardous waste dust in the three hazardous waste lime storage silos designated Tank #1, Tank #2, and Tank #3. {R 299.9521(2)(d) and (3)(a) and (b)}

3. The licensee may store a maximum of 389,880 gallons of hazardous wastes in the eight waste treatment tanks designated Tank #7A, Tank #7B, Tank #8A, Tank #8B, Tank #9A, Tank #9B, Tan #10A, and Tank #10B. {R 299.9521(2)(d) and (3)(a) and (b)}

4. The licensee may store a maximum of 80,000 gallons of hazardous liquid and sludge wastes in the two sludge receiving tanks designated Tank #11 and Tank #12. {R 299.9521(2)(d) and (3)(a) and (b)}

5. The licensee may store a maximum of 80,000 gallons of hazardous wastes awaiting treatment in the four waste/reagent storage tanks designated Tank #16, Tank #17, Tank #18, and Tank #19. {R 299.9521(2)(d) and (3)(a) and (b)}

6. The licensee may store a maximum of 40,000 gallons of hazardous waste or waste regent in the waste/reagent storage tanks designated Tank #25 and Tank #27. {R 299.9521(2)(d) and (3)(a) and (b)}

C. WASTE TREATMENT CAPACITY AND METHODS

1. The licensee may treat no more than a total volume of 576,000 gallons per day of the hazardous wastes listed in Attachment 8 in the tank systems identified as Tanks #7A, #7B, #8A, #8B, #9A, #9B, #10A, #10B, #14, and #15 in Attachment 10, subject to the terms of this license. {R 299.9521(2)(d) and (3)(a) and (b)}

2. The licensee shall treat hazardous wastes listed in Attachment 8 of this license through chemical stabilization. For wastes that require more than one type of treatment, the licensee shall use neutralization, deactivation, chemical oxidation, and/or chemical reduction treatment technologies. Waste treatment shall be conducted in accordance with the methods and procedures specified in

Attachment 11 of this license, subject to the terms of this license. {R 299.9633}

3. The licensee may treat hazardous debris contaminated with waste codes listed in Attachment 8 of this license by using the microencapsulation and macroencapsulation immobilization technologies specified in 40 CFR §268.45 and the procedures specified in Attachment 11 of this license, subject to the terms of this license. {R 299.9521(2)(d), R 299.9627 and 40 CFR Part 268, which is ABR in R 299.11003}

4. The licensee may operate the treatment system 24 hours per day, 7 days per week. {R 299.9521(3)(b)}

5. The licensee shall operate the air pollution control equipment when waste is stored or treated and maintain negative static pressure in the waste treatment building (pugmill mixer rooms, waste treatment /storage tanks) at all times that waste is stored in the treatment building, excluding air pollution control device malfunctions and routine maintenance as allowed under Part 55 of Act 451and its rules. Waste treatment shall cease during air pollution control device malfunctions and routine maintenance. The licensee shall not have more than one overhead door open at a time on the east side and the west side of the waste treatment process building. {R 299.9602(1)(b) and R 299.9521(3)(b)}

6. The licensee shall cover hazardous and non-hazardous treated waste loads in the treatment building prior to the load being transported from the treatment building. {R 299.9521(3)(b)}

7. The licensee shall not mix waste during treatment in such a manner that the fire suppression system is damaged or made ineffective. {R 299.9521(3)(b)}

8. Treatment of hazardous waste shall be completed within the confines of the treatment building. Except as specified in this condition, emissions from the treatment of hazardous waste must be controlled with a permitted air pollution control system.{ R 299.9602(1)(b) and R 299.9521(3)(b)}

   Treated hazardous and decharacterized waste may be directly transferred from the treatment building in compliance with Condition IV.C.9. and stored in the North and Southeast Container Storage Area constructed in compliance with Conditions VII.A.1. – VII.A.7. of this license. {R 299.9602(1)(b) and R 299.9521(3)(b)}

9. The licensee shall develop standard operational procedures to evaluate and minimize odors emanating from loaded containers of treated hazardous or decharacterized waste prior to removal from the treatment building. The odor evaluation and minimization standard operational procedures shall be submitted to the Southeast Michigan District Supervisor for approval within 60 days of issuance of this license. The licensee shall follow and document the use of the approved odor evaluation and minimization standard operational procedure in the facility operating record (Condition II.L.1.). {R 299.9602(1)(b), R 299.9605(1) and 40 CFR §264.15(a), which is ABR in R 299.11003}.

D. DESIGN, CONTAINMENT AND ASSESSMENT OF TANK SYSTEMS

The licensee shall operate and maintain all tank systems in accordance with the applicable requirements of R 299.9615 and 40 CFR §§264.191, 264.193, and 264.194, which are ABR in R 299.11003, and the attached plans and specifications in Attachment 10 of this license.

E. MANAGEMENT OF TANK SYSTEMS

1. The licensee shall manage the tank systems in accordance with the requirements of R 299.9615 and 40 CFR §§264.194 and 264.196 which are ABR in R 299.11003, and the spill and overfill prevention procedures specified in Attachment 12 of this license.

2. The licensee shall conduct the treatment of hazardous wastes in accordance with the methods and procedures specified in Attachment 11 of this license. {R 299.9633}

3. The licensee shall operate and maintain all tanks in compliance with the requirements of R 29.4101 to R 29.4504 pursuant to the provisions of the Fire Prevention Act, 1941 PA 207, as amended. {R 299.9615}

4. The licensee shall label tank systems in accordance with the provisions of National Fire Protection Association (NFPA) Standard No. 704. {R 299.9615(5)}

5. The licensee shall clearly mark each tank containing land disposal restricted waste with a description of its contents, the quantity of each hazardous waste received, and the date each period of accumulation begins, or record such information for each tank system in the facility operating record. {R 299.9627 and 40 CFR §268.50(a)(2)(ii), which is ABR in R 299.11003}

6. The licensee shall not store any hazardous waste in the tanks referenced in Condition IV.A. of this license for more than one year prior to treatment of its contents on-site or shipment off-site to another appropriately licensed hazardous waste treatment or disposal facility. The licensee may store hazardous waste in a tank for more than the one-year period based upon a petition approved by the Chief of the Waste Management Division demonstrating that such storage is solely for the purpose of accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment, or disposal. {R 299.9521(3)(b), R 299.9627, and 40 CFR Part 268, which is ABR in R 299.11003}

F. SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTES

1. The licensee shall not place ignitable waste in a tank system unless the procedures described in Attachment 9 of this license are followed. {R 299.9615 and 40 CFR §264.198(a), which is ABR in R 299.11003}

2. The licensee shall document compliance with Condition IV.F.1. of this license and place this documentation in the operating record (Condition II.L.1. of this license). {R 299.9605, R 299.9609, and 40 CFR §§264.17(c) and 264.73(b)(3), which are ABR in R 299.11003}

3. The licensee shall maintain the protective distances between the tank systems and any public ways, streets, alleys, or adjoining property lines that can be built upon, as required in Tables 2-1 through 2-6 of the NFPA's "Flammable and Combustible Liquids Code" (1977 or 1981) as specified in Attachment 9 of this license, and as required by R 299.9615 and 40 CFR §264.198(b), which is ABR in R 299.11003.

G. PROHIBITION ON STORING OR TREATING IGNITABLE OR REACTIVE WASTES OR MATERIALS

The licensee is prohibited from storing or treating reactive wastes or materials in tank systems at the facility. The licensee may store deactivated reactive waste that does not exhibit the characteristic of reactivity as defined in R 299.9212. {R 299.9521(2)(d) and (3)(b)}]

H. SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES OR MATERIALS

1. The licensee shall not place incompatible wastes or incompatible wastes and materials, in the same tank system or place hazardous waste in a tank system that has not been decontaminated and that previously held an incompatible waste or material. {R 299.9615 and 40 CFR §264.199, which is ABR in R 299.11003}

2. The licensee shall document compliance with Condition IV.H.1. of this license, as required by R 299.9605 and 40 CFR §264.17(c), and place this documentation in the operating record. The provisions of 40 CFR §264.17(c) are ABR in R 299.11003. {R 299.9609 and 40 CFR §264.73(b)(3), which is ABR in R 299.11003}

I. DISPOSITION OF ACCUMULATED LIQUIDS AND SOLIDS

The licensee shall remove liquids and pumpable solids from the containment system within 24 hours of detection. Non-pumpable solids shall be removed every 60 days. For high precipitation conditions, where removal cannot be completed with 24 hours, removal of the spilled or leaked waste and accumulated precipitation must begin within 24 hours of detection and continue until that removal is complete. Removed spilled and leaked waste and accumulated precipitation shall be managed in accordance with the requirements of Part 111 of Act 451 and the rules, as specified in Attachment 7 of this license. {R 299.9521(3)(b), R 299.9615, and 40 CFR §264.193(c)(4), which is ABR in R 299.11003}

J. COMPLIANCE WITH AIR EMISSION AND WASTE MANAGEMENT REQUIREMENTS FOR STORAGE AND TREATMENT IN TANK SYSTEMS

The licensee shall operate the facility in a manner that will prevent air emissions in violation of Part 55 of Act 451{R 299.9602(1)(b)}

PART V

ENVIRONMENTAL MONITORING CONDITIONS

A. GROUNDWATER MONITORING PROGRAM

1. The licensee shall conduct a detection monitoring program. Under this program, the licensee shall operate and maintain a groundwater monitoring system consisting of monitoring wells labeled OB-18, OB-19, OB-21, OB-23R, OB-36, and OB-47 as shown on Attachment A of the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license. {R 299.9611(2)(b) and R 299.9612}

   The licensee shall sample the monitoring wells in accordance with the procedures specified below:

   (a) Static water level measuring devices, pumps and/or sampling equipment shall be compatible with the parameters sampled and must be thoroughly cleaned and rinsed before use in each monitoring well and piezometer. Sampling procedures shall assure that cross-contamination and changes in water chemistry do not occur. {R 299.9612 and 40 CFR §264.97(d) and (e), which are ABR in R 299.11003}

   (b) The static water elevation shall be determined by methods giving precision to 1/8 inch or 0.01 foot prior to purging water from the wells for sampling. Measurements shall be made from the top of the casing with the elevation of all casings in the monitoring well system related to a permanent reference point, using United States Geological Survey (USGS) datum. {R 299.9612 and 40 CFR §264.97(f), which is ABR in R 299.11003}

   (c) To ensure a representative sample, a volume of water shall be purged that is equal to or greater than three times the amount of water in the well casing, or until pH and specific conductance stabilize, or until the well is dry, before obtaining a sample for analysis as specified in Section III of the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license. Wells shall be sampled immediately after purging where recovery rates allow. Where wells are pumped dry during purging, recovery rates shall be determined and samples taken as soon as sufficient recovery occurs. {R 299.9612 and 40 CFR §264.97(d) and (e), which are ABR in R 299.11003}

   (d) Water removed from each monitoring well shall be managed as specified in Section III of the Groundwater Monitoring Program Sampling and Analysis Plan Attachment 13 of this license. {R 299.9521(3)(b)}

   (e) All monitoring wells and piezometers shall have protective barriers, be clearly labeled, securely capped, and locked when not in use. {R 299.9612 and 40 CFR §264.97(c)-(e), which are ABR in R 299.11003}

   (f) Prior to undertaking monitoring well or piezometer replacement or repair, the licensee shall obtain the written approval of the Waste Management Division. {R 299.9519(5)(c)(i)}

2. The licensee shall collect and analyze samples according to the schedule, parameters, and procedures specified in the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license. The licensee shall submit proposed revisions to the Groundwater Monitoring Program Sampling and Analysis Plan to the Chief of the Waste Management Division for approval prior to implementation and shall revise any other affected document accordingly. If approved, the revisions shall become part of this operating license. {R 299.9519(5)(c)(ii), R 299.9611(2)(a), R 299.9612, and 40 CFR §264.97(d) and (e), which are ABR in R 299.11003}

3. The licensee shall submit an annual groundwater report to the Chief of the Waste Management Division no later than March 1 for the previous calendar year's activities. The report shall include a summary of groundwater quality data, data graphs, data tables, statistical analyses to date, and identification of any statistically significant increases (and/or pH decreases) pursuant to Conditions V.A.6. and V.A.11. of this license. The licensee shall determine the groundwater flow rate and direction in the monitored zone[s] at least annually, and provide a groundwater contour map and flow net diagram from this data. This annual report is in addition to the reporting requirements of Condition II.L.4. of this license. {R 299.9612(1) and 40 CFR §264.97(j), which is ABR in R 299.11003}

4. Establishing Background. The licensee shall establish background groundwater quality values at monitoring wells for the parameters specified on Table 3 in Attachment H of the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license.

   (a) Background values for the primary parameters shall be the laboratory detection limit for the chemical or in specific cases where the chemical may be present as a common laboratory contaminant, a more rigorously determined limit, as specified in Section 3.2 of The Statistical Monitoring Plan For Groundwater Monitoring, Attachment L of Attachment 13 of this license.

   (b) Background values for the secondary parameters shall be calculated annually for each monitoring well in accordance with the specifications contained in Section 3.2 of The Statistical Monitoring Plan For Groundwater Monitoring, Attachment L of Attachment 13 of this license.

   (c) In the event that groundwater quality at the upgradient wells shows a significant change, a petition may be submitted to the Chief of the Waste Management Division to re-establish background quality. Background values may be re-established only upon written approval of the Chief of the Waste Management Division.

   {R 299.9612(1)(d) and (e) and 40 CFR §264.97(a) and (g), which are ABR in R 299.11003}

5. Detection Monitoring Program. The licensee shall sample monitoring wells OB-18, OB-19R, OB-21, OB-21, OB-23R, OB-36, and OB-47 on a quarterly basis and analyze the samples for the primary, secondary, and tertiary parameters listed on Table 3 in Attachment H of the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license. Data and evaluations must be submitted to the Chief of the Waste Management Division in accordance with the time frame specified in Condition II.L.4. of this license. {R 299.9612 and 40 CFR §264.98}

6. Primary Parameters. Within 60 days of each sampling of each monitoring well, the licensee shall determine if a statistically significant increase (or change in pH) has occurred compared to background levels for each primary parameter listed on Figure 1 of the Statistical Monitoring Plan for Groundwater Monitoring Data, Attachment L of Attachment 13 of this license. A statistically significant increase (or change in pH) shall be determined using the statistical evaluation specified in the Statistical Monitoring Plan, Attachment 13 of this license. {R 299.9612(1)(e) and 40 CFR §264.97(h) and (i), which are ABR in R 299.11003}

7. If a statistically significant increase (or change in pH) in a primary monitoring parameter is detected, the licensee shall notify the Waste Management Division, Hazardous Waste Program Section, Technical Support Unit by telephone within one working day and arrange a resampling as soon as possible to confirm if a statistically significant increase (or change in pH) exists. Resampling must include not less than four replicate samples at the affected well[s] for the primary parameter[s] in

question. {R 299.9612 and 40 CFR §264.97(g), which is ABR in R 299.11003}

8. If the licensee determines pursuant to Conditions V.A.6. and V.A.7. of this license that a confirmed statistically significant increase (or change in pH) has occurred for primary parameters, the licensee shall: {R 299.9612 and 40 CFR §264.98(f) and (g), which are ABR in R 299.11003}

   (a) Notify the Director within one working day by calling the Chief of the Waste Management Division or the appropriate Waste Management Division District Supervisor or, in the event of their unavailability, the Department of Environmental Quality PEAS at 1-800-292-4706.

   (b) Provide follow-up notification to the Chief of the Waste Management Division in writing within seven calendar days of the telephone call. The notification shall indicate what parameters or constituents have shown statistically significant changes and the well[s] in which the changes have occurred.

   (c) As soon as possible, sample the groundwater in all monitoring wells within 1000 feet of the affected well for primary and secondary parameters and determine the concentration of all constituents identified in Appendix IX of 40 CFR Part 261 that are present in groundwater and for which approved analysis methods exist. The licensee may submit a request for modified Appendix IX analyses for review and approval by the Chief of the WMD. The licensee shall also establish background values for Appendix IX constituents detected pursuant to R 299.9612 and 40 CFR §264.98(g)(3), which is ABR in R 299.11003.

   (d) Immediately take steps to determine the cause of the contamination and eliminate the source of discharge.

   (e) Within 90 days of the determination, submit to the Chief of the Waste Management Division an application for a license modification to establish a compliance monitoring and corrective action program meeting the requirements of R 299.9612. The application shall include the following information:

      (i) An identification of the concentration of all Appendix IX constituents found in the groundwater.

      (ii) Any proposed changes to the groundwater monitoring system at the facility necessary to meet the requirements of R 299.9612.

      (iii) Any proposed changes to the monitoring frequency, sampling and analysis procedures or methods, or statistical procedures used at the facility necessary to meet the requirements of R 299.9612.

   (f) Within 180 days, submit to the Chief of the Waste Management Division detailed description of corrective actions that shall achieve compliance with applicable laws and rules, including a schedule of implementation. Corrective action shall also meet the requirements of R 299.9629, and include a plan for a groundwater monitoring program that shall demonstrate the effectiveness of the corrective action. Such a groundwater monitoring program may be based on a compliance monitoring program developed to meet the requirements of 40 CFR §264.99, which is ABR in R 299.11003.

   (g) During the period prior to a license modification requiring a compliance monitoring and corrective action program, the licensee shall provide the Chief of the Waste Management Division, or his or her designee, with weekly telephone updates and written reports every two weeks regarding the progress to date in determining the cause of contamination and

eliminating the discharge. The licensee shall include in the written report the results of all samples from environmental monitoring conducted by the licensee.

9. If the licensee determines pursuant to Conditions V.A.6. and V.A.7. of this license that a statistically significant increase (or change in pH) in hazardous constituents has occurred in groundwater, it may demonstrate that a source other than the licensed facility caused the increase (or change in pH) or that the increase (or change in pH) resulted from error in sampling, analysis or evaluation. While the licensee may make a demonstration under this condition in addition to, or in lieu of, submitting a license modification application within the time specified in Condition V.A.8.(e) of this license, the licensee is not relieved of the requirement to submit a license modification application within the time specified unless the demonstration made under this condition successfully shows that a source other than the licensed facility caused the increase (or change in pH) or that the increase (or change in pH) resulted from an error in sampling, analysis, or evaluation. In making a demonstration under this condition, the licensee shall:

   (a) Notify the Chief of the Waste Management Division within seven days of the determination that it intends to make a demonstration under this condition.

   (b) Within 90 days of the determination, submit a report to the Chief of the Waste Management Division that demonstrates that a source other than the licensed facility solely caused the increase (or change in pH), or that the increase (or change in pH) was caused by error in sampling, analysis, or evaluation.

   (c) Within 90 days of the determination, submit to the Chief of the Waste Management Division an application for a license modification to make any appropriate changes to the groundwater monitoring program at the facility.

   (d) Continue to monitor groundwater in compliance with this license.

   {R 299.9612 and 40 CFR §264.98(g)(6), which is ABR in R 299.11003}

10. In the event that the Chief of the Waste Management Division determines from the findings of Conditions V.A.6. and V.A.7. of this license that a statistically significant increase (or change in pH) in hazardous constituents has occurred in the groundwater, and the Chief of the Waste Management Division finds, in accordance with Section 11148 of Act 451, that the increase (or change in pH) may present an imminent and substantial hazard to the health of persons or to the natural resources, or is endangering or causing damage to public health or the environment, the licensee shall immediately cease waste receipt, storage, and treatment at the affected unit[s] until instructed by the Chief of the Waste Management Division that operations may resume. {R 299.9612(1)(g)}

11. Secondary Parameters. Within 60 days of each sampling of each monitoring well, the licensee shall determine if a statistically significant increase (or change in pH) has occurred compared to background levels for each secondary parameter listed on Figure 1 of the Statistical Monitoring Plan for Groundwater Monitoring Data, Attachment L of Attachment 13 of this license. A significant increase (or change in pH) shall be determined using the statistical evaluation specified in the Statistical Monitoring Plan, Attachment 13 of this license. {R 299.9612(1)(c)}

12. If the licensee determines pursuant to Condition V.A.11. of this license that a statistically significant increase (or change in pH) has occurred for any secondary parameter, the licensee shall:

   (a) Notify the Director, within one working day, by calling the Chief of the Waste Management Division or the appropriate Waste Management Division District Supervisor.

(b) Resample the affected well(s) for the secondary parameters that showed a statistical increase, taking not less than four samples at each well.

(c) Redetermine whether or not a statistically significant increase (or change in pH) has occurred, within one working day, notify the Chief of the Waste Management Division.

(d) If confirmed, the licensee shall immediately take steps to determine the cause of contamination and eliminate the source of the discharge. A report that explains the chronology of events, investigative methods, all lab analyses, calculations, field activities, and findings/conclusions, related to this determination shall be submitted within 60 days of a statistically significant determination under Condition V.A.11. of this license.

(e) The licensee may demonstrate that a source other than the facility, or an error in sampling, analysis, or evaluation solely caused the increase. A report that contains the information set forth in Condition V.A.12.(d) of this license shall be submitted within 60 days of a statistically significant determination under Condition V.A.11. of this license.

{R 299.9612(1)(c)}

B. AMBIENT AIR MONITORING PROGRAM

1. The licensee shall conduct ambient air monitoring in accordance with the program specified in Attachment 14 of this license. {R 299.9611(2)(c)}

2. The licensee shall report ambient air monitoring results as required by Condition II.L.4. of this license.

PART VI

CORRECTIVE ACTION CONDITIONS

A. CORRECTIVE ACTION AT THE FACILITY

The licensee shall implement corrective action for all releases of a contaminant from any waste management units at the facility, regardless of when the contaminant may have been placed in or released from the waste management unit. For the purposes of this license, the term "corrective action" means an action determined by the Chief of the Waste Management Division to be necessary to protect the public health, safety, welfare, or the environment, and includes, but is not limited to, investigation, evaluation, cleanup, removal, remediation, monitoring, containment, isolation, treatment, storage, management, temporary relocation of people, and provision of alternative water supplies, or any corrective action allowed under Title II of the federal Solid Waste Disposal Act, or regulations promulgated pursuant to that act. {Sections 11102 and 11115a of Act 451 and R 299.9629}

B. CORRECTIVE ACTION BEYOND THE FACILITY BOUNDARY

The licensee shall implement correction action beyond the facility boundary if the release of a contaminant has or may have migrated or has or may have been emitted, beyond the facility boundary, unless the licensee demonstrates to the satisfaction of the Chief of the Waste Management Division that, despite the licensee's best efforts, the licensee was unable to obtain the necessary permission to undertake this correction action. The licensee shall not be relieved of all responsibility to clean up a release that has migrated or has been emitted beyond the facility boundary where off-site access is denied. On-site measures to address such releases shall be addressed under this part of the license, as determined to be necessary on a case-by-case basis. {Section 11115a of Act 451 and R 299.9629}

C. IDENTIFICATION OF EXISTING WASTE MANAGEMENT UNITS

The following waste management units (WMUs) have been identified at the facility:

WMU Number 1	The Former Michigan Disposal Waste Processing Facility
WMU Number 2	Lagoon A and Stormwater Retention Basin
WMU Number 3	Lagoon B
WMU Number 4	Lagoon C
WMU Number 5	The Existing Michigan Disposal Waste Treatment Plant
WMU Number 6	Southeast Container Storage Area

1. The following WMUs, identified in the *Overview of Operation, Closure, and Environmental Monitoring Former Michigan Disposal, Inc. Waste Processing Facility Report* dated January 7, 1992, require further corrective action at this time. The MDEQ acknowledges the receipt of the January 7, 1992 Report and it is under review. No final determination regarding the status of these units has been made at the time this operating license was issued.

   a. WMU Number 2 Lagoon A and Stormwater Retention Basin

   b. WMU Number 3 Lagoon B

c. WMU Number 4 Lagoon C

2. The following WMUs, , identified in the *Overview of Operation, Closure, and Environmental Monitoring Former Michigan Disposal, Inc. Waste Processing Facility Report* dated January 7, 1992 and as newly regulated by this operating license, do not require corrective action at this time because the units are currently operating pursuant to the act and its rules with no evidence of a release of any contaminants. Corrective action may be required when the units undergo final closure.

a. WMU Number 5 The Existing Michigan Disposal Waste Treatment Plant

b. WMU Number 6 Southeast Container Storage Area

3. The following WMU, identified in the *Closure Certification Former Processing Plant Report* dated March 19, 1991, and in the *Overview of Operation, Closure, and Environmental Monitoring Former Michigan Disposal, Inc. Waste Processing Facility Report* dated January 7, 1992, requires no further corrective action at this time. The determination that no further corrective action is required at this time is based on information provided in the March 19, 1991 and January 7, 1992 Reports.

WMU Number 1 The Former Michigan Disposal Waste Processing Facility

4. Within 30 days of discovery of a new release of a contaminant from a WMU, the licensee shall provide written notification to the Chief of the Waste Management Division. The written notification shall include all available information pertaining to the release. Based on a review of all of the information, the Chief of the Waste Management Division may require corrective action for the newly identified release. The licensee shall submit a written RCRA Facility Investigation (RFI) Work Plan to the Chief of the Waste Management Division within 60 days after written notification by the Chief of the Waste Management Division that corrective action for the release is required.

{Section 11115a of Act 451 and R 299.9629}

D. **IDENTIFICATION OF NEW WASTE MANAGEMENT UNITS**

1. Within 30 days of discovery of a new WMU or a release of a contaminant from a new WMU, the licensee shall provide written notification to the Chief of the Waste Management Division. The written notification shall include all of the following information:

a. The location of the unit on the facility topographic map.

b. The designation of the type of unit.

c. The general dimensions and structural description, including any available drawings of the unit.

d. The date the unit was operated.

e. Specification of all waste(s) that have been managed in the unit.

f. All available information pertaining to any release of a contaminant from the unit.

2. Based on a review of all of the information provided in Condition VI.D.1. of this license, the

Chief of the Waste Management Division may require corrective action for the newly identified WMU. The licensee shall submit a written RFI Work Plan to the Chief of the Waste Management Division within 60 days after written notification by the Chief of the Waste Management Division that corrective action for the unit is required.

{Section 11115a of Act 451, R 299.9629, and 40 CFR §270.14(d), which is ABR in R 299.11003}

E. RCRA FACILITY INVESTIGATION

The licensee has conducted a RCRA Facility Investigation (RFI) to determine if a release of a contaminant from the WMU 1, the Former Michigan Disposal, Inc. Waste Processing Facility, identified in Condition VI.C.1. of this license has occurred. If the results of this RFI indicate that a release has occurred, then the licensee shall evaluate the nature and extent of the release. The licensee shall conduct a RCRA Facility Investigation (RFI) to determine if a release of a contaminant(s) from any of the WMUs identified in Conditions VI.C.2. or VI.D.2 of this license has occurred, and if a release(s) has occurred, evaluate the nature and extent of the release. The RFI shall be conducted in accordance with Conditions VI.E.1.-VI.E.5. and Attachment 15, RFI Scope of Work, of this license.

1. The licensee shall submit a written RFI Work Plan to the Chief of the Waste Management Division for review and approval within 60 days after the final closure of WMU 5 and WMU 6.

2. The Chief of the Waste Management Division will approve or modify and approve the RFI Work Plan, or provide a written Notice of Deficiency on the RFI Work Plan. The licensee shall modify the RFI Work Plan in accordance with the Notice of Deficiency and submit a new RFI Work Plan or revisions to the RFI Work Plan to the Chief of Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency. Upon approval by the Chief of the Waste Management Division, the RFI Work Plan becomes an enforceable condition of this license.

3. The licensee shall implement the approved RFI Work Plan within 90 days after receipt of the Chief of the Waste Management Division's written approval of the RFI Work Plan.

4. The licensee shall submit a written RFI Final Report to the Chief of the Waste Management Division for review and approval within 60 days after the completion of the RFI. The RFI Final Report shall document compliance with the approved RFI Work Plan and support further corrective action at the facility.

5. The Chief of the Waste Management Division will approve the RFI Final Report or provide a written Notice of Deficiency on the RFI Final Report. The licensee shall modify the RFI Final Report in accordance with the Notice of Deficiency and submit a new RFI Final Report or revisions to the RFI Final Report to the Chief of the Waste Management Division for approval within 30 days of receipt of the Notice of Deficiency.

6. The licensee shall submit bi-monthly written RFI progress reports to the Chief of the Waste Management Division.

7. The licensee shall comply with the time frames specified in Condition VI.E.1.-VI.E.6. of this license unless otherwise approved in writing by the Chief of the Waste Management Division.

{Section 11115a of Act 451 and R 299.9629}

F. DETERMINATION OF NO FURTHER ACTION

1. Based on the results of the RFI and other relevant information, the licensee shall submit a written request for a minor license modification to the Chief of the Waste Management Division if the licensee wishes to terminate corrective action for a specific WMU identified in Conditions VI.C.1. or V.D.2. of this license. The licensee must conclusively demonstrate that there have been no releases of a contaminant(s) from the WMU and that the WMU does not pose a threat to public health, safety, welfare, or the environment.

2. Based on the results of the RFI and other relevant information, the licensee shall submit a written request for a major license modification to the Chief of the Waste Management Division if the licensee wishes to terminate facility-wide corrective action. The licensee must conclusively demonstrate that there have been no releases of a contaminant(s) from any of the WMUs at the facility and that none of the WMUs pose a threat to public health, safety, welfare, or the environment.

3. If, based upon a review of the licensee's request for a license modification pursuant to Conditions VI.F.1. or VI.F.2. of this license, the results of the completed RFI, and other relevant information, the Chief of the Waste Management Division determines that the releases or suspected releases of a contaminant(s) do not exist and that the WMU(s) do not pose a threat to public health, safety, welfare, or the environment, the Chief of the Waste Management Division will approve the requested modification.

4. A determination of no further action shall not preclude the Chief of the Waste Management Division from requiring continued or periodic monitoring of air, soil, groundwater, or surface water, if necessary to protect public health, safety, welfare, or the environment, when facility-specific circumstances indicate that potential or actual releases of a contaminant(s) may occur.

5. A determination of no further action shall not preclude the Chief of the Waste Management Division from requiring further corrective action at a later date, if new information or subsequent analysis indicates that a release or potential release of a contaminant(s) from a WMU at the facility may pose a threat to public health, safety, welfare, or the environment. The Chief of the Waste Management Division will initiate the necessary license modifications if further corrective action is required at a later date.

{Section 11115a of Act 451 and R 299.9629}

G. CORRECTIVE MEASURES STUDY

If the Chief of the Waste Management Division determines, based on the results of the RFI and other relevant information, that corrective measures are necessary, the Chief of the Waste Management Division will notify the licensee in writing that a Corrective Measures Study (CMS) is required. If required by the Chief of the Waste Management Division, the licensee shall conduct a CMS to develop and evaluate the corrective measure alternative(s) necessary to address the release(s) of a contaminant(s) and the WMU(s) that are identified in the approved RFI Final Report as requiring further corrective action. The CMS shall be conducted in accordance with Conditions VI.G.1.- VI.G.7. and Attachment 16, CMS Scope of Work, of this license.

1. The licensee shall submit a written CMS Work Plan to the Chief of the Waste Management Division for review and approval within 60 days after receipt of written notification that a CMS is required.

2. The Chief of the Waste Management Division will approve or modify and approve the CMS Work Plan, or provide a written Notice of Deficiency on the CMS Work Plan. The licensee shall

modify the CMS Work Plan in accordance with the Notice of Deficiency and submit a new CMS Work Plan or revisions to CMS Work Plan to the Chief of Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency. Upon approval by the Chief of the Waste Management Division, the CMS Work Plan becomes an enforceable condition of this license.

3. The licensee shall implement the approved CMS Work Plan within 90 days after receipt of the Chief of the Waste Management Division's written approval of the CMS Work Plan.

4. The licensee shall submit a written CMS Final Report to the Chief of the Waste Management Division for review and approval within 60 days after the completion of the CMS. The CMS Final Report shall document compliance with the approved CMS Work Plan and support further corrective action at the facility.

5. The Chief of the Waste Management Division will approve the CMS Final Report or provide a written Notice of Deficiency on the CMS Final Report. The licensee shall modify the CMS Final Report in accordance with the Notice of Deficiency and submit a new CMS Final Report or revisions to the CMS Final Report to the Chief of the Waste Management Division for approval within 30 days of receipt of the Notice of Deficiency.

6. The licensee shall submit bi-monthly written CMS progress reports to the Chief of the Waste Management Division.

7. The licensee shall comply with the time frames specified in Condition VI.G.1.-VI.G.6. of this license unless otherwise approved in writing by the Chief of the Waste Management Division.

{Section 11115a of Act 451 and R 299.9629}

H. CORRECTIVE MEASURES IMPLEMENTATION

The licensee shall conduct Corrective Measures Implementation (CMI) based on the CMS Final Report approved by the Chief of the Waste Management Division. The CMI shall be conducted in accordance with Conditions VI.H.1.-VI.H.10. and Attachment 17, CMI Scope of Work, of this license.

1. The licensee shall submit a written CMI Work Plan to the Chief of the Waste Management Division for review and approval within 60 days after the approval of the CMS Final Report by the Chief of the Waste Management Division.

2. The Chief of the Waste Management Division will approve or modify and approve the CMI Work Plan, or provide a written Notice of Deficiency on the CMI Work Plan. The licensee shall modify the CMI Work Plan in accordance with the Notice of Deficiency and submit a new CMI Work Plan or revisions to the CMI Work Plan to the Chief of the Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency. The Waste Management Division will provide notice of its draft decision on the CMI Work Plan to persons on the facility mailing list and an opportunity for a public hearing. Upon approval by the Chief of the Waste Management Division, the CMI Work Plan becomes an enforceable condition of this license.

3. The licensee shall implement the approved CMI Work Plan within 90 days after receipt of the Chief of the Waste Management Division's written approval of the CMI Work Plan.

4. The licensee shall submit a written Construction Completion Report to the Chief of the Waste Management Division for review and approval within 60 days after the construction associated with the corrective measures has been completed and all operational tests run. The

Construction Completion Report shall document how the construction is in compliance with the approved design plans and specifications and that the corrective measures are performing satisfactorily based on the operational tests.

5. The Chief of the Waste Management Division will approve or modify and approve the Construction Completion Report, or provide a written Notice of Deficiency on the Construction Completion Report. The licensee shall modify the Construction Completion Report in accordance with the Notice of Deficiency and submit a new Construction Completion Report or revisions to the Construction Completion Report to the Chief of the Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency. Upon approval by the Chief of the Waste Management Division, the Construction Completion Report becomes an enforceable condition of this license.

6. The licensee shall implement full-scale corrective measures within 30 days of receipt of written approval of the Construction Completion Report by the Chief of the Waste Management Division.

7. The licensee shall submit a written CMI Final Report to the Chief of the Waste Management Division for review and approval within 60 days after the corrective measures have been completed and the corrective measures criteria have been met. The CMI Final Report shall document compliance with the corrective measures completion criteria and provide justification that the corrective measures may cease.

8. The Chief of the Waste Management Division will approve or modify and approve the CMI Final Report, or provide a written Notice of Deficiency on the CMI Final Report. The licensee shall modify the CMI Final Report in accordance with the Notice of Deficiency and submit a new CMI Final Report or revisions to the CMI Final Report to the Chief of the Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency.

9. The licensee shall submit bi-monthly written CMI progress reports on the construction phase and quarterly written CMI progress reports on the operation and maintenance activities phase to the Chief of the Waste Management Division.

10. The licensee shall comply with the time frames specified in Condition VI.H.1.-VI.H.9. of this license unless otherwise approved in writing by the Chief of the Waste Management Division.

{Section 11115a of Act 451 and R 299.9629}

I. COST ESTIMATE FOR CORRECTIVE ACTION

1. The licensee shall prepare a detailed written cost estimate for CMI at the facility. {R 299.9712}

2. The licensee shall submit the detailed written cost estimate for CMI to the Chief of the Waste Management Division for review and approval in conjunction with the CMI Work Plan required in Condition VI.H.1. of this license. {R 299.9712}

3. The Chief of the Waste Management Division will approve the cost estimate for CMI or provide a written Notice of Deficiency on the cost estimate for CMI. The licensee shall modify the cost estimate for CMI in accordance with the Notice of Deficiency and submit a new cost estimate for CMI to the Chief of the Waste Management Division for approval within 30 days of receipt of the Notice of Deficiency. Upon approval by the Chief of the Waste Management Division, the cost estimate for CMI becomes an enforceable condition of this license. {R 299.9712}

4. Until the Director notifies the licensee in writing that the licensee is no longer required by R 299.9713 to maintain financial assurance for CMI at the facility, the licensee shall adjust the CMI cost estimate for inflation within 60 days prior to the anniversary of the date of the establishment of the financial mechanism[s] used to demonstrate financial assurance for CMI. If the financial mechanism used is the financial test or corporate guarantee, the licensee shall adjust the CMI cost estimate for inflation within 30 days after the close of the firm's fiscal year and before submission of updated financial information to the Chief of the Waste Management Division. Whenever the current cost estimate increases to an amount greater than the current value of the associated financial mechanism for reasons other than inflation, the licensee shall, within 60 days, increase the value of the mechanism to an amount at least equal to the adjusted cost estimate. Evidence of such increases shall be submitted to the Chief of the Waste Management Division during the 60-day period. {R 299.9712}

5. The licensee shall recalculate the CMI cost estimate within 30 days after the Chief of the Waste Management Division has approved a modification of the CMI Work Plan. Until the Director notifies the licensee in writing that the licensee is no longer required to maintain financial assurance for CMI, the licensee shall revise the CMI cost estimate whenever there is a change in the facility's CMI Work Plan, if the change in the CMI Work Plan increases the cost of CMI. {R 299.9712}

6. The licensee shall keep the latest CMI cost estimate at the facility. {R 299.9629(3)(b)}

J. FINANCIAL ASSURANCE FOR CORRECTIVE ACTION

1. The licensee shall establish and continuously maintain corrective action financial assurance in accordance with R 299.9713. The licensee shall submit in conjunction with the CMI Work Plan the CMI financial assurance mechanism[s] approved by the Chief of the Waste Management Division in an amount at least equal to the cost estimate required by Condition VI.I.1. of this license. If more than one mechanism is used, or if more than one facility is covered by the mechanism[s], the total amount of financial assurance provided for the facility shall at least equal the amount of the cost estimate required by Condition VI.I.1. of this license. The licensee shall submit all proposed changes in the mechanism[s], other than renewals, extensions, or increases in the amount of assurance, to the Chief of the Waste Management Division and obtain approval prior to implementation. The licensee shall provide the Chief of the Waste Management Division with a signed original of all revisions and renewals within 60 days after such revision or renewal and at least 30 days prior to the anniversary of the establishment of the financial mechanism[s] provided to satisfy the requirements of this condition.

2. The licensee shall establish an approved renewal or replacement CMI financial mechanism[s] at least 30 days prior to the expiration date of the current mechanism[s], and obtain the Chief of the Waste Management Division's approval of such replacements, for all financial mechanisms provided to satisfy the requirements of this condition. Failure to provide such documentation is a violation of this license and shall be cause for the Chief of the Waste Management Division to access all funds provided in any financial mechanism not renewed or replaced in accordance with this condition and to initiate revocation of this license.

3. Whenever the current CMI cost estimate increases to an amount greater than the current amount of the associated financial mechanism(s) for reasons other than inflation, the licensee shall, within 60 days after the increase, either increase the amount of the mechanism(s) to an amount at least equal to the increased CMI cost estimate, or provide an additional financial mechanism approved by the Chief of the Waste Management Division for an amount at least equal to the difference between the current amount of financial assurance and the increased

CMI cost estimate. Evidence of such increased financial assurance must be submitted to the Chief of the Waste Management Division during the 60-day period.

K. SUMMARY OF CORRECTIVE ACTION SUBMITTALS

The licensee shall submit required corrective action documents in accordance with the schedule below.

CORRECTIVE ACTION DOCUMENT	SUBMITTAL DEADLINE
Written notification of a new release of a contaminant from an existing WMU, a new WMU, or a release of a contaminant from a new WMU	Within 30 days of discovery
RFI Work Plan for a newly identified release of a contaminant from an existing WMU, a new WMU, or a release of a contaminant from a new WMU	Within 60 days after receipt of written notification that corrective action is required
RFI Work Plan for existing WMUs and contaminant releases.	Within 60 days after the final closure of WMU 5 and WMU6.
Revised RFI Work Plan for existing WMUs and contaminant releases	Within 30 days after receipt of RFI Work Plan Notice of Deficiency
RFI progress reports	Within 60 days of initiation of the RFI and every 60 days thereafter
RFI Final Report for existing WMUs and contaminant releases	Within 60 days after completion of RFI
Revised RFI Final Report for existing WMUs and contaminant releases	Within 30 days after receipt of RFI Final Report Notice of Deficiency

CORRECTIVE ACTION DOCUMENT	SUBMITTAL DEADLINE
CMS Work Plan for existing WMUs and contaminant releases	Within 90 days after receipt of notification that CMS is required
Revised CMS Work Plan for existing WMUs and contaminant releases	Within 30 days after receipt of CMS Work Plan Notice of Deficiency
CMS progress reports	Within 60 days of initiation of the CMS and every 60 days thereafter
CMS Final Report for existing WMUs and contaminant releases	Within 60 days of completion of the CMS
Revised CMS Final Report for existing WMUs and contaminant releases	Within 30 days after receipt of CMS Final Report Notice of Deficiency
CMI Work Plan for existing WMUs and contaminant releases	Within 90 days after approval of the CMS Final Report
Revised CMI Work Plan for existing WMUs and contaminant releases	Within 30 days after receipt of CMI Work Plan Notice of Deficiency
CMI progress reports on construction phase of CMI	Within 60 days of initiation of construction and every 60 days thereafter
CMI progress reports on operation and maintenance activities	Within 60 days of initiation of operation and maintenance activities and every 90 days thereafter
Construction Completion Report	Within 60 days after completion of construction and operational tests
Revised Construction Completion Report	Within 30 days after receipt of Construction Completion Report Notice of Deficiency
CMI Final Report for existing WMUs and contaminant releases	Within 60 days after completion of CMI
Revised CMI Final Report for existing WMUs and contaminant releases	Within 30 days after receipt of CMI Final Report Notice of Deficiency

L. CORRECTIVE ACTION DOCUMENTS RETENTION

The licensee shall maintain all corrective action documents required by this license at the facility. The documents shall be maintained for the operating life of the facility and until the facility is released from financial assurance requirements for corrective action by the Director.

{Section 11115a of Act 451 and R 299.9629}

PART VII

SCHEDULE OF COMPLIANCE

A. North and Southeast Container Storage Areas

1. The licensee shall not store untreated hazardous waste, treated hazardous waste, or decharacterized waste meeting land disposal restrictions in the Southeast Container Storage Area (SECSA) until written approval is received from the Chief of the Waste Management Division (WMD). The licensee shall not store treated hazardous waste or decharacterized waste meeting land disposal restrictions in the North Container Storage Area (NCSA) until written approval is received from the Chief of the WMD.

2. The licensee shall submit conceptual plans for the construction of the proposed hazardous waste container storage buildings to be located at the NCSA and the SECSA to the Chief of the WMD **and the Chief of the Air Quality Division (AQD)** within 60 days of issuance of this license. The hazardous waste container storage buildings shall be designed with air pollution control devices appropriate for the proposed operations. A construction schedule shall accompany these submittals.

3. The licensee shall obtain all necessary approvals from MDEQ Waste Management Division and Air Quality Division, if required under Part 55 of Act 451 and its rules for the proposed operations, prior to conducting operations within the hazardous waste container storage buildings. The MDEQ Waste Management Division shall approve or modify and approve the submittals or provide a written Notice of Deficiency on the submittals. The MDEQ Air Quality Division's review process may be conducted independently of the Waste Management Division's review process pursuant to their authority under Part 55 of Act 451 and its rules.

4. Within 90 days of receipt of written approval or determination of the conceptual plans in accordance with Condition VII.A.2., the licensee shall submit detailed engineering design plans and specifications to the Chief of the WMD and the Chief of the AQD, if air pollution control equipment has been determined necessary for the proposed operations.

5. Within 6 months of receipt of written approval of the detailed engineering design plans and specifications in accordance with Condition VII.A.2,, the licensee shall initiate construction in accordance with the approved engineering design plans and specifications and construction schedule.

6. The licensee shall complete construction of the proposed buildings in accordance with the approved construction schedule. Any modifications to the approved construction schedule must be approved by the Chief of the WMD, prior to implementation.

7. The licensee shall submit as-built drawings of the constructed hazardous waste container storage buildings and a construction certification report signed by a professional engineer to the Chief of the WMD within 30 days of construction completion. Within 30 days of receipt of the construction certification report for the SECSA and the modified waste analysis plan required by Condition VII.B.2.of this license, the WMD will review the submittals and conduct an inspection of the SECSA. Upon receipt of written approval of the submittals, the licensee may begin operations within the SECSA. The construction certification report submittal and inspection requirement also applies to the construction and operation of the NCSA.

8. Within 60 days of the effective date of this license, the licensee shall submit a workplan to investigate the presence and quality of groundwater present within the upper sand unit at the

facility.

a) The plan shall contain, at a minimum, the following elements:

1) The locations of all known structures which potentially influence perched groundwater flow in the vicinity of the SECSA and other waste handling areas at the facility.

2) A groundwater sampling and analysis plan (SAP) which shall include proposed locations and methodologies for the collection of groundwater samples. In addition, the groundwater SAP shall include a proposed list of analytical parameters, methods and detection limits, a description of sampling procedures, and a schedule for the completion of the workplan.

3) The results of the investigation shall include a groundwater contour map of the upper saturated unit, a sand thickness map, top of clay elevations, a map showing various cross sections, including structures identified in condition VII.A.4.(a)(1), and the results of the groundwater investigation.

b) Based on the results of the investigation, the licensee shall provide recommendations to the Technical Support Unit of the WMD for the long-term monitoring of the SECSA and other waste handling areas at the facility for review and approval.

c) The Chief of the WMD shall approve, disapprove, or approve with modifications the workplan. In the event of disapproval, WMD shall specify any deficiencies and required modifications or additions to the workplan. The licensee shall respond to any deficiencies in the workplan within 30 days of notification by WMD. The licensee shall complete the approved workplan in accordance with the schedule contained in the workplan.

d) Upon approval, the workplan and any long-term groundwater monitoring determined to be necessary by the WMD as result of workplan implementation shall become an enforceable part of this license.

B. Waste Analysis Plan

1. The licensee shall submit a compatibility test workplan to the Chief of the WMD within 60 days of issuance of this license. The workplan shall include the following:

(a) Specific methodologies for each simulated waste treatment type.

(b) Definitions for quality assurance/quality control for the lab simulations.

(c) Ratios of the waste, reagents, and combustible containers, supports, and packaging in the lab simulations to the amounts in the actual respective treatment tank.

(d) A recording and reporting format used to document each lab simulation.

(e) The results of lab simulation shall be maintained in accordance with Condition II.L.1. of this license.

(f) Comparisons between the results of lab simulation and each respective actual treatment tank shall be performed and recorded. Any problems shall also be

recorded.

2. Within 30 days of construction completion and prior to the operation of the SECSA, the licensee shall submit to the Chief of the WMD, a modified waste analysis plan that details how the licensee proposes to manage wastes in the SECSA. Upon approval, the modified waste analysis plan shall be an enforceable part of this license.

{R 299.9521(2)(a) and 40 CFR §270.33}

INDEX OF ATTACHMENTS

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Figure 2 ..... Southeast Container Storage Area

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Attachment 17 ..... Corrective Measures Implementation

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: http://www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

WASTE MANAGEMENT DIVISION
PO BOX 30241
LANSING MI 48909-7741

RECEIVED
AUG 28 1997
DIVISION FRONT OFFICE
Waste, Pesticides & Toxics Division
U.S. EPA – REGION 5

August 18, 1997

Ms. Margaret McCue (D-8J)
U.S. EPA, Region 5
Waste, Pesticides & Toxics Division
77 West Jackson Boulevard
Chicago, Illinois 60604-3507

Dear Ms. McCue:

SUBJECT: Draft Operating License for Michigan Disposal Waste Treatment Plant
Belleville, Michigan; MID 000 724 831

The Michigan Department of Environmental Quality (MDEQ), Waste Management Division has modified the draft operating license for the subject facility based on comments received during the public participation process. Enclosed is a copy of the modified draft operating license.

If you have any questions, please contact me.

Sincerely,

Kimberly M. Tyson

Kimberly M. Tyson
Hazardous Waste Program Section
Waste Management Division
517-373-2487

Enclosure
cc: Operating License File

EQP 0100e
(Rev. 10/96)

831-123

DEQ

State of Michigan
Department of Environmental Quality
HAZARDOUS WASTE MANAGEMENT FACILITY OPERATING LICENSE

NAME OF LICENSEE: Michigan Disposal Waste Treatment Plant

NAME OF OWNER: EQ - The Environmental Quality Company

NAME OF OPERATOR: EQ - The Environmental Quality Company

NAME OF TITLEHOLDER OF LAND: Ford Motor Company

FACILITY NAME: Michigan Disposal Waste Treatment Plant

FACILITY LOCATION: 49350 North I-94 Service Drive
Belleville, Michigan 48111

EPA IDENTIFICATION NUMBER: MID 000 724 831 EFFECTIVE DATE: September __, 1997

REAPPLICATION DATE: EXPIRATION DATE: March __, 2002

AUTHORIZED ACTIVITIES

Pursuant to Part 111 of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), being §§324.11101 to 324.11152 of the Michigan Compiled Laws, and the hazardous waste management administrative rules (hereafter called the "rules") promulgated thereunder, being R 299.9101 et. seq. of the Michigan Administrative Code, by the Michigan Department of Environmental Quality (MDEQ), an operating license (hereafter called the "license") is issued to Michigan Disposal Waste Treatment Plant (hereafter called the "licensee") to operate a hazardous wastestorage and treatment facility located in Belleville, Michigan, at latitude 42°13'30"N and longitude 083°31'00"W. The licensee is authorized to conduct the following hazardous waste management activities:

☒ STORAGE	☒ TREATMENT	☐ DISPOSAL	☐ POST CLOSURE
☒ Container	☒ Container	☐ Landfill	☐ Tank
☒ Tank	☒ Tank	☐ Land Application	☐ Surface Impoundment
☐ Waste Pile	☐ Surface Impoundment	☐ Surface Impoundment	☐ Landfill
☐ Surface Impoundment	☐ Incinerator		☐ Waste Pile
☐ Drip Pad	☐ Other:		

APPLICABLE REGULATIONS AND LICENSE APPROVAL

The conditions of this license were developed in accordance with the applicable provisions of the rules, effective October 15, 1996. The licensee shall comply with all terms and conditions of this license. This license consists of the ___ pages of conditions attached hereto (including those in any Attachments 1 through 17) and the applicable regulations contained in R 299.9101 through R 299.11008 as specified in the license. For purposes of compliance with this license, applicable rules are those which are in effect on the date of issuance of this license in accordance with R 299.9521(3)(a).

This license is based on the information submitted in the license application submitted on March 15, 1995 and any subsequent amendments (hereafter referred to as "the application"). Pursuant to R 299.9519(11)(c), the license may be revoked if the licensee fails, in the application or during the license issuance process, to disclose fully all relevant facts or, at any time, misrepresents any relevant facts. As specified in R 299.9519(1), the facility shall be constructed, operated, and maintained in accordance with Part 111 of Act 451, the rules, and this license.

This license is effective on the date of issuance and shall remain in effect for five years from the date of issuance, unless revoked pursuant to R 299.9519 or continued in effect as provided by the Michigan Administrative Procedures Act, 1969 PA 306, as amended (Act 306).

Issued this __ day of September, 1997

by _____
Jim Sygo, Chief
Waste Management Division

DRAFT 08/18/97 10:41 AM

MICHIGAN DISPOSAL WASTE TREATMENT PLANT
MID 000 724 831

HAZARDOUS WASTE MANAGEMENT FACILITY OPERATING LICENSE

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PART I

STANDARD CONDITIONS

A. TERMINOLOGY

Throughout this license, "Act 451" means Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and "rules" means the hazardous waste management administrative rules promulgated pursuant to Part 111 of Act 451, as in effect on the date of issuance of this license. The term "Waste Management Division" means the division within the Michigan Department of Environmental Quality (MDEQ) responsible for administering Part 111 of Act 451 and the rules. Throughout this license, "Director" means the Director of the MDEQ or the Director's duly authorized designee such as the Chief of the Waste Management Division of the MDEQ.

B. EFFECT OF LICENSE

Except as otherwise provided by law, any treatment, storage, or disposal of hazardous waste not specifically authorized in this license is prohibited. Issuance of this license does not convey property rights of any sort or any exclusive privilege {R 299.9516(7) and 40 Code of Federal Regulations (CFR) §270.30(g), which is adopted by reference (ABR) in R 299.11003}; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of federal, state, or local law or regulations {R 299.9516(8)}; nor does it obviate the necessity of obtaining such permits or approvals from other units of government as may be required by law. Compliance with the terms of this license does not constitute a warranty or representation of any kind by the MDEQ, nor does the MDEQ intend that compliance with this license constitutes a defense to any order issued or any action brought under Act 451 and any other applicable state statute and Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) {42 USC 9606(a)}, the Resource Conservation and Recovery Act of 1976, as amended (RCRA), and its rules, and any other applicable federal statute. The licensee, however, does not represent that it will not argue that compliance with the terms of this license may be a defense to such future regulatory actions. Each attachment to this license is a part of, and is incorporated into, this license and is deemed an enforceable part of the license.

C. LICENSE ACTIONS

This license may be modified or revoked in accordance with R 299.9519. The filing of a request for a license modification or revocation, or the notification of planned changes or anticipated noncompliance on the part of the licensee does not stay the applicability or enforceability of any license condition. {R 299.9519, R 299.9521(1)(a) and 40 CFR §270.30(f), which is ABR in R 299.11003}

D. SEVERABILITY

The provisions of this license are severable, and if any provision of this license, or the application of any provision of this license to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this license shall not be affected thereby.

E. **RESPONSIBILITIES**

1. The licensee shall comply with Part 111 of Act 451, the rules, and all conditions of this license, except to the extent authorized by the MDEQ pursuant to the terms of an emergency operating license. {R 299.9521(1)(a) and (3)(a) and (b), and 40 CFR §270.30(a), which is ABR in R 299.11003}

   (a) Duty to Reapply. If the licensee wishes to continue an activity regulated by this license after the expiration date of this license, the licensee shall submit a complete application for a new license to the Chief of the Waste Management Division at least 180 days before this license expires, September __, **2002**, unless an extension is granted pursuant to R 299.9510(5). {R 299.9521(1)(a) and (c) and (3)(a), and 40 CFR §270.30(b), which is ABR in R 299.11003}

   (b) License Expiration. To the extent consistent with Section 91(2) of Act 306, this license and all conditions herein will remain in effect beyond the license expiration date if the licensee has submitted a timely, complete application and the Chief of the Waste Management Division has not issued a new license. {R 299.9521(1)(c) and (3)(a)}

   (c) Inspection and Entry. The licensee shall allow the Chief of the Waste Management Division, or any authorized representative, including, but not limited to, a contractor, upon the presentation of credentials and other documents as may be required by law, to sample or monitor, at reasonable times, any substances or parameters at any location for the purpose of determining:

      (i) Whether the management of hazardous waste may present an imminent and substantial hazard to the health of persons or to the natural resources, or is endangering or causing danger to public health or the environment;

      (ii) Whether cause exists for an enforcement action, license revocation, license modification, denial of a license renewal application, or to determine compliance with this license.

      If samples are taken for analysis, duplicate samples and a copy of the analytical results shall be furnished to the licensee upon request.

      {Sections 11146(1) and (2) and 11148(1) of Act 451, R 299.9521(1)(a), and 40 CFR §270.30(i), which is ABR in R 299.11003}

   (d) Specific Monitoring Requirements. The Chief of the Waste Management Division reserves authority to require specific monitoring for hazardous wastes or hazardous waste constituents, in addition to those requirements detailed in this license, if the Chief of the Waste Management Division finds that additional monitoring is needed to demonstrate compliance with this license, Part 111 of Act 451, the rules, and any other applicable laws or rules. {R 299.9611(5)}

   (e) Notice of Facility Modifications. The licensee shall give notice to the Chief of the Waste Management Division as soon as possible prior to any planned physical alterations or additions to the licensed facility. {R 299.9519(1)}

   (f) License Amendments for Facility Modifications. The licensee shall request and obtain a license amendment prior to undertaking any modifications to the facility. Except as

otherwise authorized by Part 111 of Act 451 and the rules, the licensee shall obtain a construction permit prior to expanding, enlarging, or altering the facility. {R 299.9501(1), R 299.9519, and R 299.9521(1)(b)(i)}

(g) Submission of Statements and Certifications for Construction and Capability. The licensee shall submit to the Chief of the Waste Management Division, by certified mail or hand delivery, a letter signed by the licensee and a registered professional engineer stating that the facility has been constructed or modified in compliance with the license and approved plans and the certifications of construction and capability required pursuant to Section 11123(3) of Act 451. The licensee shall not treat, store, or dispose of hazardous waste in the modified portion of the facility until one of the following conditions is met:

(i) The Chief of the Waste Management Division, or the authorized representative, has inspected the modified facility and finds it is in compliance with the conditions of the license;

(ii) If within 15 days of the date of submission of the letter in Condition I.E.1.(g) of this license, the licensee has not received notice from the Chief of the Waste Management Division of his or her intent to inspect, prior inspection is waived, and the licensee may commence treatment, storage, or disposal of hazardous waste.

{R 299.9521(1)(b)(ii)}

(h) Anticipated Noncompliance. The licensee shall give advance notice to the Chief of the Waste Management Division as soon as the licensee becomes aware of any planned changes or activity in the licensed facility which may result in noncompliance with license requirements. {R 299.9521(1)(a) and 40 CFR §270.30(l)(2), which is ABR in R 299.11003}

(i) Transfer of License. The licensee shall obtain the approval of the Chief of the Waste Management Division, by a modification to the license, prior to transferring ownership or operation of the facility to another person. In addition, the licensee shall comply with the requirements of R 299.9605 when transferring the ownership of the facility. The new owner/operator shall not accept hazardous waste at the facility unless the license modification has been issued by the Chief of the Waste Management Division. {R 299.9522}

(j) Other Information. Whenever the licensee becomes aware that he/she failed to submit any relevant facts in the license application, or submitted incorrect information in a license application or in any report to the Chief of the Waste Management Division, the licensee shall promptly submit such facts or information. {R 299.9521(1)(a) and 40 CFR §270.30(l)(11), which is ABR in R 299.11003}

2. The licensee shall comply with the requirements of 40 CFR §270.30(c)-(e) and (h)-(j), including those requirements pertaining to:

(a) Need to halt or reduce activity not a defense,

(b) Duty to mitigate,

(c) Proper operation and maintenance,

(d) Duty to provide information,

(e) Inspection and entry,

(f) Monitoring and records.

{R 299.9521(1)(a) and 40 CFR §270.30(c)-(e) and (h)-(j), which are ABR in R 299.11003}

3. Any license noncompliance, except to the extent authorized by the MDEQ pursuant to the terms of an emergency operating license, constitutes a violation of Part 111 of Act 451 and is grounds for enforcement action, license revocation, license modification, or denial of a license renewal application. {R 299.9521(1)(a) and 40 CFR §270.30(a), which is ABR in R 299.11003}

F. SIGNATORY REQUIREMENT

The licensee shall insure that all reports required by this license or other information requested by the Chief of the Waste Management Division, or authorized representative, are signed and certified in accordance with R 299.9610(4), by a responsible corporate officer, as defined in 40 CFR §270.11, which is ABR in R 299.11003. {R 299.9521(1)(a) and 40 CFR §270.30(k), which is ABR in R 299.11003}

G. SUBMITTAL DUE DATES AND DEADLINES

When the due date or deadline for submission of applications, reports, records, and monitoring results required under this license falls on a weekend or legal state holiday, the due date or deadline shall be extended to the next regular business day, and reports, records, and monitoring results shall be considered submitted on a timely basis if submitted by the next regular business day. This extension does not apply to the submittal due date or deadline for financial mechanisms, and associated renewals, replacements, and continuations of financial mechanisms required under this license.

The licensee may request extension of the due dates or deadlines for submittals required under this license. The licensee shall submit such requests at least five business days prior to the existing due date or deadline for review and approval by the Chief of the Waste Management Division. Written extension requests shall include justification for each extension. {R 299.9521(3)(a)}

PART II

GENERAL OPERATING CONDITIONS

A. DESIGN AND OPERATION OF FACILITY

The licensee shall maintain and operate the facility to prevent the possibility of a fire, explosion, or any sudden or non-sudden release of hazardous waste or hazardous waste constituents to the environment, including air, soil, or waters of the State which could threaten human health or welfare or the environment. {R 299.9602, R 299.9606, R 299.9607, and 40 CFR §§264.31 and 264.51, which are ABR in R 299.11003}

B. REQUIRED NOTICE

1. The licensee shall notify the Chief of the Waste Management Division in writing at least four weeks in advance of the date the licensee expects to receive hazardous waste from a foreign source. Notice of subsequent shipments of the same waste from the same foreign source is not required. When receiving such hazardous waste, the licensee shall comply with applicable laws, including, but not limited to, any treaties or other agreements entered into between the country in which the foreign source is located and the United States. {R 299.9605(1) and 40 CFR §264.12(a), which is ABR in R 299.11003}

2. When the licensee is to receive hazardous waste from an off-site source (except where the licensee is also the generator), he must inform the generator in writing that he has the appropriate license for, and will accept, the waste the generator is shipping. The licensee must keep a copy of this written notice as part of the operating record (see Condition II.L.1. of this license). {R 299.9605(1) and 40 CFR §264.12(b), which is ABR in R 299.11003}

C. GENERAL WASTE ANALYSIS

1. The licensee shall ensure that any waste stored, treated, or disposed at the facility has been properly characterized pursuant to R 299.9302, and comply with the procedures described in the attached waste analysis plan, Attachment 1 of this license, and the following conditions which modify the referenced sections in Attachment 1:

   (a) **The licensee shall not accept waste containing polychlorinated biphenyls (PCBs) with concentrations greater than 50 parts per million (ppm). The licensee shall sample and analyze each incoming shipment of oily waste or waste suspected of containing PCBs in accordance with the sampling techniques specified in Section 6.3 of the waste analysis plan and a standard U.S. EPA methodology or a methodology approved by MDEQ to quickly detect PCBs concentrations greater than 50 ppm. If waste containing PCBs with concentrations greater than 50 ppm are detected with this methodology, the licensee shall conduct additional confirmatory testing. Upon receipt of results confirming that the waste contains such PCBs, the licensee shall reject the waste in accordance with the rejected load procedures included in waste analysis plan. The analytical test methodology to be utilized by the licensee shall be included in Table 2 and Appendix B of the waste analysis plan. [Sections 3.2, 3.2.3, 5.1, Table 2, and Appendices A and B]**

   (b) **All combustible containers, supports, and packaging added to a batch treatment process, whether or not integral to the wastes or reagents comprising the batch, shall be recorded on the batch ticket and added and mixed proportionally in the acceptance laboratory mock compatibility test tank. The batch ticket is a log used to document the description and quantity of waste and reagents in a batch treatment process. The licensee shall record and**

maintain the results of the laboratory simulations in accordance with Condition II.L.1 of this license. [Section 3.2.3]

(c) Wastes that are bulked and consolidated in vertical tanks or roll-off boxes shall be subjected to the same compatibility and waste code evaluations as applied to wastes that are mixed in the treatment tanks. Such waste bulking or consolidation shall not be considered final treatment of the waste. [Section 3.3.2]

(d) The sampling techniques described herein are performed in accordance with the techniques outlined in US EPA's SW-846. [Section 6.1]

(e) All sampling equipment used in the collection of waste samples shall either be disposable (i.e., scoops or drum thieves) or sufficiently cleaned to remove observable contamination prior to sampling prior to reuse. [Section 6.4]

(f) The compatibility test as described in Appendix B of the waste analysis plan shall be modified pursuant to Condition VII.B. of this license. Upon receipt of written approval, the compatibility test workplan shall become a part of the waste analysis plan, Attachment 1 of this license, and an enforceable part of this license. [Appendix B]

{R 299.9605(1), and 40 CFR §264.13, which is ABR in R 299.11003}

D. QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

The licensee shall ensure that all samples collected for the purposes of waste characterization and environmental monitoring are collected, transported, analyzed, stored, and disposed of by trained and qualified individuals in accordance with their Quality Assurance/Quality Control (QA/QC) Plan. The QA/QC Plan shall at a minimum include the written procedures outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. Environmental Protection Agency (U.S. EPA) Publication SW-846, Third Edition, Chapter 1, and its Updates I (July 1992), II (September 1994), IIA (August 1993), and IIB (January 1995), and any facility or contractor's written standard operating procedures (SOPs) which are equivalent or more stringent than SW-846, Chapter 1. The licensee shall make the written QA/QC Plan available to the Chief of the Waste Management Division or an authorized representative upon request. {R 299.9521(3)(a) and (b) and R 299.9611(2)}

E. SECURITY

The licensee shall comply with the security requirements of R 299.9605(1) and 40 CFR §264.14, which is ABR in R 299.11003.

F. GENERAL INSPECTION REQUIREMENTS

1. The licensee shall inspect the hazardous waste management facility, remedy any deterioration or malfunction of equipment or structures, and document inspections and remedies in accordance with the attached inspection schedule, Attachment 2 of this license, and the provisions of 40 CFR §264.15 which is ABR in R 299.11003. {R 299.9605(1)}

2. The licensee shall develop and implement a procedure to insure compliance with the requirements of R 299.9605(2).

G. **PERSONNEL TRAINING**

The licensee shall conduct personnel training as required by R 299.9605(1) and 40 CFR §264.16, which is ABR in R 299.11003. This training program shall, at a minimum, cover all items in the attached outline, Attachment 3 of this license. The licensee shall maintain training documents and records as required by R 299.9605 and 40 CFR §264.16(d), which is ABR in R 299.11003.

H. **PREPAREDNESS AND PREVENTION**

The licensee shall comply with the preparedness and prevention requirements of R 299.9606, including, but not limited to, required equipment, testing, and maintenance of equipment, access to communications and alarm systems, required aisle space, and arrangements with emergency response teams. {R 299.9606 and 40 CFR Part 264, Subpart C, which is ABR in R 299.11003}

I. **CONTINGENCY PLAN**

The licensee shall comply with the contingency plan requirements of R 299.9607. The contingency plan, Attachment 4 of this license, and the prescribed emergency procedures shall be immediately implemented by the licensee whenever there is a fire, explosion, or other release of hazardous waste or hazardous waste constituents which threatens or could threaten human health or the environment, or if the licensee has knowledge that a spill has reached surface water or groundwater. {R 299.9607 and 40 CFR Part 264, Subpart D, which is ABR in R 299.11003}

J. **DUTY TO MITIGATE**

Upon notification from the Chief of the Waste Management Division or his or her designee that an activity at the facility may present an imminent and substantial endangerment to human health or the environment, the licensee shall immediately halt such activity and conduct other activities as required by the Chief of the Waste Management Division to eliminate the said endangerment. The licensee shall not resume the halted activity without the prior written approval from the Chief of the Waste Management Division. {Section 11148 of Act 451 and R 299.9521(3)(b)}

K. **MANIFEST SYSTEM**

1. The licensee shall comply with the manifest requirements of R 299.9304, R 299.9305, and R 299.9608.

2. The licensee shall follow the MDEQ, Waste Management Division, rejected load procedures included in waste analysis plan, Attachment 1 of this license.

L. **RECORDKEEPING AND REPORTING**

1. Operating Record. The licensee shall maintain a written operating record at the facility, until closure of the facility. {R 299.9609 and 40 CFR §264.73 and Part 264, Appendix I, which are ABR in R 299.11003}

2. Biennial Report. The licensee shall comply with the biennial report requirements of R 299.9610. A single copy of the biennial report shall be submitted to the U.S. EPA, Region 5 Administrator by March 1 of each even numbered year. {R 299.9521(1)(a) and R 299.9610 and 40 CFR §270.30(l)(9), which is ABR in R 299.11003}

3. Environmental Monitoring Reports. The licensee shall submit the results of all environmental monitoring required by this license in the form of an Environmental Monitoring Report to the Chief of the Waste Management Division within 60 days of sample collection. In addition, the licensee shall submit air monitoring results to the Wayne County Department of Environment, Air Quality Management Division. {R 299.9521(1)(a) and 40 CFR §270.30(l)(4), which is ABR in R 299.11003}

4. Environmental Monitoring Data Availability. The licensee shall provide environmental monitoring information or data which it generates to any local public official requesting such information or data. Such information or data shall be made available on the same day the licensee forwards this information to the Chief of the Waste Management Division. {R 299.9521(3)(b)}

5. Additional Environmental Sampling and Analysis. If the licensee conducts any additional environmental sampling or analysis beyond that required by this license, the results of such sampling or analysis shall be reported in accordance with Condition II.L.4. of this license. Such increased frequency shall also be indicated in the Environmental Monitoring Report. {R 299.9521(1)(a) and 40 CFR §270.30(l)(4), which is ABR in R 299.11003}

6. Reporting of Noncompliance. The licensee shall immediately report to the Chief of the Waste Management Division any noncompliance with the license that may endanger human health or the environment. The licensee shall fulfill this reporting requirement by doing both of the following:

   (a) The licensee shall immediately contact the Chief of the Waste Management Division at 517-373-2730, if the noncompliance occurs during the period 8:00 a.m. to 5:00 p.m., Monday through Friday, except State holidays, or by calling the Department of Environmental Quality Pollution Emergency Alerting System (PEAS) telephone number 1-800-292-4706 during all other times. This report shall include the following:

      (i) Information concerning the release or discharge of any hazardous waste or hazardous waste constituent which may endanger public drinking water supplies or the environment;

      (ii) Information concerning the fire, explosion, or other release or discharge of any hazardous waste or hazardous waste constituent which could threaten human health or the environment or a spill that has reached surface water or groundwater;

      (iii) A description of the occurrence and its cause, including all of the information outlined in R 299.9607(2)(a)-(i).

   (b) The licensee shall also follow-up the verbal report by providing a written report to the Chief of the Waste Management Division within five days of the time the licensee becomes aware of the circumstances. The written report shall contain all of the information in Condition II.L.7.(a)(i)-(iii) of this license along with a description of the noncompliance and its cause; the periods of noncompliance (including exact dates and times); whether the noncompliance has been corrected and, if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance and when those activities occurred or will occur. The licensee need not comply with the five-day written notice requirement if the Chief of the Waste Management Division waives the requirement and the licensee submits a written report containing this information within 15 days of the time the licensee becomes aware of the circumstances.

   {R 299.9521(1)(a) and R 299.9607 and 40 CFR §270.30(l)(10), which is ABR in R 299.11003}

7. Other Noncompliance. The licensee shall report all other instances of noncompliance with this license, Part 111 of Act 451, the rules, and any other applicable environmental laws or rules that apply to the licensed facility, at the time monitoring reports required by this license are submitted or within 30 days, whichever is sooner. The reports shall contain the information listed in Condition I.L.7. of this license. {R 299.9521(1)(a) and 40 CFR §270.30(l)(10), which is ABR in R 299.11003}

B. Form Modification. The licensee may make minor modifications to the forms contained in the attachments to this license. The modifications may include changing the format, updating existing references and information, adding necessary information, and changing certification and notification information in accordance with Part 111 of Act 451 and its rules, and RCRA and its regulations. The licensee shall submit the modifications to the Chief of the Waste Management Division prior to implementing the use of the modified form(s). If the Chief of the Waste Management Division does not reject or require revision of the modified form(s) within 14 days of receipt, the licensee shall implement use of the modified form(s) and the form(s) shall be incorporated into this license as a replacement for the existing form(s).

M. CLOSURE

The licensee shall comply with the closure requirements of R 299.9613, including, but not limited to, performance standards, amendment of closure plans, notification of closure, time allowed for closure, disposal or decontamination of equipment, and certification of closure. The licensee shall close the facility in accordance with the closure plan, Attachment 5 of this license, all other applicable requirements of this license, and all other applicable laws. The licensee shall submit a proposed amended copy of the closure plan to the Chief of the Waste Management Division at the same time such a license modification is requested. {R 299.9613 and 40 CFR Part 264, Subpart G, except 40 CFR §§264.112(d)(1), 264.115, and 264.120, which is ABR in R 299.11003}

N. COST ESTIMATE FOR FACILITY CLOSURE

1. At the time of issuance of this license, the closure cost estimate is $939,131.

2. The licensee shall comply with the closure cost estimate requirements of R 299.9702, including, but not limited to, adjustment of the closure cost estimate and maintenance of the latest cost estimate at the facility. {R 299.9702 and 40 CFR §264.142, which is ABR in R 299.11003}.

O. FINANCIAL ASSURANCE FOR FACILITY CLOSURE

1. The licensee shall provide and continuously maintain closure financial assurance in accordance with R 299.9703 in an amount at least equal to the cost estimate required by Condition II.N. of this license. The licensee shall submit all proposed changes in the mechanism(s), other than renewals, extensions, or increases in the amount of assurance, to the Chief of the Waste Management Division and obtain his approval prior to implementation. The licensee shall provide the Chief of the Waste Management Division with a signed original of all revisions and renewals within 60 days after such revision or renewal, by the applicable deadlines specified in R 299.9704 through R 299.9709, and prior to the anniversary of the establishment of the financial mechanism(s) provided to satisfy the requirements of this condition.

2. Whenever the current closure cost estimate increases to an amount greater than the current amount of the associated financial mechanism, the licensee shall, within 60 days after the increase, either increase the amount of the mechanism to an amount at least equal to the increased closure cost estimate, or provide an additional financial mechanism approved by the Chief of the Waste

Management Division for an amount at least equal to the difference between the current amount of financial assurance and the increased closure cost estimate. Evidence of such increased financial assurance must be submitted to the Chief of the Waste Management Division during the 60-day period.

P. LIABILITY REQUIREMENTS

The licensee shall continuously maintain liability coverage for sudden and accidental occurrences, as required by R 299.9710, except as otherwise allowed by that rule. The licensee shall submit to the Chief of the Waste Management Division a signed original pollution liability insurance amendatory endorsement or other financial mechanism approved by the Chief of the Waste Management Division prior to the anniversary date of the establishment of the mechanism(s) used to satisfy the requirements of this condition. In the case of the financial test or corporate guarantee, the licensee shall submit the updated financial information within 90 days of the close of each succeeding fiscal year.

Q. WASTE MINIMIZATION

The licensee shall certify at least annually that the licensee has a program in place to reduce the volume and toxicity of hazardous waste that the licensee generates to the degree determined by the licensee to be economically practicable; and the proposed method of treatment, storage, or disposal is the practicable method currently available to the licensee which minimizes the present and future threat to human health and the environment. The certification shall be recorded, as it becomes available, and maintained in the operating record until closure of the facility. {R 299.9609(1)(a), 40 CFR §264.73(b)(9), which is ABR in R 299.11003, and Section 3005(h) of RCRA, 42 U.S.C. Section 6925(h)}

R. LAND DISPOSAL RESTRICTIONS

The licensee shall comply with all of the requirements of 40 CFR Part 268. {R 299.9627 and 40 CFR Part 268, which is ABR in R 299.11003}

S. AIR EMISSION STANDARDS

1. The licensee shall notify the Chief of the Waste Management Division of any waste management units which become subject to the requirements of 40 CFR Part 264, Subparts AA and BB, within 30 days of the start of the regulated activity. {R 299.9630, R 299.9631, and 40 CFR Part 264, Subparts AA and BB, which are ABR in R 299.11003}

2. **The licensee shall operate the facility in a manner that minimizes odors emanating from the facility and that prevents odors which violate Part 55 of Part 451 and the rules promulgated pursuant to that part. A complaint of objectionable odor, which has been confirmed and verified by the Wayne County Air Pollution Control Authority to have been caused by the operation of the facility, is considered to be a violation of this condition.**

   Upon receipt of such confirmed odor complaint, the licensee shall:

   (a) investigate the operations of the facility which caused the complaint,

   (b) take such actions as may be necessary to eliminate the cause of the complaint provided such actions do not otherwise violate the terms and conditions of this license,

   (c) determine the changes in operations necessary to prevent a recurrence of the odor complaint,

   (d) submit a written report to the Chief of the Waste Management Division which documents

the results of the investigation and the changes needed in the operations to avoid a recurrence, and

(d) complete such additional steps as the Chief of the Waste Management Division determines are necessary to prevent recurrence of the odor.

Failure to comply with any of these steps is a violation of this license.

{R 299.9521(3)(b) and R 299.9602(1)(a)}.

T. **HAZARDOUS WASTE DELIVERY AND ON-SITE WASTE TRANSPORT REQUIREMENTS**

1. All deliveries of hazardous waste to the facility shall be made in accordance with the procedures specified in Attachment 6 of this license.

2. The licensee shall provide written notification to the transportation companies regularly frequenting the facility that:

   a) Wastes shipped to the facility must be placed into closed containers or covered during transportation. The structural integrity of the waste containers must prevent leakage while in transit.

   b) All trucks transporting hazardous waste to or from the facility shall use Rawsonville Road to enter and exit the facility.

   c) Trucks transporting hazardous waste to or from the facility shall neither park nor stand on the North I-94 Service Drive.

3. **All vehicles transporting or holding hazardous or non-hazardous waste or waste constituents, treated or untreated, or any product or product constituents, shall be covered at all times except when sampling, loading, or unloading. The vehicles in question shall only be uncovered immediately before such activities, and shall be covered immediately after such activities.**

4. **The licensee shall maintain adequate access for ingress and egress to any portion of the facility to allow unobstructed movement of personnel and equipment in case of an emergency. {R 299.9606 and 40 CFR §264.34, which is ABR in R 299.11003}**

{R 299.9521(3)(b)}

U. **GENERAL HOUSEKEEPING**

1. **If any visible contamination remains on the exterior of a vehicle, the licensee shall decontaminate that vehicle to prevent the vehicle from tracking the contamination through the facility or outside the facility.**

2. **The licensee shall remove any spilled or leaked waste at the facility immediately upon detection and manage it in accordance with the requirements of Part 111 of Act 451 and its rules.**

{R 299.9521(3)(b)}

V. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The licensee shall maintain at the facility the following documents and amendments required by this license, until closure is completed, certified by an independent registered professional engineer, and the facility is released from financial assurance requirements for closure by the Director:

1. Waste analysis plan, including QA/QC plan.
2. Inspection schedules.
3. Personnel training documents and records.
4. Contingency plan.
5. Closure plan.
6. Cost estimates for facility closure and copies of related financial assurance documents.
7. Operating record.
8. Site security plan.
9. Facility engineering plans and specifications.
10. Recordkeeping procedures.
11. Environmental monitoring plans, including sampling and analysis plans and QA/QC plans.
12. Environmental monitoring data and statistical records.
13. Preventative procedures (personnel protection plan).

{R 299.9521(3)(a)}

PART III
CONTAINER STORAGE AND TREATMENT CONDITIONS

A. COVERAGE OF LICENSE

1. The hazardous waste container storage areas at the facility shown on Drawings entitled Site Plan, Facility Drawing, and S.E. Storage Area are covered by this license. Any expansion or enlargement beyond the facility boundary shown on previously referenced drawings or beyond the 264,300 gallon hazardous waste storage design capacity requires a construction permit from the Chief of the Waste Management Division. {R 299.9521(1)(b)}

2. Drawings entitled Site Plan, Facility Drawing, and S.E. Storage Area are incorporated into this license as part of Attachment 7.

B. WASTE IDENTIFICATION AND QUANTITY

1. The licensee may store no more than a total volume of 264,300 gallons of the hazardous wastes listed in Attachment 8 in containers at the facility, subject to the terms of this license. **For the purposes of converting gallons to pounds, the conversion factor shall be 8.34 pounds equal 1 gallon of water.** {R 299.9521(2)(d)}

2. A maximum of 82,500 gallons of waste in 1500 containers may be stored in the North Container Storage Area in accordance with the Facility Drawing in Attachment 7. {R 299.9521(3)(b)}

3. A maximum of 33,000 gallons of waste in 600 containers may be stored in the East Container Staging Area in accordance with the Facility Drawing in Attachment 7. {R 299.9521(3)(b)}

4. The licensee may temporarily store, in accordance with the Facility Drawing in Attachment 7, a maximum number of 100 containers that are difficult to empty inside the west and east bays of the treatment building prior to the drums being crushed, and for the purposes of preparation for opening and final disposal of wastes into the treatment tanks. The containers shall be stored on the paved floor in front of the treatment tanks storing treated waste awaiting analytical results. Containers may be stored in this area for no more than one eight hour shift. {R 299.9521(3)(b)}

5. At no time shall the total number of containers in storage in the North Container Storage Area, the East Container Staging Area, and within the bays of the treatment building exceed 1500 containers or 82,500 gallons. {R 299.9521(3)(b)}

6. **A maximum of 181,800 gallons or 900 cubic yards of hazardous waste in containers may be stored in the Southeast Container Storage Area in accordance with the S.E. Storage Area drawing in Attachment 7, subject to the terms of this license. {R 299.9521(3)(b)}**

C. WASTE TREATMENT METHODS

The licensee may treat hazardous debris contaminated with the hazardous waste codes listed in Attachment 8 of this license in macroencapsulation units at the facility, subject to the terms of this license. Placement of hazardous debris directly into a macroencapsulation unit shall occur only inside the treatment building under the confines of the air pollution control equipment. {R 299.9521(2)(d) and (3)(a) and (b)}

D. CONDITION OF CONTAINERS

If a container holding hazardous waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the licensee shall transfer the hazardous waste from such container to a

container that is in good condition, or otherwise manage the waste in compliance with the conditions of this license. {R 299.9614(1)(a) and 40 CFR §264.171, which is ABR in R 299.11003}

E. **COMPATIBILITY OF WASTE WITH CONTAINERS**

The licensee shall assure that the ability of the containers to contain the waste is not impaired. {R 299.9614 and 40 CFR §264.172, which is ABR in R 299.11003}

F. **MANAGEMENT OF CONTAINERS**

1. The licensee shall keep all containers holding hazardous waste closed during storage except when it is necessary to add or remove waste, and shall not open, handle, or store containers in a manner which may rupture the containers or cause them to leak. {R 299.9614 and 40 CFR §264.173, which is ABR in R 299.11003}

2. The licensee shall ensure that each container of hazardous waste in the container storage area is labeled or clearly marked with the words "Hazardous Waste" and the hazardous waste number, and the date it was accepted for storage so that compliance with the one-year storage limit can be assessed. The labels on each container shall be clearly visible for inspection. {R 299.9521(3)(b), R 299.9614, R 299.9627, and 40 CFR §268.50(a)(2)(i), which is ABR in R 299.11003}

3. The licensee shall only place containers into the hazardous waste container storage areas referenced in Condition III.A. of this license in accordance with the configuration shown in the Facility Drawing and the S.E. Storage Area Drawing in Attachment 7 of this license or an alternate configuration approved by the Chief of the Waste Management Division. {R 299.9521(3)(b)}

4. The licensee shall not stack containers of hazardous waste. {R 299.9521(3)(b)}

5. The licensee shall not store any container of hazardous waste for more than one year in the container storage areas referenced in Condition III.A. of this license prior to treatment of its contents on site or shipment off-site to another appropriately licensed hazardous waste treatment or disposal facility, except as approved by the Chief of the Waste Management Division based on a petition demonstrating that such storage is solely for the purpose of accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment, or disposal. {R 299.9521(3)(b), R 299.9627, and 40 CFR Part 268, which is ABR in R 299.11003}

6. **The licensee shall not store containers holding liquid hazardous waste in the Southeast Container Storage Area unless Conditions VII.A.1.- VII.A.3. of this license are complied with. {R 299.9614 and 40 CFR §264.175, which is ABR in R 299.11003}**

7. **The licensee shall store containers of treated hazardous or non-hazardous waste in the North Container Storage Area and the Southeast Container Storage Area until such time as the waste is removed for retreatment or disposal off-site. {R 299.9521(1)(b)}**

8. **The licensee shall not store treated hazardous or non- hazardous waste in tractor-trailers or similar containers in the North Container Storage Area and the Southeast Container Storage Area unless Conditions VII.A.1. - VII.A.3. of this license are complied with. {R 299.9602(1)(b) and R 299.9521(3)(b)}**

9. **The licensee shall not store empty containers at the facility in a manner that results in air pollution violations. {R 299.9602(1)(b) and R 299.9521(3)(b)}**

G. **CONTAINMENT**

The licensee shall operate and maintain the containment system in accordance with the requirements of R 299.9614 and 40 CFR §264.175, which is ABR in R 299.11003, and the attached plans and specifications in Attachment 7 of this license.

H. **SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTES**

1. The licensee shall not locate containers holding ignitable or reactive wastes within 15 meters (50 feet) of the facility's property line. {R 299.9614 and 40 CFR §264.176, which is ABR in R 299.11003}

2. The licensee shall prevent the ignition of ignitable wastes by following the procedures specified in Attachment 9 of this license. {R 299.9605 and 40 CFR §264.17(a), which is ABR in R 299.11003}

3. The licensee shall document compliance with Condition III.G.2. of this license and place this documentation in the operating record (Condition II.L.1. of this license). {R 299.9605 and 40 CFR §264.17(c), which is ABR in R 299.11003}

4. The licensee is prohibited from storing reactive wastes in the hazardous waste container storage areas referenced in Condition III.A. of this license. {R 299.9521(2)(d) and (3)(b)}]

5. The licensee is prohibited from storing ignitable wastes having a flashpoint less than 90°F. {R 299.9521(2)(d) and (3)(b)}

6. Containers holding ignitable waste shall be stored only in the East Container Staging Area. Such containers shall be clearly segregated from waste containers awaiting acceptance.

SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES OR MATERIALS

1. The licensee is prohibited from placing incompatible wastes or incompatible wastes and materials in the same container. {R 299.9521(2)(d) and (3)(b)}]

2. The licensee shall prevent the placement of hazardous waste in an unwashed container that previously held an incompatible waste or material. {R 299.9614 and 40 CFR §264.177(b), which is ABR in R 299.11003}

3. The licensee is prohibited from storing incompatible wastes or material in the hazardous waste container storage areas referenced in Condition III.A. of this license. {R 299.9521(2)(d)}

4. The licensee shall document compliance with Conditions III.H.1. and III.H.2. of this license and place this documentation in the operating record (Condition II.L.1. of this license). {R 299.9605 and 40 CFR §264.17(c), which is ABR in R 299.11003}

J. **DISPOSITION OF ACCUMULATED LIQUIDS AND SOLIDS**

The licensee shall remove spilled or leaked waste and accumulated precipitation from the containment system immediately upon detection and manage it in accordance with the requirements of Part 111 of Act 451 and the rules, as specified in Attachment 7 of this license. {R 299.9521(3)(b), R 299.9614(1)(a) and 40 CFR §264.175(b)(5), which is ABR in R 299.11003}

′. COMPLIANCE WITH AIR EMISSION AND WASTE MANAGEMENT REQUIREMENTS FOR STORAGE IN CONTAINERS

The licensee shall comply with all air emission and waste management requirements for hazardous waste storage containers contained in permits issued under the Wayne County Air Pollution Control Ordinance and Part 55 of Act 451. Failure to abide by the above referenced statute or permits issued thereunder shall constitute a violation of this license. {R 299.9602(1)(b)}

PART IV

TANK SYSTEM STORAGE AND TREATMENT CONDITIONS

A. COVERAGE OF LICENSE

1. The hazardous waste tank system storage and treatment areas at the facility shown on the Facility Drawing are covered by this license. Any expansion or enlargement beyond the facility boundary shown on the Facility Drawing or beyond the 649,880 gallon tank system storage design capacity or beyond the 576,000 gallon per day treatment design capacity requires a construction permit from the Chief of the Waste Management Division. {R 299.9521(1)(b)}

2. The Facility Drawing is incorporated into this license as Attachment 10.

B. WASTE IDENTIFICATION AND QUANTITY

1. The licensee may store no more than a total volume of 649,880 gallons of the hazardous wastes listed in Attachment 8 in the tank systems identified as Tanks #1, #2, #3, #7A, #7B, #8A, #8B, #9A, #9B, #10A, #10B, #11, #12, #16, #17, #18, #19, #25, and #27 in Attachment 10, subject to the terms of this license. **For the purposes of converting gallons to pounds, the conversion factor shall be 8.34 pounds equal 1 gallon of water.** {R 299.9521(2)(d) and (3)(a) and (b)}

2. The licensee may store a maximum of 60,000 gallons of dry hazardous waste dust in the three hazardous waste lime storage silos designated Tank #1, Tank #2, and Tank #3. {R 299.9521(2)(d) and (3)(a) and (b)}

3. The licensee may store a maximum of 389,880 gallons of hazardous wastes in the eight waste treatment tanks designated Tank #7A, Tank #7B, Tank #8A, Tank #8B, Tank #9A, Tank #9B, Tank #10A, and Tank #10B. {R 299.9521(2)(d) and (3)(a) and (b)}

4. The licensee may store a maximum of 80,000 gallons of hazardous liquid and sludge wastes in the two sludge receiving tanks designated Tank #11 and Tank #12. {R 299.9521(2)(d) and (3)(a) and (b)}

5. The licensee may store a maximum of 80,000 gallons of hazardous wastes awaiting treatment in the four waste/reagent storage tanks designated Tank #16, Tank #17, Tank #18, and Tank #19. {R 299.9521(2)(d) and (3)(a) and (b)}

6. The licensee may store a maximum of 40,000 gallons of hazardous waste or waste regent in the waste/reagent storage tanks designated Tank #25 and Tank #27. {R 299.9521(2)(d) and (3)(a) and (b)}

C. WASTE TREATMENT CAPACITY AND METHODS

1. The licensee may treat no more than a total volume of 576,000 gallons per day of the hazardous wastes listed in Attachment 8 in the tank systems identified as Tanks #7A, #7B, #8A, #8B, #9A, #9B, #10A, #10B, #14, and #15 in Attachment 10, subject to the terms of this license. {R 299.9521(2)(d) and (3)(a) and (b)}

2. The licensee shall treat hazardous wastes listed in Attachment 8 of this license through chemical stabilization. For wastes that require more than one type of treatment, the licensee shall use neutralization, deactivation, chemical oxidation, and/or chemical reduction treatment technologies. Waste treatment shall be conducted in accordance with the methods and procedures specified in

Attachment 11 of this license, subject to the terms of this license. {R 299.9633}

3. The licensee may treat hazardous debris contaminated with waste codes listed in Attachment 8 of this license by using the microencapsulation and macroencapsulation immobilization technologies specified in 40 CFR §268.45 and the procedures specified in Attachment 11 of this license, subject to the terms of this license. {R 299.9521(2)(d), R 299.9627 and 40 CFR Part 268, which is ABR in R 299.11003}

4. The licensee may operate the treatment system 24 hours per day, 7 days per week. {R 299.9521(3)(b)}

5. **The licensee shall operate the air pollution control equipment 24 hours a day and maintain negative static pressure in the waste treatment building (pugmill mixer rooms, waste treatment /storage tanks) at all times. The licensee shall not have more than one overhead door open at a time on each of the waste treatment process buildings. {R 299.9602(1)(b) and R 299.9521(3)(b)}**

6. **The licensee shall cover hazardous and non-hazardous treated waste loads in the treatment building prior to the load being transported from the treatment building. {R 299.9521(3)(b)}**

7. **The licensee shall not mix waste during treatment in such a manner that the mixture exceeds the edge height of the tank. {R 299.9521(3)(b)}**

8. **Treatment of hazardous and non-hazardous waste shall be completed within the confines of the treatment building. Except as specified in this condition, emissions from treated waste must be controlled in a building with a permitted air pollution control system until the waste is no longer emitting volatile organic compounds (VOCs) or odors.**

   Treated wastes may be directly transported from the treatment building to the container storage areas equipped with a permitted air pollution control systems in compliance with the standardized treatment methodologies specified in Condition IV.C.10. and Condition IV.C.6. of this license. {R 299.9602(1)(b) and R 299.9521(3)(b)}

9. **The licensee shall determine and document the completion of treatment, at a minimum, by VOC measurements (using photoionization detectors), mixing times, holding times, physical observations, and temperature. {R299.9633(d)}**

10. **The licensee shall develop standardized batch treatment methodologies and facility checklists for the application of such methodologies for each treatment process and combinations of treatment processes. Such methodologies must contain a description of the point after treatment at which treated waste may be transported to the container storage areas as described in Condition IV.C.8. so as to minimize odors emanating from the waste. These methodologies shall be submitted to the Chief of the Waste Management Division for approval, within 60 days of issuance of this license. The licensee shall follow and document the use of the approved methodologies in specifying, adding and mixing wastes and reagents for each waste treatment. {R299.9633(d)}.**

D. DESIGN, CONTAINMENT AND ASSESSMENT OF TANK SYSTEMS

The licensee shall operate and maintain all tank systems in accordance with the applicable requirements of R 299.9615 and 40 CFR §§264.191, 264.193, and 264.194, which are ABR in R 299.11003, and the attached plans and specifications in Attachment 10 of this license.

E. MANAGEMENT OF TANK SYSTEMS

1. The licensee shall manage the tank systems in accordance with the requirements of R 299.9615 and 40 CFR §§264.194 and 264.196 which are ABR in R 299.11003, and the spill and overfill prevention procedures specified in Attachment 12 of this license.

2. The licensee shall conduct the treatment of hazardous wastes in accordance with the methods and procedures specified in Attachment 11 of this license. {R 299.9633}

3. The licensee shall operate and maintain all tanks in compliance with the requirements of R 29.4101 to R 29.4504 pursuant to the provisions of the Fire Prevention Act, 1941 PA 207, as amended. {R 299.9615}

4. The licensee shall label tank systems in accordance with the provisions of National Fire Protection Association (NFPA) Standard No. 704. {R 299.9615(5)}

5. The licensee shall clearly mark each tank containing land disposal restricted waste with a description of its contents, the quantity of each hazardous waste received, and the date each period of accumulation begins, or record such information for each tank system in the facility operating record. {R 299.9627 and 40 CFR §268.50(a)(2)(ii), which is ABR in R 299.11003}

6. The licensee shall not store any hazardous waste in the tanks referenced in Condition IV.A. of this license for more than one year prior to treatment of its contents on-site or shipment off-site to another appropriately licensed hazardous waste treatment or disposal facility. The licensee may store hazardous waste in a tank for more than the one-year period based upon a petition approved by the Chief of the Waste Management Division demonstrating that such storage is solely for the purpose of accumulation of such quantities of hazardous waste as are necessary to facilitate proper recovery, treatment, or disposal. {R 299.9521(3)(b), R 299.9627, and 40 CFR Part 268, which is ABR in R 299.11003}

F. SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTES

1. The licensee shall not place ignitable in a tank system unless the procedures described in Attachment 9 of this license are followed. {R 299.9615 and 40 CFR §264.198(a), which is ABR in R 299.11003}

2. The licensee shall document compliance with Condition IV.F.1. of this license and place this documentation in the operating record (Condition II.L.1. of this license). {R 299.9605, R 299.9609, and 40 CFR §§264.17(c) and 264.73(b)(3), which are ABR in R 299.11003}

3. The licensee shall maintain the protective distances between the tank systems and any public ways, streets, alleys, or adjoining property lines that can be built upon, as required in Tables 2-1 through 2-6 of the NFPA's "Flammable and Combustible Liquids Code" (1977 or 1981) as specified in Attachment 9 of this license, and as required by R 299.9615 and 40 CFR §264.198(b), which is ABR in R 299.11003.

G. PROHIBITION ON STORING OR TREATING IGNITABLE OR REACTIVE WASTES OR MATERIALS

The licensee is prohibited from storing or treating reactive wastes or materials in tank systems at the facility. {R 299.9521(2)(d) and (3)(b)}

H. SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES OR MATERIALS

1. The licensee shall not place incompatible wastes or incompatible wastes and materials, in the same tank system or place hazardous waste in a tank system that has not been decontaminated and that previously held an incompatible waste or material. {R 299.9615 and 40 CFR §264.199, which is ABR in R 299.11003}

2. The licensee shall document compliance with Condition IV.H.1. of this license, as required by R 299.9605 and 40 CFR §264.17(c), and place this documentation in the operating record. The provisions of 40 CFR §264.17(c) are ABR in R 299.11003. {R 299.9609 and 40 CFR §264.73(b)(3), which is ABR in R 299.11003}

I. DISPOSITION OF ACCUMULATED LIQUIDS AND SOLIDS

The licensee shall remove spilled or leaked waste and accumulated precipitation from the tank systems, including the treatment bays, immediately upon detection and manage it in accordance with the requirements of Part 111 of Act 451 and the rules. {R 299.9521(3)(b), R 299.9615, and 40 CFR §264.193(c)(4), which is ABR in R 299.11003}

J. COMPLIANCE WITH AIR EMISSION AND WASTE MANAGEMENT REQUIREMENTS FOR STORAGE AND TREATMENT IN TANK SYSTEMS

The licensee shall comply with all air emission and waste management requirements for hazardous waste storage and treatment tanks contained in permits issued under the Wayne County Air Pollution Control Ordinance and Part 55 of Act 451. Failure to abide by the above referenced statute or permits issued thereunder shall constitute a violation of this license. {R 299.9602(1)(b)}

PART V

ENVIRONMENTAL MONITORING CONDITIONS

A. GROUNDWATER MONITORING PROGRAM

1. The licensee shall conduct a detection monitoring program. Under this program, the licensee shall operate and maintain a groundwater monitoring system consisting of monitoring wells labeled OB-18, OB-19, OB-21, OB-23R, OB-36, and OB-47 as shown on Attachment A of the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license. {R 299.9611(2)(b) and R 299.9612}

   The licensee shall sample the monitoring wells in accordance with the procedures specified below:

   (a) Static water level measuring devices, pumps and/or sampling equipment shall be compatible with the parameters sampled and must be thoroughly cleaned and rinsed before use in each monitoring well and piezometer. Sampling procedures shall assure that cross-contamination and changes in water chemistry do not occur. {R 299.9612 and 40 CFR §264.97(d) and (e), which are ABR in R 299.11003}

   (b) The static water elevation shall be determined by methods giving precision to 1/8 inch or 0.01 foot prior to purging water from the wells for sampling. Measurements shall be made from the top of the casing with the elevation of all casings in the monitoring well system related to a permanent reference point, using United States Geological Survey (USGS) datum. {R 299.9612 and 40 CFR §264.97(f), which is ABR in R 299.11003}

   (c) To ensure a representative sample, a volume of water shall be purged that is equal to or greater than three times the amount of water in the well casing, or until pH and specific conductance stabilize, or until the well is dry, before obtaining a sample for analysis as specified in Section III of the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license. Wells shall be sampled immediately after purging where recovery rates allow. Where wells are pumped dry during purging, recovery rates shall be determined and samples taken as soon as sufficient recovery occurs. {R 299.9612 and 40 CFR §264.97(d) and (e), which are ABR in R 299.11003}

   (d) Water removed from each monitoring well shall be managed as specified in Section III of the Groundwater Monitoring Program Sampling and Analysis Plan Attachment 13 of this license. {R 299.9521(3)(b)}

   (e) All monitoring wells and piezometers shall have protective barriers, be clearly labeled, securely capped, and locked when not in use. {R 299.9612 and 40 CFR §264.97(c)-(e), which are ABR in R 299.11003}

   (f) Prior to undertaking monitoring well or piezometer replacement or repair, the licensee shall obtain the written approval of the Waste Management Division, unless the location, design, and depth of the replacement monitoring well or piezometer remain unchanged. {R 299.9519(5)(c)(i)}

2. The licensee shall collect and analyze samples according to the schedule, parameters, and procedures specified in the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license. The licensee shall submit proposed revisions to the Groundwater Monitoring Program Sampling and Analysis Plan to the Chief of the Waste Management Division for approval prior to implementation and shall revise any other affected document accordingly. If

approved, the revisions shall become part of this operating license. {R 299.9519(5)(c)(ii), R 299.9611(2)(a), R 299.9612, and 40 CFR §264.97(d) and (e), which are ABR in R 299.11003}

3. The licensee shall submit an annual groundwater report to the Chief of the Waste Management Division no later than March 1 for the previous calendar year's activities. The report shall include a summary of groundwater quality data, data graphs, data tables, statistical analyses to date, and identification of any statistically significant increases (and/or pH decreases) pursuant to Conditions V.A.6. and V.A.11. of this license. The licensee shall determine the groundwater flow rate and direction in the monitored zone[s] at least annually, and provide a groundwater contour map and flow net diagram from this data. This annual report is in addition to the reporting requirements of Condition II.L.4. of this license. {R 299.9612(1) and 40 CFR §264.97(j), which is ABR in R 299.11003}

4. Establishing Background. The licensee shall establish background groundwater quality values at monitoring wells for the parameters specified on Table 3 in Attachment H of the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license.

   (a) Background values for the primary parameters shall be the laboratory detection limit for the chemical or in specific cases where the chemical may be present as a common laboratory contaminant, a more rigorously determined limit, as specified in Section 3.2 of The Statistical Monitoring Plan For Groundwater Monitoring, Attachment L of Attachment 13 of this license.

   (b) Background values for the secondary parameters shall be calculated annually for each monitoring well in accordance with the specifications contained in Section 3.2 of The Statistical Monitoring Plan For Groundwater Monitoring, Attachment L of Attachment 13 of this license.

   (c) In the event that groundwater quality at the upgradient wells shows a significant change, a petition may be submitted to the Chief of the Waste Management Division to re-establish background quality. Background values may be re-established only upon written approval of the Chief of the Waste Management Division.

   {R 299.9612(1)(d) and (e) and 40 CFR §264.97(a) and (g), which are ABR in R 299.11003}

5. Detection Monitoring Program. The licensee shall sample monitoring wells OB-18, OB-19R, OB-21, OB-21, OB-23R, OB-36, and OB-47 on a quarterly basis and analyze the samples for the primary, secondary, and tertiary parameters listed on Table 3 in Attachment H of the Groundwater Monitoring Program Sampling and Analysis Plan, Attachment 13 of this license. Data and evaluations must be submitted to the Chief of the Waste Management Division in accordance with the time frame specified in Condition II.L.4. of this license. {R 299.9612 and 40 CFR §264.9B}

6. Primary Parameters. Within 60 days of each sampling of each monitoring well, the licensee shall determine if a statistically significant increase (or change in pH) has occurred compared to background levels for each primary parameter listed on Figure 1 of the Statistical Monitoring Plan for Groundwater Monitoring Data, Attachment L of Attachment 13 of this license. A statistically significant increase (or change in pH) shall be determined using the statistical evaluation specified in the Statistical Monitoring Plan, Attachment 13 of this license. {R 299.9612(1)(e) and 40 CFR §264.97(h) and (i), which are ABR in R 299.11003}

7. If a statistically significant increase (or change in pH) is detected, the licensee shall notify the Waste Management Division, Hazardous Waste Program Section, Technical Support Unit by

telephone within one working day and arrange a resampling as soon as possible to confirm if a statistically significant increase (or change in pH) exists. Resampling must include not less than four replicate samples at the affected well[s] for the primary parameter[s] in question. {R 299.9612 and 40 CFR §264.97(g), which is ABR in R 299.11003}

8. If the licensee determines pursuant to Conditions V.A.6. and V.A.7. of this license that a statistically significant increase (or change in pH) has occurred for primary parameters, the licensee shall: {R 299.9612 and 40 CFR §264.98(f) and (g), which are ABR in R 299.11003}

(a) Notify the Director within one working day by calling the Chief of the Waste Management Division or the appropriate Waste Management Division District Supervisor or, in the event of their unavailability, the Department of Environmental Quality PEAS at 1-800-292-4706.

(b) Provide follow-up notification to the Chief of the Waste Management Division in writing within seven calendar days of the telephone call. The notification shall indicate what parameters or constituents have shown statistically significant changes and the well[s] in which the changes have occurred.

(c) As soon as possible, sample the groundwater in all monitoring wells within 1000 feet of the affected well for primary and secondary parameters and determine the concentration of all constituents identified in Appendix IX of 40 CFR Part 261 that are present in groundwater and for which approved analysis methods exist. The licensee may submit a request for modified Appendix IX analyses for review and approval by the Chief of the WMD. The licensee shall also establish background values for Appendix IX constituents detected pursuant to R 299.9612 and 40 CFR §264.98(g)(3), which is ABR in R 299.11003.

(d) Immediately take steps to determine the cause of the contamination and eliminate the source of discharge.

(e) Within 90 days of the determination, submit to the Chief of the Waste Management Division an application for a license modification to establish a compliance monitoring and corrective action program meeting the requirements of R 299.9612. The application shall include the following information:

(i) An identification of the concentration of all Appendix IX constituents found in the groundwater.

(ii) Any proposed changes to the groundwater monitoring system at the facility necessary to meet the requirements of R 299.9612.

(iii) Any proposed changes to the monitoring frequency, sampling and analysis procedures or methods, or statistical procedures used at the facility necessary to meet the requirements of R 299.9612.

(f) Within 180 days, submit to the Chief of the Waste Management Division detailed description of corrective actions that shall achieve compliance with applicable laws and rules, including a schedule of implementation. Corrective action shall also meet the requirements of R 299.9629, and include a plan for a groundwater monitoring program that shall demonstrate the effectiveness of the corrective action. Such a groundwater monitoring program may be based on a compliance monitoring program developed to meet the requirements of 40 CFR §264.99, which is ABR in R 299.11003.

(g) During the period prior to a license modification requiring a compliance monitoring and

corrective action program, the licensee shall provide the Chief of the Waste Management Division, or his or her designee, with weekly telephone updates and written reports every two weeks regarding the progress to date in determining the cause of contamination and eliminating the discharge. The licensee shall include in the written report the results of all samples from environmental monitoring conducted by the licensee.

9. If the licensee determines pursuant to Conditions V.A.6. and V.A.7. of this license that a statistically significant increase (or change in pH) in hazardous constituents has occurred in groundwater, it may demonstrate that a source other than the licensed facility caused the increase (or change in pH) or that the increase (or change in pH) resulted from error in sampling, analysis or evaluation. While the licensee may make a demonstration under this condition in addition to, or in lieu of, submitting a license modification application within the time specified in Condition V.A.8.(e) of this license, the licensee is not relieved of the requirement to submit a license modification application within the time specified unless the demonstration made under this condition successfully shows that a source other than the licensed facility caused the increase (or change in pH) or that the increase (or change in pH) resulted from an error in sampling, analysis, or evaluation. In making a demonstration under this condition, the licensee shall:

   (a) Notify the Chief of the Waste Management Division within seven days of the determination that it intends to make a demonstration under this condition.

   (b) Within 90 days of the determination, submit a report to the Chief of the Waste Management Division that demonstrates that a source other than the licensed facility solely caused the increase (or change in pH), or that the increase (or change in pH) was caused by error in sampling, analysis, or evaluation.

   (c) Within 90 days of the determination, submit to the Chief of the Waste Management Division an application for a license modification to make any appropriate changes to the groundwater monitoring program at the facility.

   (d) Continue to monitor groundwater in compliance with this license.

   {R 299.9612 and 40 CFR §264.98(g)(6), which is ABR in R 299.11003}

10. In the event that the Chief of the Waste Management Division determines from the findings of Conditions V.A.6. and V.A.7. of this license that a statistically significant increase (or change in pH) in hazardous constituents has occurred in the groundwater, and the Chief of the Waste Management Division finds, in accordance with Section 11148 of Act 451, that the increase (or change in pH) may present an imminent and substantial hazard to the health of persons or to the natural resources, or is endangering or causing damage to public health or the environment, the licensee shall immediately cease waste receipt, storage, and treatment at the affected unit[s] until instructed by the Chief of the Waste Management Division that operations may resume. {R 299.9612(1)(g)}

11. Secondary Parameters. Within 60 days of each sampling of each monitoring well, the licensee shall determine if a statistically significant increase (or change in pH) has occurred compared to background levels for each secondary parameter listed on Figure 1 of the Statistical Monitoring Plan for Groundwater Monitoring Data, Attachment L of Attachment 13 of this license. A significant increase (or change in pH) shall be determined using the statistical evaluation specified in the Statistical Monitoring Plan, Attachment 13 of this license. {R 299.9612(1)(c)}

12. If the licensee determines pursuant to Condition V.A.11. of this license that a statistically significant increase (or change in pH) has occurred for any secondary parameter, the licensee shall:

(a) Notify the Director, within one working day, by calling the Chief of the Waste Management Division or the appropriate Waste Management Division District Supervisor.

(b) Resample the affected well(s) for the secondary parameters that showed a statistical increase, taking not less than four samples at each well.

(c) Redetermine whether or not a statistically significant increase (or change in pH) has occurred, within one working day, notify the Chief of the Waste Management Division.

(d) If confirmed, the licensee shall immediately take steps to determine the cause of contamination and eliminate the source of the discharge. A report that explains the chronology of events, investigative methods, all lab analyses, calculations, field activities, and findings/conclusions, related to this determination shall be submitted within 60 days of a statistically significant determination under Condition V.A.11. of this license.

(e) The licensee may demonstrate that a source other than the facility, or an error in sampling, analysis, or evaluation solely caused the increase. A report that contains the information set forth in Condition V.A.12.(d) of this license shall be submitted within 60 days of a statistically significant determination under Condition V.A.11. of this license.

{R 299.9612(1)(c)}

B. AMBIENT AIR MONITORING PROGRAM

1. The licensee shall conduct ambient air monitoring in accordance with the program specified in Attachment 14 of this license. {R 299.9611(2)(c)}

2. The licensee shall report ambient air monitoring results as required by Condition II.L.4. of this license.

PART VI

CORRECTIVE ACTION CONDITIONS

A. CORRECTIVE ACTION AT THE FACILITY

The licensee shall implement corrective action for all releases of a contaminant from any waste management units at the facility, regardless of when the contaminant may have been placed in or released from the waste management unit. For the purposes of this license, the term "corrective action" means an action determined by the Chief of the Waste Management Division to be necessary to protect the public health, safety, welfare, or the environment, and includes, but is not limited to, investigation, evaluation, cleanup, removal, remediation, monitoring, containment, isolation, treatment, storage, management, temporary relocation of people, and provision of alternative water supplies, or any corrective action allowed under Title II of the federal Solid Waste Disposal Act, or regulations promulgated pursuant to that act. {Sections 11102 and 11115a of Act 451 and R 299.9629}

B. CORRECTIVE ACTION BEYOND THE FACILITY BOUNDARY

The licensee shall implement correction action beyond the facility boundary if the release of a contaminant has or may have migrated or has or may have been emitted, beyond the facility boundary, unless the licensee demonstrates to the satisfaction of the Chief of the Waste Management Division that, despite the licensee's best efforts, the licensee was unable to obtain the necessary permission to undertake this correction action. The licensee shall not be relieved of all responsibility to clean up a release that has migrated or has been emitted beyond the facility boundary where off-site access is denied. On-site measures to address such releases shall be addressed under this part of the license, as determined to be necessary on a case-by-case basis. {Section 11115a of Act 451 and R 299.9629}

C. IDENTIFICATION OF NEW WASTE MANAGEMENT UNITS (WMU)

1. Within 30 days of discovery of a new WMU or a release of a contaminant from a new WMU, the licensee shall provide written notification to the Chief of the Waste Management Division. The written notification shall include all of the following information:

    a. The location of the unit on the facility topographic map.

    b. The designation of the type of unit.

    c. The general dimensions and structural description, including any available drawings of the unit.

    d. The date the unit was operated.

    e. Specification of all waste(s) that have been managed in the unit.

    f. All available information pertaining to any release of a contaminant from the unit.

2. Based on a review of all of the information provided in Condition VI.C.1. of this license, the Chief of the Waste Management Division may require corrective action for the newly identified WMU. The licensee shall submit a written RFI Work Plan to the Chief of the Waste Management Division within 60 days after written notification by the Chief of the Waste Management Division that corrective action for the unit is required.

{Section 11115a of Act 451, R 299.9629, and 40 CFR §270.14(d), which is ABR in R 299.11003}

D. RCRA FACILITY INVESTIGATION

The licensee shall conduct a RCRA Facility Investigation (RFI) to determine if a release of a contaminant(s) from any of the WMUs identified in Conditions VI.C.1. of this license has occurred, and if a release(s) has occurred, evaluate the nature and extent of the release(s). The RFI shall be conducted in accordance with Conditions VI.D.1.-VI.D.5. and Attachment 15, RFI Scope of Work, of this license.

1. The licensee shall submit a written RFI Work Plan to the Chief of the Waste Management Division for review and approval within 60 days after written notification by the Chief of the Waste Management Division that corrective action for the unit is required.

2. The Chief of the Waste Management Division will approve or modify and approve the RFI Work Plan, or provide a written Notice of Deficiency on the RFI Work Plan. The licensee shall modify the RFI Work Plan in accordance with the Notice of Deficiency and submit a new RFI Work Plan or revisions to the RFI Work Plan to the Chief of Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency. Upon approval by the Chief of the Waste Management Division, the RFI Work Plan becomes an enforceable condition of this license.

3. The licensee shall implement the approved RFI Work Plan within 90 days after receipt of the Chief of the Waste Management Division's written approval of the RFI Work Plan.

4. The licensee shall submit a written RFI Final Report to the Chief of the Waste Management Division for review and approval within 60 days after the completion of the RFI. The RFI Final Report shall document compliance with the approved RFI Work Plan and support further corrective action at the facility.

5. The Chief of the Waste Management Division will approve the RFI Final Report or provide a written Notice of Deficiency on the RFI Final Report. The licensee shall modify the RFI Final Report in accordance with the Notice of Deficiency and submit a new RFI Final Report or revisions to the RFI Final Report to the Chief of the Waste Management Division for approval within 30 days of receipt of the Notice of Deficiency.

6. The licensee shall submit bi-monthly written RFI progress reports to the Chief of the Waste Management Division.

7. The licensee shall comply with the time frames specified in Condition VI.D.1.-VI.D.6. of this license unless otherwise approved in writing by the Chief of the Waste Management Division.

{Section 11115a of Act 451 and R 299.9629}

E. DETERMINATION OF NO FURTHER ACTION

1. Based on the results of the RFI and other relevant information, the licensee shall submit a written request for a minor license modification to the Chief of the Waste Management Division if the licensee wishes to terminate corrective action for a specific WMU identified in Conditions VI.C.1. of this license. The licensee must conclusively demonstrate that there have been no releases of a contaminant(s) from the WMU and that the WMU does not pose a threat to public health, safety, welfare, or the environment.

2. Based on the results of the RFI and other relevant information, the licensee shall submit a written request for a major license modification to the Chief of the Waste Management Division if the licensee wishes to terminate facility-wide corrective action. The licensee must conclusively demonstrate that there have been no releases of a contaminant(s) from any of the WMUs at the facility and that none of the WMUs pose a threat to public health, safety, welfare, or the environment.

3. If, based upon a review of the licensee's request for a license modification pursuant to Conditions VI.E.1. or VI.E.2. of this license, the results of the completed RFI, and other relevant information, the Chief of the Waste Management Division determines that the releases or suspected releases of a contaminant(s) do not exist and that the WMU(s) do not pose a threat to public health, safety, welfare, or the environment, the Chief of the Waste Management Division will approve the requested modification.

4. A determination of no further action shall not preclude the Chief of the Waste Management Division from requiring continued or periodic monitoring of air, soil, groundwater, or surface water, if necessary to protect public health, safety, welfare, or the environment, when facility-specific circumstances indicate that potential or actual releases of a contaminant(s) may occur.

5. A determination of no further action shall not preclude the Chief of the Waste Management Division from requiring further corrective action at a later date, if new information or subsequent analysis indicates that a release or potential release of a contaminant(s) from a WMU at the facility may pose a threat to public health, safety, welfare, or the environment. The Chief of the Waste Management Division will initiate the necessary license modifications if further corrective action is required at a later date.

{Section 11115a of Act 451 and R 299.9629}

F. **CORRECTIVE MEASURES STUDY**

If the Chief of the Waste Management Division determines, based on the results of the RFI and other relevant information, that corrective measures are necessary, the Chief of the Waste Management Division will notify the licensee in writing that a Corrective Measures Study (CMS) is required. If required by the Chief of the Waste Management Division, the licensee shall conduct a CMS to develop and evaluate the corrective measure alternative(s) necessary to address the release(s) of a contaminant(s) and the WMU(s) that are identified in the approved RFI Final Report as requiring further corrective action. The CMS shall be conducted in accordance with Conditions VI.F.1.- VI.F.7. and Attachment 16, CMS Scope of Work, of this license.

1. The licensee shall submit a written CMS Work Plan to the Chief of the Waste Management Division for review and approval within 60 days after receipt of written notification that a CMS is required.

2. The Chief of the Waste Management Division will approve or modify and approve the CMS Work Plan, or provide a written Notice of Deficiency on the CMS Work Plan. The licensee shall modify the CMS Work Plan in accordance with the Notice of Deficiency and submit a new CMS Work Plan or revisions to CMS Work Plan to the Chief of Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency. Upon approval by the Chief of the Waste Management Division, the CMS Work Plan becomes an enforceable condition of this license.

3. The licensee shall implement the approved CMS Work Plan within 90 days after receipt of the Chief of the Waste Management Division's written approval of the CMS Work Plan.

4. The licensee shall submit a written CMS Final Report to the Chief of the Waste Management Division for review and approval within 60 days after the completion of the CMS. The CMS Final Report shall document compliance with the approved CMS Work Plan and support further corrective action at the facility.

5. The Chief of the Waste Management Division will approve the CMS Final Report or provide a written Notice of Deficiency on the CMS Final Report. The licensee shall modify the CMS Final Report in accordance with the Notice of Deficiency and submit a new CMS Final Report or revisions to the CMS Final Report to the Chief of the Waste Management Division for approval within 30 days of receipt of the Notice of Deficiency.

6. The licensee shall submit bi-monthly written CMS progress reports to the Chief of the Waste Management Division.

7. The licensee shall comply with the time frames specified in Condition VI.F.1.-VI.F.6. of this license unless otherwise approved in writing by the Chief of the Waste Management Division.

{Section 11115a of Act 451 and R 299.9629}

G. CORRECTIVE MEASURES IMPLEMENTATION

The licensee shall conduct Corrective Measures Implementation (CMI) based on the CMS Final Report approved by the Chief of the Waste Management Division. The CMI shall be conducted in accordance with Conditions VI.G.1.-VI.G.10. and Attachment 17, CMI Scope of Work, of this license.

1. The licensee shall submit a written CMI Work Plan to the Chief of the Waste Management Division for review and approval within 60 days after the approval of the CMS Final Report by the Chief of the Waste Management Division.

2. The Chief of the Waste Management Division will approve or modify and approve the CMI Work Plan, or provide a written Notice of Deficiency on the CMI Work Plan. The licensee shall modify the CMI Work Plan in accordance with the Notice of Deficiency and submit a new CMI Work Plan or revisions to the CMI Work Plan to the Chief of the Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency. The Waste Management Division will provide notice of its draft decision on the CMI Work Plan to persons on the facility mailing list and an opportunity for a public hearing. Upon approval by the Chief of the Waste Management Division, the CMI Work Plan becomes an enforceable condition of this license.

3. The licensee shall implement the approved CMI Work Plan within 90 days after receipt of the Chief of the Waste Management Division's written approval of the CMI Work Plan.

4. The licensee shall submit a written Construction Completion Report to the Chief of the Waste Management Division for review and approval within 60 days after the construction associated with the corrective measures has been completed and all operational tests run. The Construction Completion Report shall document how the construction is in compliance with the approved design plans and specifications and that the corrective measures are performing satisfactorily based on the operational tests.

5. The Chief of the Waste Management Division will approve or modify and approve the Construction Completion Report, or provide a written Notice of Deficiency on the Construction

Completion Report. The licensee shall modify the Construction Completion Report in accordance with the Notice of Deficiency and submit a new Construction Completion Report or revisions to the Construction Completion Report to the Chief of the Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency. Upon approval by the Chief of the Waste Management Division, the Construction Completion Report becomes an enforceable condition of this license.

6. The licensee shall implement full-scale corrective measures within 30 days of receipt of written approval of the Construction Completion Report by the Chief of the Waste Management Division.

7. The licensee shall submit a written CMI Final Report to the Chief of the Waste Management Division for review and approval within 60 days after the corrective measures have been completed and the corrective measures criteria have been met. The CMI Final Report shall document compliance with the corrective measures completion criteria and provide justification that the corrective measures may cease.

8. The Chief of the Waste Management Division will approve or modify and approve the CMI Final Report, or provide a written Notice of Deficiency on the CMI Final Report. The licensee shall modify the CMI Final Report in accordance with the Notice of Deficiency and submit a new CMI Final Report or revisions to the CMI Final Report to the Chief of the Waste Management Division for approval within 30 days after receipt of the Notice of Deficiency.

9. The licensee shall submit bi-monthly written CMI progress reports on the construction phase and quarterly written CMI progress reports on the operation and maintenance activities phase to the Chief of the Waste Management Division.

10. The licensee shall comply with the time frames specified in Condition VI.G.1.-VI.G.9. of this license unless otherwise approved in writing by the Chief of the Waste Management Division.

{Section 11115a of Act 451 and R 299.9629}

H. COST ESTIMATE FOR CORRECTIVE ACTION

1. The licensee shall prepare a detailed written cost estimate for CMI at the facility. {R 299.9712}

2. The licensee shall submit the detailed written cost estimate for CMI to the Chief of the Waste Management Division for review and approval in conjunction with the CMI Work Plan required in Condition VI.G.1. of this license. {R 299.9712}

3. The Chief of the Waste Management Division will approve the cost estimate for CMI or provide a written Notice of Deficiency on the cost estimate for CMI. The licensee shall modify the cost estimate for CMI in accordance with the Notice of Deficiency and submit a new cost estimate for CMI to the Chief of the Waste Management Division for approval within 30 days of receipt of the Notice of Deficiency. Upon approval by the Chief of the Waste Management Division, the cost estimate for CMI becomes an enforceable condition of this license. {R 299.9712}

4. Until the Director notifies the licensee in writing that the licensee is no longer required by R 299.9713 to maintain financial assurance for CMI at the facility, the licensee shall adjust the CMI cost estimate for inflation within 60 days prior to the anniversary of the date of the establishment of the financial mechanism[s] used to demonstrate financial assurance for CMI. If the financial mechanism used is the financial test or corporate guarantee, the licensee shall

adjust the CMI cost estimate for inflation within 30 days after the close of the firm's fiscal year and before submission of updated financial information to the Chief of the Waste Management Division. Whenever the current cost estimate increases to an amount greater than the current value of the associated financial mechanism for reasons other than inflation, the licensee shall, within 60 days, increase the value of the mechanism to an amount at least equal to the adjusted cost estimate. Evidence of such increases shall be submitted to the Chief of the Waste Management Division during the 60-day period. {R 299.9712}

5. The licensee shall recalculate the CMI cost estimate within 30 days after the Chief of the Waste Management Division has approved a modification of the CMI Work Plan. Until the Director notifies the licensee in writing that the licensee is no longer required to maintain financial assurance for CMI, the licensee shall revise the CMI cost estimate whenever there is a change in the facility's CMI Work Plan, if the change in the CMI Work Plan increases the cost of CMI. {R 299.9712}

6. The licensee shall keep the latest CMI cost estimate at the facility. {R 299.9629(3)(b)}

I. FINANCIAL ASSURANCE FOR CORRECTIVE ACTION

1. The licensee shall establish and continuously maintain corrective action financial assurance in accordance with R 299.9713. The licensee shall submit in conjunction with the CMI Work Plan the CMI financial assurance mechanism[s] approved by the Chief of the Waste Management Division in an amount at least equal to the cost estimate required by Condition VI.H.1. of this license. If more than one mechanism is used, or if more than one facility is covered by the mechanism[s], the total amount of financial assurance provided for the facility shall at least equal the amount of the cost estimate required by Condition VI.H.1. of this license. The licensee shall submit all proposed changes in the mechanism[s], other than renewals, extensions, or increases in the amount of assurance, to the Chief of the Waste Management Division and obtain approval prior to implementation. The licensee shall provide the Chief of the Waste Management Division with a signed original of all revisions and renewals within 60 days after such revision or renewal and at least 30 days prior to the anniversary of the establishment of the financial mechanism[s] provided to satisfy the requirements of this condition.

2. The licensee shall establish an approved renewal or replacement CMI financial mechanism[s] at least 30 days prior to the expiration date of the current mechanism[s], and obtain the Chief of the Waste Management Division's approval of such replacements, for all financial mechanisms provided to satisfy the requirements of this condition. Failure to provide such documentation is a violation of this license and shall be cause for the Chief of the Waste Management Division to access all funds provided in any financial mechanism not renewed or replaced in accordance with this condition and to initiate revocation of this license.

3. Whenever the current CMI cost estimate increases to an amount greater than the current amount of the associated financial mechanism(s) for reasons other than inflation, the licensee shall, within 60 days after the increase, either increase the amount of the mechanism(s) to an amount at least equal to the increased CMI cost estimate, or provide an additional financial mechanism approved by the Chief of the Waste Management Division for an amount at least equal to the difference between the current amount of financial assurance and the increased CMI cost estimate. Evidence of such increased financial assurance must be submitted to the Chief of the Waste Management Division during the 60-day period.

J. SUMMARY OF CORRECTIVE ACTION SUBMITTALS

The licensee shall submit required corrective action documents in accordance with the schedule below.

CORRECTIVE ACTION DOCUMENT	SUBMITTAL DEADLINE
Written notification of a new release of a contaminant from an existing WMU, a new WMU, or a release of a contaminant from a new WMU	Within 30 days of discovery
RFI Work Plan for a newly identified release of a contaminant from an existing WMU, a new WMU, or a release of a contaminant from a new WMU	Within 60 days after receipt of written notification that corrective action is required
Revised RFI Work Plan for existing WMUs and contaminant releases	Within 30 days after receipt of RFI Work Plan Notice of Deficiency
RFI progress reports	Within 60 days of initiation of the RFI and every 60 days thereafter
RFI Final Report for existing WMUs and contaminant releases	Within 60 days after completion of RFI
Revised RFI Final Report for existing WMUs and contaminant releases	Within 30 days after receipt of RFI Final Report Notice of Deficiency

CORRECTIVE ACTION DOCUMENT	SUBMITTAL DEADLINE
CMS Work Plan for existing WMUs and contaminant releases	Within 90 days after receipt of notification that CMS is required
Revised CMS Work Plan for existing WMUs and contaminant releases	Within 30 days after receipt of CMS Work Plan Notice of Deficiency
CMS progress reports	Within 60 days of initiation of the CMS and every 60 days thereafter
CMS Final Report for existing WMUs and contaminant releases	Within 60 days of completion of the CMS
Revised CMS Final Report for existing WMUs and contaminant releases	Within 30 days after receipt of CMS Final Report Notice of Deficiency
CMI Work Plan for existing WMUs and contaminant releases	Within 90 days after approval of the CMS Final Report
Revised CMI Work Plan for existing WMUs and contaminant releases	Within 30 days after receipt of CMI Work Plan Notice of Deficiency
CMI progress reports on construction phase of CMI	Within 60 days of initiation of construction and every 60 days thereafter
CMI progress reports on operation and maintenance activities	Within 60 days of initiation of operation and maintenance activities and every 90 days thereafter
Construction Completion Report	Within 60 days after completion of construction and operational tests
Revised Construction Completion Report	Within 30 days after receipt of Construction Completion Report Notice of Deficiency
CMI Final Report for existing WMUs and contaminant releases	Within 60 days after completion of CMI
Revised CMI Final Report for existing WMUs and contaminant releases	Within 30 days after receipt of CMI Final Report Notice of Deficiency

K. CORRECTIVE ACTION DOCUMENTS RETENTION

The licensee shall maintain all corrective action documents required by this license at the facility. The documents shall be maintained for the operating life of the facility and until the facility is released from financial assurance requirements for corrective action by the Director.

{Section 11115a of Act 451 and R 299.9629}

PART VII

SCHEDULE OF COMPLIANCE

A. North and Southeast Container Storage Areas

1. The licensee shall submit engineering design plans and specifications for the construction of the hazardous waste container storage buildings to be located at the North Container Storage Area and the Southeast Container Storage Area (SECSA) to the Chief of the Waste Management Division (WMD) within 30 days of issuance of this license. A construction schedule shall accompany this submittal.

2. Within 6 months of receipt of written approval, the licensee shall initiate construction in accordance with the approved design plans and specifications and construction schedule.

3. The licensee shall submit as-built drawings of the hazardous waste container storage buildings to the Chief of the WMD within 30 days of construction completion.

4. Within 60 days of the effective date of this license, the licensee shall submit a workplan to investigate the presence and quality of groundwater present within the upper sand unit at the facility.

   a) The plan shall contain, at a minimum, the following elements:

      1) The locations of all known structures which potentially influence perched groundwater flow in the vicinity of the SECSA.

      2) A groundwater sampling and analysis plan (SAP) which shall include proposed locations and methodologies for the collection of groundwater samples. In addition, the groundwater SAP shall include a proposed list of analytical parameters, methods and detection limits, a description of sampling procedures, and a schedule for the completion of the workplan.

      3) The results of the investigation shall include a groundwater contour map of the upper saturated unit, a sand thickness map, top of clay map and the results of the groundwater investigation.

      4) Based on the results of the investigation, the licensee shall provide recommendations to the Technical Support Unit of the WMD for the long term monitoring of the SECSA for review and approval.

   b) The Chief of the WMD shall approve, disapprove, or approve with modifications the workplan. In the event of disapproval, WMD shall specify any deficiencies and required modifications or additions to the workplan. The licensee shall respond to any deficiencies in the workplan within 30 days of notification by WMD. The licensee shall complete the approved workplan in accordance with the schedule contained in the workplan.

   c) Upon approval, the workplan and any long term groundwater monitoring determined to be necessary by the WMD as result of workplan implementation shall become an enforceable part of this license.

B. Waste Analysis Plan

1. The licensee shall submit a compatibility test workplan to the Chief of the Waste Management Division within 60 days of issuance of this license.. The workplan shall include the following:

   (a) Specific methodologies for each simulated waste treatment type.

   (b) Definitions for quality assurance/quality control for the lab simulations.

   (c) Ratios of the waste, reagents, and combustible containers, supports, and packaging in the lab simulations to the amounts in the actual respective treatment tank.

   (d) A recording and reporting format used to document each lab simulation.

   (e) The results of lab simulation shall be maintained in accordance with Condition II.L.1. of this license.

   (f) Comparisons between the results of lab simulation and each respective actual treatment tank shall be performed and recorded. Any problems shall also be recorded.

{R 299.9521(2)(a) and 40 CFR §270.33}

INDEX OF ATTACHMENTS

Attachment 1 ..... Waste Analysis Plan

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STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: http://www.deq.state.mi.us

RUSSELL J. HARDING, Director

NOTICE OF FINAL DECISION

MICHIGAN DISPOSAL WASTE TREATMENT PLANT
Hazardous Waste Management Facility

State Part 111 Operating License and Federal RCRA Permit

The Michigan Department of Environmental Quality (MDEQ) issued a hazardous waste management facility operating license to the Michigan Disposal Waste Treatment Plant (MDWTP), pursuant to Part 111, Hazardous Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The license was issued on September 30, 1999, and allows the MDWTP to continue to operate a hazardous waste storage and treatment facility at 49350 North I-94 Service Drive, Belleville, Michigan. The MDWTP also received a federal permit issued by the United States Environmental Protection Agency (U.S. EPA), pursuant to the Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act (RCRA). The effective date of the RCRA permit is September 30, 1999. Both the Part 111 license and the RCRA permit will expire five years from the date of issuance.

The MDEQ conducted an extensive public participation process and the major issues raised during that process and the response provided by the U.S. EPA and MDEQ to those issues are addressed in the enclosed Executive Summary. The full *Response to Comment* report is available by request by returning the order form in the Executive Summary.

The final Part 111 operating license and RCRA permit may be reviewed at the MDEQ, Waste Management Division Office, located on the first floor of the John A. Hannah Building in Lansing, Michigan (contact Ms. Kimberly Tyson at 517-373-2487); the MDEQ Southeast Michigan District Office located at 38980 Seven Mile Road in Livonia, Michigan (contact Mr. Mike Busse at 313-953-1403); the Van Buren Township Hall located at 46425 Tyler Road in Belleville, Michigan (contact Mr. Michael Long at 313-699-8900); and the Fred C. Fischer Library located at 167 Fourth Street in Belleville, Michigan (contact Ms. Deborah Green at 313-699-3291). A copy of the license may be obtained, for the cost of reproduction, by contacting Ms. Julie Blanchard at 517-373-9875. Questions or comments concerning the MDWTP should be directed to Ms. Kimberly Tyson at 517-373-2487.

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION
JERRY C. BARTNIK
KEITH J. CHARTERS
LARRY DEVUYST
PAUL EISELE
JAMES P. HILL
DAVID HOLLI
JOEY M. SPANO

JOHN ENGLER, Governor
DEPARTMENT OF NATURAL RESOURCES
STEVENS T. MASON BUILDING, PO BOX 30028, LANSING MI 48909-7528
ROLAND HARMES, Director

REPLY TO:
WASTE MANAGEMENT DIVISION
PO BOX 30241
LANSING MI 48909-7741

cc: M DeRosa
J. Huff

April 21, 1995

RECEIVED
APR 27 1995
OFFICE OF RCRA
WASTE MANAGEMENT DIVISION
EPA, REGION V

Mr. Andy Tschampa (HRP-8J)
Michigan Permits Unit
U.S. EPA-Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Dear Mr. Tschampa:

SUBJECT: Receipt of a Hazardous Waste Management Operating License Renewal Application for Envotech Management Services, Inc; MID 000 724 831

B18

On March 15, 1995, the Michigan Department of Natural Resources, Waste Management Division received a hazardous waste management facility operating license renewal application from Envotech Management Services, Inc. for their facility located in Belleville, Michigan. The facility was originally issued a license on March 30, 1990. Enclosed is a copy of the public notice announcing its receipt. A copy of the application was sent directly to you by the applicant. The public notice appeared in the Belleville Enterprise on April 6, 1995.

Ms. Kimberly Bee Tyson is the permit engineer responsible for the review of this application. She expects to complete the administrative completeness review by May 26, 1995 and the technical review by June 30, 1995. Please have your staff review the application and provide Ms. Tyson with their comments by those dates. Thank you for your cooperation in this matter. If you have any questions or comments, please contact Ms. Tyson at 517-373-2487, or me.

Sincerely,

Kenneth J. Burda

Kenneth J. Burda, Chief
Hazardous Waste Program Section
Waste Management Division
517-373-0530

Enclosure
cc: Ms. Lorraine Kosik, U.S. EPA
Ms. Shari Sutker, U.S. EPA
Mr. Larry AuBuchon/Mr. Mike Busse, DNR-Livonia
Operating License File

CC: USEPA ✓
VEHICLE LIC.
& SPECIAL CONDITIONS

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STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
WASTE MANAGEMENT DIVISION

ACT 136

LIQUID INDUSTRIAL WASTE HAULER VEHICLE LICENSE

Issued under the authority of Act 136, P.A., 1969, as amended. Failure to comply with the provisions of this Act may result in revocation or denial of license.

EPA/Michigan I.D. No.: MID 000 724 831

Date Issued: February 28, 1991

Date Expires: February 28, 1992

Date & Reason Amended:

In compliance with the provisions of the Michigan Liquid Industrial Waste Haulers Act (P.A. 136, 1969, as amended), hereinafter referred to as "the Act",

Name: Michigan Disposal, Inc.

Address: 1349 S. Huron Street
Ypsilanti, Michigan 48197

Business Telephone: 313-485-6464

Emergency Telephone: 313-697-2471

is authorized to transport liquid industrial waste in the vehicles describe below in accordance with the provisions of the Act and the "Special Conditions" contained in this license.

[X] License valid only when used in conjuction with a Hazardous Waste Transporter License (Act 64, P.A. 1979, as amended).

[ ] License valid only when used in conjuction with a Liquid Industrial Waste Haulers Business License.

Vehicle I.D. No.	Vehicle Description	Vehicle Capacity	Vehicle Decal No.	DNR Vehicle License No.
TD 14331	1958 Fruehauf Tanker	9,000 gal	686	698-1
UNX 550901	1977 Fruehauf Tanker	6,500 gal	687	698-2
UNV 624501	1979 Fruehauf Tanker	6,500 gal	688	698-3
UNV 624502	1979 Fruehauf Tanker	6,500 gal	689	698-4
End of list				

*

APPLICATIONS FOR RENEWAL SHALL BE SUBMITTED SIXTY (60) DAYS BEFORE EXPIRATION. THIS LICENSE IS NOT TRANSFERABLE.

David Hales, Director

Approved By: Waste Management Division

PR-5119
4/88

ACT 136
LIQUID INDUSTRIAL WASTE HAULER
SPECIAL CONDITIONS

Issued under the authority of Act 136, P.A., 1969, as amended. Failure to comply with the provisions of this Act may result in revocation or denial of license.

EPA/Michigan I.D. No.: MID 000 724 831 Decal No(s): 686-689

1. The licensee shall carry a copy of the vehicle license in the licensed vehicle(s) at all times.

2. There shall be placed on both sides of the waste hauling portion of the vehicle not less than two inches high the words, "Licensed Industrial Waste Hauling Vehicle" followed by the Department of Natural Resources assigned vehicle license number and adjacent to that number shall be affixed a seal (decal) furnished by the Department.

3. The shipment of liquid industrial waste shall be secured so that no liquid industrial waste escapes from the vehicle, and the outside of all vehicles and accessory equipment shall be kept clean of all waste.

4. Interior and exterior vehicle washwaters disposed of in Michigan, must be disposed of in accordance with all applicable rules and regulations of Act 245, P.A. 1929, as amended and Act 64, P.A. 1979, as amended.

5. The interior of the vehicle must be cleaned prior to transportation of any commercial product or material to prevent cross contamination of materials. Any liquid industrial waste generated as a result of the cleaning operation must be disposed of consistent with Act 245, P.A. 1929, as amended, Act 64, P.A. 1979, as amended, and other applicable federal/state/local regulations.

6. It is the licensee's responsibility to assure the waste types being transported are compatible with vehicle containers used to transport.

7. Crankcase oil shall not be spread on the ground for dust control unless: (a) it is evaluated according to Act 64 P.A., 1979, as amended, and found to be nonhazardous; and (b) it is applied in compliance with all other rules and statutes.

8. Although not specifically required in the Act, we recommend containment be provided for any loaded vehicle parked at your facility to prevent losses to any sewer, ground, groundwaters, or surface waters.

9. A person shall not dispose of waste onto or into the ground except at locations specifically approved by the Director. Waste shall not be disposed of in any sewer unless in accordance with the pretreatment regulations; with P.A. 245, 1929, as amended; with P.A. 64, 1979, as amended; and all other applicable laws of the State of Michigan. No waste shall be placed, stored or disposed of in a location or manner where it could enter any public or private drain, pond, stream, surface water, or groundwater.

10. Liquid industrial waste haulers not licensed under the Michigan Hazardous Waste Management Act (P.A. 64, 1979, as amended), must continuously maintain a surety bond or other acceptable securities as defined in Section 5 of the Act.

11. Brine from oil and gas wells regulated under Act 61, P.A. 1939, as amended, shall be sub-surface disposed of at an approved permitted Act 64, or Act 315, P.A. 1969, disposal well. Surface disposal brine shall be done in accordance with Act 61, P.A. 1939, as amended, including orders, and at 245, P.A. 1929, as amended.

12. Transportation of RCRA and Act 64 regulated waste requires a license under the Michigan Hazardous Waste Management Act (P.A. 64, 1979, as amended).

13. Licensee shall comply with State of Michigan Act 300, Act 207, Act 181 and the federal hazardous materials transportation act.

14. In the event of a spill of liquid industrial waste, the transporter shall take appropriate immediate action to protect human health and the environment, including notification of local authorities. If a spill occurs in Michigan, the licensee shall immediately give notice of the spill to the Department of Natural Resources by telephoning 800-292-4706 or 517-373-2730.

15. A transporter shall clean up any discharge that occurs during transportation or take such actions as may be required or approved by federal, state, or local officials so that the waste discharge no longer presents a hazard to human health or the environment.

ACT 136
LIQUID INDUSTRIAL WASTE HAULER
SPECIAL CONDITIONS *

Issued under the authority of Act 136, P.A., 1969, as amended. Failure to comply with the provisions of this Act may result in revocation or denial of license.

EPA I.D. Number MID 000 724 831

Date Issued: February 28, 1991

Date Expires: February 28, 1992

The licensee shall:

1. Ensure that each vehicle used to transport liquid industrial waste is licensed under the Act prior to transporting any liquid industrial waste.

2. Carry a copy of the Michigan Hazardous Waste Management Act (P.A. 64, 1979, as amended) business license in each vehicle used to transport liquid industrial waste.

3. Liquid industrial waste haulers licensed under the Michigan Hazardous Waste Management Act (P.A. 64, 1979, as amended), must continuously maintain financial assurance as defined in R299.9711 of the Act.

4. Accept loads of liquid industrial waste only if offered for transport with an appropriate manifest form completed by the liquid industrial waste generator unless a specific exemption has been approved for the generator.

5. Maintain copies of completed manifests in each vehicle for liquid industrial waste transported in that vehicle for the last two months. In lieu of the manifests, trip records must be maintained in each vehicle documenting the last two months of liquid industrial waste transported in that vehicle. The trip record shall state the date, source of the waste, quantity, type, the point and method of disposal.

6. Non-hazardous waste manifest and trip records must be retained for a period of two years and be available for inspection.

7. Deliver the liquid industrial waste and accompanying manifest only to the destination specified by the generator on the manifest.

8. Abide by all of the provisions and conditions of the liquid industrial waste hauler vehicle licenses used by the licensee.

*Special conditions are for Act 64 licensed haulers for which an Act 136 business license is not required.

RECEIVED
APR 16 1990
OFFICE OF RCRA
WASTE MANAGEMENT DIVISION
EPA, REGION V

State of Michigan
Department of Natural Resources

HAZARDOUS WASTE FACILITY OPERATING LICENSE

Name of Licensee: Michigan Disposal, Inc.

Name of Owner: Michigan Disposal, Inc.

Name of Operator: Michigan Disposal, Inc.

Name of Titleholder of Land: Ford Motor Company

Facility Name: Michigan Disposal, Inc.

Facility Location: 49350 North I-94 Service Drive
Belleville, Michigan 48111

EPA Identification Number: MID 000 724 831

Effective Date: March 30, 1990

Expiration Date: March 30, 1995

Authorized Activities

Pursuant to the Hazardous Waste Management Act, 1979 P.A. 64, as amended, and rules promulgated thereunder by the Michigan Department of Natural Resources (MDNR), an operating license is issued to Michigan Disposal, Inc. (hereafter called the licensee) to operate a hazardous waste storage and treatment facility located in Belleville, Michigan, at latitude 42°13'30"N and longitude 083°31'00"W. The licensee is authorized to conduct the following hazardous waste management activities:

XX Storage	XX Treatment	___ Disposal
X Container	X Tank	___ Injection Well
X Tank	___ Surface Impoundment	___ Landfill
___ Waste Pile	___ Incinerator	___ Land Application
___ Surface Impoundment	___ Other	___ Surface Impoundment

Applicable Regulations:

The conditions of this license were developed in accordance with the applicable provisions of the January 15, 1989 rules under 1979 P.A. 64, as amended:

X Part 2	X R 299.9614	___ R 299.9623 to R 299.9625
X Part 3	X R 299.9615	___ R 299.9626
X Part 5	___ R 299.9616	X R 299.9627
X R 299.9601 to R 299.9611	___ R 299.9617	___ Part 7
X R 299.9612	___ R 299.9618	___ Part 8
X R 299.9613	___ R 299.9619 to R 299.9622	

License Approval:

The licensee shall comply with all terms and conditions of this license. This license consists of the conditions contained herein (including those in any attachments) and the applicable regulations contained in R 299.9101 through R 299.11008 as specified in the license. Applicable rules are those which are in effect on the date of issuance of this license.

This license is based on the information submitted in the operating license application submitted on January 9, 1986 and any subsequent amendments (hereafter referred to as the application). The facility shall be constructed and/or operated as specified in the application. Any inaccuracies found in this information provides grounds for the revocation or modification of this license (see R 299.9519(6)) and enforcement action. The licensee shall inform the Director of any deviation from or changes in the information in the application which would affect the licensee's ability to comply with the applicable rules or license conditions.

This license is effective on the date of issuance and shall remain in effect for five years from the date of issuance, unless revoked (R 299.9519) or continued in effect as provided by 1969 P.A. 306, as amended, the Michigan Administrative Procedures Act.

Issued this 30th day of March, 1990.

by Delbert Rector
David F. Hales, Director ACTING

PART I
STANDARD CONDITIONS

A. TERMINOLOGY

Throughout this license, "Act 64" means 1979 P.A. 64, as amended, and "rules" means the Administrative Rules for 1979 P.A. 64, as amended. The term "Waste Management Division" means the division within the Michigan Department of Natural Resources (MDNR) responsible for administering 1979 P.A. 64, as amended, and its rules.

B. EFFECT OF LICENSE

Any treatment, storage or disposal of hazardous waste not specifically authorized in this license is prohibited. Issuance of this license does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of federal, state or local law or regulations; nor does it obviate the necessity of obtaining such permits or approvals from other units of government as may be required by law. Compliance with the terms of this license does not constitute a warranty or representation of any kind by the MDNR, or a defense to any order issued or any action brought under Act 64, Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9606(a), or any other statutory or common law authority providing for the protection of the public health, welfare, or safety, or the environment. Each attachment to this license is a part of, and is incorporated into, this license and is deemed an enforceable part of the license.

C. LICENSE ACTIONS

The filing of a request for a license modification or revocation, or the notification of planned changes or anticipated noncompliance on the part of the licensee does not stay the applicability or enforceability of any license condition.

D. SEVERABILITY

The provisions of this license are severable, and if any provision of this license, or the application of any provision of this license to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this license shall not be affected thereby.

E. DUTIES AND REQUIREMENTS

1. <u>Duty to Comply</u>.

   (a) The licensee shall comply with Act 64, its rules and all conditions of this license.

(b) Any license noncompliance constitutes a violation of Act 64 and is grounds for enforcement action, license revocation, license modification, or denial of a license renewal application.

2. Duty to Reapply. If the licensee wishes to continue an activity allowed by this license after the expiration date of this license, the licensee shall submit a complete application for a new license to the Chief of the Waste Management Division at least 180 days before this license expires.

3. License Expiration. To the extent consistent with Section 91(2) of the Michigan Administrative Procedures Act, MCL 24.291(2), this license and all conditions herein will remain in effect beyond the license expiration date if the licensee has submitted a timely, complete application and through no fault of the licensee, the Director has not issued a new license.

4. Need to Halt or Reduce Activity Not a Defense. It shall not be a defense for the licensee in an enforcement action that it would have been necessary to halt or reduce the licensed activity in order to maintain compliance with the conditions of this license.

5. Duty to Mitigate.

(a) The licensee shall take all steps necessary to prevent and to correct any threat to, or impact on the environment or human health, welfare, or safety resulting from or that may result from compliance or noncompliance with any condition in this license.

(b) Upon notification from the Director or his or her designee that an activity at the facility may present an imminent and substantial endangerment to human health or the environment, the licensee shall immediately halt such activity and conduct other activities as required by the Director to eliminate said endangerment. The licensee shall not resume the halted activity without the prior written approval from the Director.

6. Proper Operation and Maintenance. The licensee shall at all times properly operate and maintain all facilities and related appurtenances which are installed or used by the licensee to achieve compliance with the conditions of this license. Proper operation and maintenance includes: effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls (including appropriate quality assurance procedures). This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the license.

7. Duty to Provide Information.

(a) The licensee shall furnish to the Director, or any authorized representative, including, but not limited to, a contractor, within a reasonable time, any information which the Director or the authorized representative may request to determine:

(i) Whether the management of hazardous waste may present an imminent and substantial hazard to the health of persons or to the natural resources, or is endangering or causing danger to public health or the environment;

(ii) Whether cause exists for an enforcement action, license revocation, license modification, denial of a license renewal application, or to determine compliance with this license.

(b) The licensee shall also furnish to the Director or any authorized representative, upon request, copies of any record required to be kept by this license.

8. Inspection and Entry. The licensee shall allow the Director, or any authorized representative, including, but not limited to, a contractor, upon the presentation of credentials and other documents as may be required by law, to:

(a) Enter at reasonable times upon the licensee's facility and any other locations where records are required to be kept under the conditions of this license;

(b) Have access to and receive copies of, at reasonable times, any record required to be kept under the conditions of this license;

(c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this license; and

(d) Sample or monitor, at reasonable times, any substances or parameters at any location for the purpose of determining:

(i) Whether the management of hazardous waste may present an imminent and substantial hazard to the health of persons or to the natural resources, or is endangering or causing danger to public health or the environment;

(ii) Whether cause exists for an enforcement action, license revocation, license modification, denial of a license renewal application, or to determine compliance with this license. If samples are taken for analysis, duplicate samples and a duplicate of the analytical results shall be furnished to the licensee upon request.

9. Monitoring and Records.

(a) Samples and measurements taken by the licensee for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the waste to be analyzed shall be the appropriate method from Appendix I of 40 CFR Part 261. Laboratory methods used by the licensee shall be those specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW-846 (1986) or an equivalent method included in any attachment to this license. Alternate methods for obtaining a representative sample or for alternate test methods may be used if approved in writing by the Director.

(b) The Director reserves authority to require specific monitoring for hazardous wastes or hazardous waste constituents in addition to those requirements detailed in this license if the Director finds that additional monitoring is needed to demonstrate compliance with this license, Act 64, its rules and any other applicable laws or rules.

(c) The licensee shall submit the results of all environmental monitoring required by this license in the form of an Environmental Monitoring Report to the Chief of the Waste Management Division within 60 days of sample collection or within 7 days of receipt of the analytical results, whichever is sooner. In addition, the licensee shall submit results of air monitoring to the Wayne County Health Department, Air Pollution Control Division.

(d) The licensee shall provide environmental monitoring information or data which it generates to Van Buren Township upon request. Such information or data shall be made available to Van Buren Township on the same day the licensee forwards this information to the Chief of the Waste Management Division and to the Wayne County Health Department, Air Pollution Control Division.

(e) If the licensee conducts any additional environmental sampling or analysis beyond that required by this license, the results of such sampling or analysis shall be reported in accordance with Condition I.E.9.(c) of this license. Such increased frequency shall also be indicated in the Environmental Monitoring Report.

(f) The licensee shall preserve and retain all records and documents relating to this license, including, but not limited to, all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this license, and records of all data used to complete the application for this license for a period of at least three years from the date of the sample, measurement,

report or record. This period may be extended by the Director at any time and is automatically extended during the course of any unresolved enforcement action regarding this facility.

(g) Records of monitoring information shall specify:

(i) The dates, exact place, and times of sampling or measurements;

(ii) The individuals who performed the sampling or measurements;

(iii) The dates analyses were performed;

(iv) The analytical techniques or methods used; and

(v) The results of such analyses.

10. Facility Modifications. The licensee shall give notice to the Chief of the Waste Management Division as soon as possible prior to any physical modifications to the licensed facility. In accordance with R 299.9519, the licensee shall request and obtain a license amendment prior to undertaking any modifications to the facility. The licensee shall obtain a construction permit prior to expanding, enlarging, or altering the facility.

11. Anticipated Noncompliance. The licensee shall give advance notice to the Chief of the Waste Management Division as soon as the licensee becomes aware of any changes or activity in the licensed facility which may result in noncompliance with license requirements.

12. Transfer of License. In accordance with R 299.9522, the licensee shall obtain the approval of the Director, by a modification to the license, prior to transferring ownership or operation of the facility to another person. In addition, the licensee shall comply with the requirements of R 299.9605 when transferring the ownership of the facility. The new owner/operator shall not accept hazardous waste at the facility unless the license modification has been issued by the Director.

13. Reporting of Noncompliance.

(a) The licensee shall immediately report to the Director any noncompliance with the license which may endanger human health or the environment. The licensee shall fulfill this reporting requirement by immediately contacting the Chief of the Waste Management Division at 517-373-2730 if the noncompliance occurs during the period 8:00 a.m. to 5:00 p.m., Monday through Friday, except State holidays, or by calling the Department of Natural Resources Pollution Emergency Alerting System (PEAS) telephone

number 1-800-292-4706 during all other times. This report shall include the following:

(i) Information concerning the release or discharge of any hazardous waste or hazardous waste constituent which may endanger public drinking water supplies or the environment.

(ii) Information concerning the release or discharge of any hazardous waste or hazardous waste constituent, or of a fire or explosion at the facility, which could threaten the environment or human health.

(iii) A description of the occurrence and its cause, including:

(A) Name, address, and telephone number of the owner or operator;

(B) Name, address, and telephone number of the facility;

(C) Date, time, and type of incident;

(D) Name and quantity of materials involved;

(E) The extent of injuries, if any;

(F) An assessment of actual or potential hazard to the environment and human health where this is applicable; and

(G) Estimated quantity and disposition of recovered material that resulted from the incident.

(b) The licensee shall also follow-up the verbal report by providing a written report to the Chief of the Waste Management Division within five days of the time the licensee becomes aware of the circumstances. The written report shall contain all of the information in Condition I.E.13.(a)(iii) along with a description of the noncompliance and its cause; the periods of noncompliance (including exact dates and times); whether the noncompliance has been corrected; and if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance and when those activities occurred or will occur. The licensee need not comply with the five day written notice requirement if the Chief of the Waste Management Division waives the requirement and the licensee submits a written report containing this information within 15 days of the time the licensee becomes aware of the circumstances.

14. Other Noncompliance. The licensee shall report all other instances of noncompliance not otherwise required to be

reported above, at the time monitoring reports required by this license are submitted or within 30 days, whichever is sooner. The reports shall contain the information listed in Condition I.E.13. of this license.

15. Other Information. Whenever the licensee becomes aware that he/she failed to submit any relevant facts in the license application, or submitted incorrect information in a license application or in any report to the Director, the licensee shall promptly submit such facts or information.

16. Public Utility Notification. The licensee shall notify any public utility of any excavation, tunneling, or discharging of explosives or demolition of buildings which may affect the utility's facilities in accordance with Act 53 of the Public Acts of 1974, MCL 460.701 to 460.718, and comply with each of the requirements of that Act.

F. ENVIRONMENTAL AND HUMAN HEALTH STANDARDS

The licensee shall operate the facility in a manner that will prevent all of the following:

1. Endangerment or damage to human health, welfare or the environment.

2. Violations of the Federal Clean Water Act or 1929 P.A. 245, as amended, the Michigan Water Resources Commission Act.

3. Air emissions in violation of the Federal Clean Air Act or 1965 P.A. 348, as amended, the Michigan Air Pollution Act.

4. Exposure of humans or the environment to harmful quantities of hazardous waste or hazardous waste constituents.

5. Pollution, impairment or destruction of the natural resources of the State.

G. SIGNATORY REQUIREMENT

The licensee shall insure that all reports required by this license or other information requested by the Director are signed by a responsible corporate officer. A responsible corporate officer means (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million, if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures, or (iii) by a duly authorized representative of the corporation. A person is a duly authorized representative of the corporation only if:

1. The authorization is made in writing by a principal executive officer of at least the level of vice president.

2. The authorization specifies either an individual or a position having responsibility for overall operation of the regulated facility or activity.

3. The written authorization is submitted to the Director.

H. DOCUMENTS TD BE MAINTAINED AT FACILITY SITE

The licensee shall maintain at the facility, until closure is completed and certified by an independent registered professional engineer, the following documents and amendments required by this license:

1. Waste analysis plan
2. Inspection schedules
3. Personnel training documents and records
4. Contingency plan
5. Closure plan
6. Cost estimate for facility closure
7. Up-to-date closure financial assurance instrument(s)
8. Operating log
9. Site security plan
10. Facility engineering plans and specifications
11. Recordkeeping procedures
12. Up-to-date liability insurance instrument or financial test
13. Environmental monitoring sampling and analysis plans
14. Environmental monitoring data and statistical records
15. Preventative procedures (personnel protection plan).

PART II
GENERAL FACILITY CONDITIONS

A. DESIGN AND OPERATION OF FACILITY

The licensee shall maintain and operate the facility to minimize the possibility of a fire, explosion, or any sudden or non-sudden release of any hazardous waste constituents to the environment, including air, soil, or waters of the State which could threaten human health or welfare or the environment.

B. REQUIRED NOTICE

1. The licensee shall notify the Director in writing at least four weeks in advance of the date the licensee expects to receive hazardous waste from a foreign source. Notice of subsequent shipments of the same waste from the same foreign source is not required. When receiving such hazardous waste, the licensee shall comply with applicable laws, including, but not limited to, any treaties or other agreements entered into between the country in which the foreign source is located and the United States.

2. When the licensee is to receive hazardous waste from an off-site source (except where the licensee is also the generator), he must inform the generator in writing that he has the appropriate license for, and will accept, the waste the generator is shipping. The licensee must keep a copy of this written notice as part of the operating log (see Condition II.J.1.).

C. GENERAL WASTE ANALYSIS

The licensee shall follow the procedures described in the attached waste analysis plan, Attachment 1 of this license.

D. SECURITY

The licensee shall comply with the security requirements of R 299.9605 and 40 CFR §264.14, which is adopted by reference in R 299.11003.

E. GENERAL INSPECTION REQUIREMENTS

1. The licensee shall follow the inspection schedule, Attachment 2 of this license. The licensee shall remedy any deterioration or malfunction of equipment or structures which the inspection reveals and make these corrections on a schedule which ensures that the condition does not and will not threaten human health or welfare or the environment. Where a hazard is imminent or has already occurred, full remedial action must be taken immediately, but in any event, full remedial action shall be taken within a reasonable time. The licensee shall record inspections in an inspection log or summary and keep these records for at least three years from the date of inspection. The records shall include:

(a) The date and time of the inspection;
(b) The name of the inspector;
(c) A notation of the observations made; and
(d) The date and nature of any repairs or other remedial actions.

2. The licensee shall inspect the cargo portion of each waste hauling vehicle before it leaves the facility, and shall maintain a record of these inspections for a period of at least six months. If an inspection reveals that waste remains in the vehicle, the licensee shall remove the waste from the vehicle before the vehicle leaves the facility. Inspection and waste removal shall be accomplished in accordance with procedures approved by the Chief of the Waste Management Division. This inspection requirement shall not apply to vehicles transporting waste that has been rejected, or waste that is manifested to another hazardous waste management facility.

F. PERSONNEL TRAINING

The licensee shall conduct personnel training as required by Act 64 and its rules. This training program shall follow the attached outline, Attachment 3 of this license. The licensee shall maintain training documents and records as required by R 299.9605 and 40 CFR §264.16(d) which is adopted by reference in R 299.11003.

G. PREPAREDNESS AND PREVENTION

1. Required Equipment. At a minimum, the licensee shall equip the facility with the equipment set forth in the contingency plan, Attachment 4 of this license.

2. Testing and Maintenance of Equipment. The licensee shall test and maintain the equipment specified in Condition II.G.1. of this license to assure its proper operation in time of emergency.

3. Access to Communications or Alarm System. The licensee shall maintain access to the communications or alarm system as required by R 299.9606 and 40 CFR §264.34, which is adopted by reference in R 299.11003.

4. Required Aisle Space. At a minimum, the licensee shall maintain aisle space as required by R 299.9606 and 40 CFR §264.35, which is adopted by reference in R 299.11003.

5. Arrangements with Emergency Response Teams. The licensee shall attempt to make arrangements for emergency services with state and local authorities as required by R 299.9606 and 40 CFR §264.37, which is adopted by reference in R 299.11003. If state or local officials refuse to enter into the preparedness and prevention arrangements with the licensee, the licensee must document this refusal in the operating log.

H. CONTINGENCY PLAN

1. Implementation of Plan. The licensee shall immediately implement the contingency plan, Attachment 4 of this license, and follow the emergency procedures described in R 299.9607 and 40 CFR §264.56 whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which threatens or could threaten human health or welfare or the environment. The provisions of 40 CFR §264.56 are adopted by reference in R 299.11003.

2. Copies of Plan. The licensee shall provide copies of the contingency plan as required by R 299.9607 and 40 CFR §264.53, which is adopted by reference in R 299.11003.

3. Amendments to Plan. The licensee shall annually review and revise as necessary, the contingency plan, in accordance with R 299.9607 and 40 CFR §264.54, which is adopted by reference in R 299.11003. All proposed revisions to the contingency plan shall be submitted to the Director for approval. If approved, the revisions shall become part of this operating license.

4. Emergency Coordinator. The licensee shall comply with the requirements of R 299.9607 and 40 CFR §264.55, concerning the emergency coordinator. The provisions of 40 CFR §264.55 are adopted by reference in R 299.11003.

I. MANIFEST SYSTEM

1. The licensee shall comply with the manifest requirements of R 299.9304, R 299.9305, and R 299.9608.

2. The licensee shall follow the MDNR, Waste Management Division rejected load procedures included in the waste analysis plan, Attachment 1 of this license.

J. RECORDKEEPING AND REPORTING

1. Operating Log (Record). The licensee shall maintain a written operating log at the facility in accordance with R 299.9609.

2. Biennial Report. The licensee shall comply with the biennial report requirements of R 299.9610(1).

K. CLOSURE

1. Performance Standard. The licensee shall close and partially close the facility in accordance with the closure plan, Attachment 5 of this license, R 299.9613 and 40 CFR §264.111, which is adopted by reference in R 299.11003, and all other applicable requirements of this license, and all other applicable laws.

2. Amendments to Closure Plan. The licensee shall amend the closure plan if, at any time during the active life of the facility, proposed changes in operation or facility design will affect the closure plan, increase closure costs, or whenever there is a change in the expected year of closure. The

licensee shall not implement the proposed changes unless the amended closure plan is approved by the Director and all other necessary approvals have been obtained.

The licensee shall submit a proposed amended copy of the closure plan to the Director at the same time a license modification is requested.

3. Notification of Closure. The licensee shall notify the Director at least 45 days prior to initiating closure.

4. Time Allowed for Closure. After receiving the final volume of hazardous waste, the licensee shall treat or remove from the site all hazardous waste in accordance with the schedule specified in the closure plan, Attachment 5 of this license. After receiving the final volume of hazardous waste, the licensee shall complete final closure activities in accordance with the schedule specified in the closure plan, Attachment 5 of this license.

5. Disposal or Decontamination of Equipment. During final or partial closure, the licensee shall properly dispose of or decontaminate all contaminated facility equipment, structures and soil.

6. Certification of Closure. When closure or partial closure is complete, the licensee shall submit to the Director, within 60 days, certification both by the owner or operator and by an independent registered professional engineer that the facility has been closed or partially closed in accordance with the approved closure plan.

L. COST ESTIMATE FOR FACILITY CLOSURE

1. The licensee's current closure cost estimate, prepared in accordance with R 299.9702(1) and 40 CFR §264.142(a), which is adopted by reference in R 299.11003, is specified in Attachment 6 of this license.

2. The licensee shall adjust the closure cost estimate for inflation within 30 days after the close of the firm's fiscal year as required by R 299.9702(1) and 40 CFR §264.142(b), which is adopted by reference in R 299.11003. Whenever the current cost estimate increases to an amount greater than the current value of the associated financial instrument for reasons other than inflation, the licensee shall, within 60 days, increase the value of the instrument to an amount at least equal to the adjusted cost estimate. Evidence of such increases must be submitted to the Chief of the Waste Management Division during the 60 day period.

3. The licensee shall revise the closure cost estimate whenever there is a change in the facility's closure plan as required by R 299.9702(1) and 40 CFR §264.142(c), which is adopted by reference in R 299.11003.

4. The licensee shall keep at the facility the latest closure cost estimate as required by R 299.97D2(1) and 40 CFR §264.142(d), which is adopted by reference in R 299.11003.

M. FINANCIAL ASSURANCE FOR FACILITY CLOSURE

1. The licensee shall provide and continuously maintain a closure financial assurance instrument approved by the Director in at least the amount of the cost estimate required by Condition II.L. of this license. The licensee shall submit all proposed changes in financial assurance instruments to the Director and obtain his approval prior to implementation. In addition, the licensee shall maintain copies at the facility and shall make these documents available for inspection upon request from a Department representative.

2. The licensee shall provide the Chief of the Waste Management Division with a signed original of an approved renewal or replacement closure financial assurance instrument 60 days prior to the expiration date of the current instrument. Failure to provide such documentation is a violation of this license and shall be cause for the Director to access all funds provided in any financial instrument not renewed in accordance with this condition and to initiate revocation of this license.

N. LIABILITY REQUIREMENTS

The licensee shall continuously maintain liability coverage for sudden and accidental occurrences as required by R 299.9710 except as otherwise allowed by that rule.

O. INCAPACITY OF OWNERS OR OPERATORS, GUARANTORS, OR FINANCIAL INSTITUTIONS

1. The licensee shall notify the Director by certified mail of the commencement of a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code, naming the licensee as debtor, within 10 days after commencement of the proceeding.

2. A licensee who fulfills the requirements of Act 64 and its rules by obtaining a trust fund, surety bond, letter of credit, certificate of deposit, or insurance policy shall be deemed to be without the required financial assurance or liability coverage in the event of bankruptcy of the trustee or issuing institution, or a suspension or revocation of the authority of the trustee institution to act as trustee or of the institution issuing the surety bond, letter of credit, certificate of deposit, or insurance policy to issue such instruments. The licensee shall establish other financial assurance or liability coverage within 60 days after such an event.

P. HAZARDOUS WASTE DELIVERY REQUIREMENTS

1. All trucks transporting hazardous waste, to or from the facility shall use Rawsonville Road to enter and exit the facility.

2. Trucks transporting hazardous waste to or from the facility shall neither park nor stand on the North I-94 Service Drive.

3. All deliveries of hazardous waste made to the facility before 7:00 a.m. and after 7:00 p.m. shall be made in accordance with the procedures specified in Attachment 20 of this license.

Q. TRANSFER OF OPERATIONS

1. The licensee shall continue to operate the existing facility in accordance with that facility's May 27, 1982 license, until the effective date of this license.

2. By March 19, 1990, the licensee shall complete construction of the facility in accordance with the plans and specifications approved by the Chief of the Waste Management Division.

3. Before April 2, 1990, the licensee shall submit to the Chief of the Waste Management Division, the following documents:

   (a) A certification that the hazardous waste tank systems were properly installed, as required by R 299.9615 and 40 CFR §264.192(g), which is adopted by reference in R 299.11003;

   (b) A certification that the facility has been constructed in accordance with the approved plans and specifications, as required by R 299.9508(1)(c);

   (c) A certification that the facility is capable of storing and treating hazardous waste, as required by R 299.9508(1)(d);

   (d) As-built engineering plans for the facility, as required by R 299.9508(1)(b) and R 299.9504 (1)(g).

4. Beginning April 2, 1990, the licensee shall accept, store, and treat hazardous waste only at the facility covered by this license.

5. By July 2, 1990, the licensee shall begin closure of the existing facility in accordance with an approved closure plan for that facility. The closure plan currently being revised by the licensee shall be approvable by March 23, 1990.

6. The licensee shall not store or treat nonhazardous waste at the facility until a license for that use has been issued by the MDNR, pursuant to 1978 P.A. 641, as amended, the Solid Waste Management Act. The licensee may continue to store and treat nonhazardous wastes at the existing facility, until the effective date of the Act 641 license for the facility covered by this license.

R. ACCEPTABLE WASTE TYPES

1. Attachment 8 of this license shall consist of two lists of waste types that are acceptable for storage and treatment by

the licensee. List A shall consist of waste types acceptable under Act 64, List B shall consist of waste types acceptable under the Wayne County Health Department, Air Pollution Control Division permits.

2. List A shall only be altered through a license amendment pursuant to R 299.9519. List B may be altered at the discretion of the Wayne County Health Department Air Pollution Control Division. Revisions to List B shall be incorporated into this license without a license amendment.

3. The licensee shall accept, store, and treat only waste types that are listed on both List A and List B of Attachment 8.

PART III
CONDITIONS FOR STORAGE IN CONTAINERS

A. COVERAGE OF LICENSE

1. The hazardous waste container storage areas shown on Drawing S-1 are covered by this license. Any expansion or enlargement beyond the facility boundaries shown on Drawings S-1 and G-1 or beyond the 82,500 gallon storage design capacity requires a construction permit from the Director.

2. Drawings S-1 and G-1 are incorporated into this license as Attachment 7.

B. WASTE IDENTIFICATION AND QUANTITY

1. The licensee may store a total volume of 82,500 gallons of the hazardous wastes listed in Attachment 8 in a maximum of 1500 containers at the facility, subject to the terms of this license.

2. A maximum of 82,500 gallons of waste in 1500 containers may be stored in the North Container Storage Area in accordance with Drawing S-1.

3. A maximum of 22,000 gallons of waste in 400 containers may be stored in the East Container Staging Area in accordance with Drawing S-1.

4. At no time shall the number of containers on site exceed 1500.

C. CONDITION OF CONTAINERS

If a container holding hazardous waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the licensee shall transfer the hazardous waste from such container to a container that is in good condition, or otherwise manage the waste in compliance with the conditions of this license.

D. COMPATIBILITY OF WASTE WITH CONTAINERS

The licensee shall assure that the ability of the containers to contain the waste is not impaired as required by R 299.9614 and 40 CFR §264.172, which is adopted by reference in R 299.11003.

E. MANAGEMENT OF CONTAINERS

1. The licensee shall manage the containers as required by R 299.9614 and 40 CFR §264.173, which is adopted by reference in R 299.11003.

2. Waste storage containers shall not be stacked.

3. The licensee shall maintain an accurate inventory of the waste stored in containers, including the date on which the contents of each container is processed.

4. The licensee shall not store any container at the facility for more than one year prior to treatment of its contents on site, or shipment of the container and its contents to another appropriately licensed waste management facility.

F. CONTAINMENT

The licensee shall operate and maintain the containment system in accordance with the requirements of R 299.9614 and 40 CFR §264.175, which is adopted by reference in R 299.11003, and the attached plans and specifications, Attachment 9 of this license.

G. SPECIAL REQUIREMENTS FOR IGNITABLE WASTES

1. The licensee shall not locate containers holding ignitable wastes within 15 meters (50 feet) of the facility's property line as required by R 299.9614 and 40 CFR §264.176, which is adopted by reference in R 299.11003.

2. The licensee shall prevent the ignition of ignitable waste by following the procedures specified in Attachment 10 of this license, as required by R 299.9605 and 40 CFR §264.17(a), which is adopted by reference in R 299.11003.

3. The licensee shall document compliance with Condition III.G.1., as required by R 299.9605 and 40 CFR §264.17(c), and place this documentation in the operating record (Condition II.J.1.). The provisions of 40 CFR §264.17(c) are adopted by reference in R 299.11003.

4. Containers holding ignitable waste shall be stored only in the East Container Staging Area. Such containers shall be clearly segregated from waste containers awaiting acceptance.

H. SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES

1. In accordance with R 299.9614 and 40 CFR §264.177(a), which is adopted by reference in R 299.11003, the licensee shall prevent the placement of incompatible wastes or incompatible wastes and materials in the same container.

2. In accordance with R 299.9614 and 40 CFR §264.177(b), which is adopted by reference in R 299.11003, the licensee shall prevent the placement of hazardous waste in an unwashed container that previously held an incompatible waste or material.

3. The licensee shall prevent the storage of incompatible wastes as required by R 299.9614 and 40 CFR §264.177(c), which is adopted by reference in R 299.11003.

4. The licensee shall document compliance with Conditions III.H.1. and 2. as required by R 299.9605 and 40 CFR §264.17(c), which

is adopted by reference in R 299.11003, and place this documentation in the operating record (Condition II.J.1.).

I. LABELING OF CONTAINERS

1. The licensee shall label containers consistent with and as required by R 299.9614(1). The labels on each container shall be clearly visible for inspection.

2. The licensee shall clearly mark each container of land disposal restricted waste to identify its contents and the date it is accepted for storage, as required by R 299.9627 and 40 CFR §268.50(a)(2)(i), which is adopted by reference in R 299.11003.

J. DISPOSITION OF ACCUMULATED LIQUIDS

The licensee shall analyze and dispose all liquids accumulated in the container storage containment systems within 24 hours of detection, in accordance with the requirements of R 299.9614(1)(a) and 40 CFR §264.175(b)(5), which is adopted by reference in R 299.11003, and as specified in Attachment 9 of this license.

K. CONTAINER HANDLING SYSTEM

1. By July 31, 1990, the licensee shall submit to the Chief of the Waste Management Division and the Director of the Wayne County Health Department, Air Pollution Control Division, plans and specifications for a mechanical container handling system. The proposed system shall include appropriate air pollution control equipment. All Installation Permit applications for the system and the emission control equipment shall be submitted with the plans and specifications.

2. Within six months of approval by the Chief of the Waste Management Division and the Director of the Wayne County Health Department, Air Pollution Control Division, the licensee shall install the mechanical container handling system in accordance with the approved plans and specifications.

PART IV
CONDITIONS FOR STORAGE AND TREATMENT IN TANKS

A. COVERAGE OF LICENSE

1. The hazardous waste storage and treatment tank systems shown on Drawing S-1 are covered by this license. Any expansion or enlargement beyond the facility boundaries shown on Drawings S-1 and G-1 or beyond the 767,330 gallon tank storage design capacity or beyond the 192,000 gallon per day treatment design capacity requires a construction permit from the Director.

2. Drawings S-1 and G-1 are incorporated into this license as Attachment 7.

B. STORAGE WASTE IDENTIFICATION AND QUANTITY

1. The licensee may store a total volume of 767,130 gallons of the hazardous and nonhazardous wastes listed in Attachment 8 of this license, in the 21 tanks identified as Tanks #1, #2, #3, #7, #8, #9, #10, #11, #12, #16, #17, #18, #19, #20, #21, #22, #23, #24, #25, #26, and #27 in Drawing S-1, subject to the terms of this license.

2. A maximum of 60,000 gallons of dry hazardous waste dust may be stored in the three hazardous waste lime storage silos designated Tank #1, Tank #2, and Tank #3 in Drawing S-1.

3. A maximum of 1030 cubic yards of the hazardous wastes listed in Attachment 8 of this license may be stored in the waste holding tanks designated Tank #7 and Tank #8 in Drawing S-1.

4. A maximum of 1035 cubic yards of K062 hazardous waste, the nonhazardous wastes, and the characteristic hazardous wastes listed in Attachment 8 of this license may be stored in the waste holding tanks designated Tank #9 and Tank #10 in Drawing S-1.

5. A maximum of 40,000 gallons of the hazardous wastes listed in Attachment 8 of this license may be stored in the sludge receiving tank designated Tank #11 in Drawing S-1.

6. A maximum of 40,000 gallons of K062 hazardous waste, the nonhazardous wastes, and the characteristic hazardous wastes listed in Attachment 8 of this license may be stored in the sludge receiving tank designated Tank #12 in Drawing S-1.

7. A maximum of 80,000 gallons of the hazardous and nonhazardous wastes listed in Attachment 8 of this license that are to be treated by the licensee may be stored in the four waste storage tanks designated Tank #16, Tank #17, Tank #18, and Tank #19 in Drawing S-1.

8. A maximum of 40,000 gallons of the hazardous and nonhazardous wastes listed in Attachment 8 of this license may be stored in

the two waste storage tanks designated Tank #25 and Tank #27 in Drawing S-1.

9. Ninety thousand gallons of the 767,130 gallon tank storage design capacity does not currently exist at the licensed facility. Accordingly, a maximum of six 15,000 gallon hazardous waste storage tanks, designated Tank #20, Tank #21, Tank #22, Tank #23, Tank #24, and Tank #26 in Drawing S-1, may be installed within 3 years of the effective date of this license in the locations shown on Drawing S-1, in accordance with plans and specifications approved by the Chief of the Waste Management Division.

C. TREATMENT CAPACITY AND METHODS

1. The licensee may treat a total volume of 192,000 gallons of the hazardous and nonhazardous wastes listed in Attachment 8 of this license per day, subject to the terms of this license.

2. The licensee may operate the waste treatment system 24 hours per day, 7 days per week.

3. The licensee shall treat the wastes listed in Attachment 8 of this license through stabilization. Waste treatment shall be conducted in accordance with the procedures specified in Attachment 12 of this license, subject to the terms of this license.

4. The licensee may treat the hazardous wastes listed in Attachment 8 of this license using the 0.5 cubic yard (100 gallon) capacity pug mill designated Tank #14 in Drawing S-1, in accordance with the procedures specified in Attachment 12 of this license.

5. The licensee may treat K062 hazardous waste, the nonhazardous wastes, and the characteristic hazardous wastes listed in Attachment 8 of this license using the 0.5 cubic yard (100 gallon) capacity pug mill designated Tank #15 in Drawing S-1, in accordance with the procedures specified in Attachment 12 of this license.

D. DESIGN OF TANKS

The licensee shall construct, operate and maintain all tanks and associated appurtenances, including piping and secondary containment structures, in accordance with the applicable requirements of R 299.9615 and 40 CFR §264.191, §264.192, §264.193, and §264.194 which are adopted by reference in R 299.11003, and the attached plans and specifications, Attachment 11 of this license.

E. GENERAL OPERATING REQUIREMENTS

1. As required by R 299.9615 and 40 CFR §264.194(a), which is adopted by reference in R 299.11003, the licensee shall not place hazardous wastes or treatment reagents in a tank system if they could cause the tank, its ancillary equipment, or the

containment system to rupture, leak, corrode, or otherwise fail.

2. The licensee shall use appropriate controls and practices to prevent spills and overflows from tank or containment systems, as required by R 299.9615 and 40 CFR §264.194(b), which is adopted by reference in R 299.11003, by the methods specified in Attachment 13.

3. The licensee shall immediately remove from service any tank system or containment system from which there has been a leak or spill, or which is unfit for use, and shall comply with the requirements of R 299.9615 and 40 CFR §264.196, which is adopted by reference in R 299.11003.

F. SPECIAL REQUIREMENTS FOR IGNITABLE WASTES

1. The licensee shall not place ignitable waste in a tank system unless the procedures described in Attachment 10 of this license are followed, as required by R 299.9615 and 40 CFR §264.198(a), which is adopted by reference in R 299.11003.

2. The licensee shall document compliance with Condition IV.F.1. as required by R 299.9605 and 40 CFR §264.17(c) and place this documentation in the operating record (Condition II.J.1.). The provisions of 40 CFR §264.17(c) are adopted by reference in R 299.11003.

3. The licensee shall maintain the protective distances between the tanks and any public ways, streets, alleys, or adjoining property lines that can be built upon, as required in Tables 2-1 through 2-6 of the National Fire Protection Association's "Flammable and Combustible Liquids Code" (1977 or 1981) as required by R 299.9615 and 40 CFR §264.198(b), which is adopted by reference in R 299.11003.

G. SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES

1. The licensee shall not place incompatible wastes in the same tank system or place hazardous waste in a tank system that previously held an incompatible waste or material as required by R 299.9605 and 40 CFR §264.17(b), which is adopted by reference in R 299.11003.

2. The licensee shall document compliance with Condition IV.G.1., as required by R 299.9605 and 40 CFR §264.17(c) and place this documentation in the operating record (Condition II.J.1.). The provisions of 40 CFR §264.17(c) are adopted by reference in R 299.11003.

H. INVENTORY AND RECORDKEEPING REQUIREMENTS

1. The licensee shall maintain an accurate inventory of the hazardous waste stored in tanks, including the date on which the contents of each tank is processed.

2. The licensee shall label tanks in accordance with the provisions of NFPA Standard No. 704 as required by R 299.9615(4).

3. The licensee shall clearly mark each tank containing land disposal restricted waste to identify its contents, the quantity of each hazardous waste received, and the date each period of accumulation begins, or record such information in the facility operating record, as required by R 299.9627 and 40 CFR §268.50(a)(2)(ii), which is adopted by reference in R 299.11003.

4. The licensee shall not store any waste in tanks for more than one year prior to treatment of the waste on site, or shipment of the waste to another appropriately licensed waste management facility.

H. DISPOSITION OF ACCUMULATED LIQUIDS

The licensee shall analyze and dispose all liquids accumulated in the tank secondary containment systems within 24 hours of detection, in accordance with the requirements of R 299.9615(1) and 40 CFR §264.193(b)(4), which is adopted by reference in R 299.11003, and as specified in Attachment 14 of this license.

PART V
CONDITIONS FOR AIR EMISSIONS

A. COVERAGE OF LICENSE

The equipment that is regulated by the Wayne County Health Department, Air Pollution Control Division (WCAPCD) is:

1. Wet Scrubber (WCAPCD permit #C-8073)
2. Lime Storage Tank #1 (WCAPCD permit #C-8074)
3. Lime Storage Tank #2 (WCAPCD permit #C-8075)
4. Lime Storage Tank #3 (WCAPCD permit #C-8076)
5. Lime Storage Tank #4 (WCAPCD permit #C-8077)
6. Lime Storage Tank #5 (WCAPCD permit #C-8078)
7. Lime Storage Tank #6 (WCAPCD permit #C-8079)
8. Waste Holding Tank #7 (WCAPCD permit #C-8080)
9. Waste Holding Tank #8 (WCAPCD permit #C-8081)
10. Waste Holding Tank #9 (WCAPCD permit #C-8082)
11. Waste Holding Tank #10 (WCAPCD permit #C-8083)
12. Sludge Receiving Tank #11 (WCAPCD permit #C-8084)
13. Sludge Receiving Tank #12 (WCAPCD permit #C-8085)
14. West Pug Mill Mixer, Tank #14 (WCAPCD permit #C-8086)
15. East Pug Mill Mixer, Tank #15 (WCAPCD permit #C-8087)
16. Waste Storage Tank #16 (WCAPCD permit #C-8189)
17. Waste Storage Tank #17 (WCAPCD permit #C-8188)
18. Waste Storage Tank #18 (WCAPCD permit #C-8640)
19. Waste Storage Tank #19 (WCAPCD permit #C-8641)
20. Waste Storage Tank #25 (WCAPCD permit #C-8642)
21. Waste Storage Tank #27 (WCAPCD permit #C-8643).

B. GENERAL CONDITIONS

1. Not more than 30 days after completion of the installation of the equipment listed in Condition V.A. (the emission sources), the licensee shall apply, in writing, for WCAPCD Certificates of Operation. Written application shall be sent to: Mr. Michael Maillard, Director, Enforcement Services, Wayne County Department of Health, Air Pollution Control Division, 2211 East Jefferson, Detroit, Michigan 48207.

2. Trial operation of the emission sources shall be allowed for 90 days, provided such operation is in compliance with all of the terms and conditions contained in the WCAPCD Installation Permits. If a Certificate of Operation has not been issued for an emission source prior to the expiration of the trial operation period, an extension of trial operation may be requested of the WCAPCD Director.

3. Operation of an emission source shall permanently cease upon denial of the Certificate of Operation by the WCAPCD.

4. The licensee shall demonstrate compliance with all WCAPCD regulation requirements and with all other applicable state and federal regulation requirements and with all general and special conditions of the Installation Permits prior to issuance of any Certificate of Operation.

5. The licensee shall not reconstruct, alter, modify, expand, or relocate the emission sources unless plans, specifications, and an application for an Installation Permit are submitted to and approved by the WCAPCD.

6. No emission source shall be operated for any other purpose or in any other manner than that for which the WCAPCD Installation Permit was approved and for which a WCAPCD Certificate of Operation has been issued unless otherwise authorized in writing by the WCAPCD. Such emission source shall also be maintained in a state of good repair.

7. Operation of the emission sources shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property.

8. Operation of the emission sources shall not interfere with the attainment or maintenance of the air quality standard for any air contaminant.

9. Operation of the emission sources shall not result in significant deterioration of air quality.

10. The licensee shall provide notification of any abnormal conditions or malfunction of process or control equipment covered by this license, resulting in emissions in violation of the WCAPCD requirements or of any air permit conditions for more than two hours, to the Enforcement Section of the WCAPCD. Such notice shall be made as soon as reasonably possible, but not later than 9:00 a.m. of the next working day. The licensee shall also, within 10 days, submit to the WCAPCD Enforcement Section and to the Chief of the Waste Management Division, a written detailed report, including probable causes, duration of violation, remedial action taken, and the steps which are being undertaken to prevent a reoccurrence.

11. Approval of air permit applications by WCAPCD does not exempt the licensee from complying with any future regulations which may be promulgated.

12. Approval of air permits by WCAPCD does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

13. The restrictions and conditions of the Installation Permits shall apply to any person or legal entity which now or shall hereafter own or operate the emission sources for which the Installation Permits are issued. Any new owner or operator shall immediately notify the Director of the WCAPCD Enforcement Section, in writing, of such change in ownership or principal operator status of the emission sources.

14. If the installation, reconstruction, relocation, or alteration of the emission sources for which WCAPCD permits have been approved has not commenced within, or has been interrupted for, 18 months, these permits shall become void unless otherwise authorized by the WCAPCD.

C. SPECIAL CONDITIONS

1. The licensee shall not accept or process any waste stream other than those listed in Attachment 8 of this license without prior notification and approval by the WCAPCD.

2. The licensee shall not accept waste streams with more than 1% by volume volatile organic compounds except for 60,000 gallons per year not to exceed 3% by volume volatile organic compounds.

3. The licensee shall not accept more than 1,336,000 gallons of volatile organic compound containing waste per year calculated using the formula below:

volume percent VOC in waste load	X	gallons waste load received	=	gallons of VOC containing waste

4. The licensee shall not accept more than 124,000 gallons of volatile organic compound containing waste classified as F001 and F002 calculated using actual analysis for each load and the formula in Condition V.C.3.

5. The licensee shall not accept any organic waste with a flash point less than 90°F.

6. Emissions of total volatile organic compounds from the scrubber stack shall not exceed 0.25 pounds per hour.

7. Emissions of halogenated volatile organic compounds from the scrubber stack shall not exceed 2.66 milligrams per cubic meter, 0.028 grams per second, nor 0.224 pounds per hour.

8. Emissions of methylene chloride from the scrubber stack shall not exceed 1.21 milligrams per cubic meter, 12.8 milligrams per second, nor 0.102 pounds per hour.

9. Emissions of benzene from the scrubber stack shall not exceed 16.9 micrograms per cubic meter, 0.179 milligrams per second, nor 1.42×10^{-3} pounds per hour.

10. Emissions of 1,1,2,2-tetrachloroethane from the scrubber stack shall not exceed 24.1 micrograms per cubic meter, 0.256 milligrams per second, nor 2.03×10^{-3} pounds per hour.

11. Emissions of carbon tetrachloride from the scrubber stack shall not exceed 48.3 micrograms per cubic meter, 0.513 milligrams per second, nor 4.07×10^{-3} pounds per hour.

12. Emissions of chloroform from the scrubber stack shall not exceed 48.3 micrograms per cubic meter, 0.513 milligrams per second, nor 4.07×10^{-3} pounds per hour.

13. Emissions of dibromochloromethane from the scrubber stack shall not exceed 48.3 micrograms per cubic meter, 0.513 milligrams per second, nor 4.07×10^{-3} pounds per hour.

14. Emissions of tetrachloroethene from the scrubber stack shall not exceed 2.05 milligrams per cubic meter, 21.8 milligrams per second, nor 0.173 pounds per hour.

15. Emissions of trichloroethene from the scrubber stack shall not exceed 725 micrograms per cubic meter, 7.69 milligrams per second, nor 6.10×10^{-2} pounds per hour.

16. Emissions of vinyl chloride from the scrubber stack shall not exceed 483 micrograms per cubic meter, 5.13 milligrams per second, nor 4.07×10^{-2} pounds per hour.

17. Stack testing shall be conducted at the licensee's expense and with prior approval from the WCAPCD to verify compliance with the emissions limitations in Conditions V.C.6. through V.C.16. Testing shall be conducted within 30 days of completion of trial operation by a method acceptable to the Director of the Enforcement Section of the WCAPCD. A written report containing the results of such testing shall be submitted to the WCAPCD within 60 days of completion of the testing.

18. No visible emissions shall occur from the operation of the facility other than the emissions from the storage silo baghouses.

19. Exhaust from the scrubber shall not exceed 50 odor units per cubic foot at the stack if the stack is at least minimum stack height as defined in Appendix C of the Wayne County Air Pollution Control Ordinance. Exhaust from the scrubber shall not exceed 150 odor units per cubic foot at the stack if the stack height is at least good engineering practice stack height as defined in Appendix C of the Wayne County Air Pollution Control Ordinance.

20. Odor testing shall be conducted, at the licensee's expense and with prior approval of the WCAPCD, within 30 days of completion of the trial operation. A written copy of the test results shall be reported to the WCAPCD within 60 days of completion of the testing.

21. The licensee shall not process any waste unless the scrubber is installed and operating properly.

22. After a determination by and written notification from the WCAPCD Director that emissions from this operation are causing unreasonable interference with the common public right to live free from foul or noxious odors, the licensee shall immediately cease operations until the cause of odors can be corrected to

the satisfaction of the WCAPCD. The licensee shall not restart the operation(s) until the WCAPCD Director has approved the restart in writing. Information submitted by the licensee indicating the odors have been eliminated shall be evaluated by the WCAPCD as expeditiously as possible. The licensee may request the Health Officer to schedule a special meeting to consider a cessation order issued by the WCAPCD Director. This meeting will be held within 48 hours of the licensee's request. At that meeting, the Health Officer may continue, modify, or rescind the cessation order.

23. Negative static pressure shall be maintained in the building during any waste processing or when any waste is stored in the sludge feed tanks or when waste is in the waste holding tanks.

24. The licensee shall not have more than one sliding door open on the east or west side of the plant at any time.

25. An automatic feed system shall be utilized to aid in maintaining both sodium hypochlorite and sulfuric acid concentrations in the scrubber unit. The concentration of the sodium hypochlorite solution shall be maintained at 2250 parts per million ± 250 parts per million. Chemical analysis to assure compliance with this requirement shall be performed and recorded once per 8 hour shift until such time as the licensee demonstrates, using at least 60 days actual operating data, that chemical analysis done once per operating day is sufficient for proper operation and maintenance of the scrubber. With WCAPCD approval of this demonstration, the analysis shall be performed and recorded once per operating day instead of once per 8 hour shift.

26. Scrubber exhaust shall be discharged unobstructed vertically upward from a stack not less than 75 feet above grade nor more than 36 inches in diameter.

27. Emissions of PM-10 from each storage silo baghouse shall not exceed 0.004 grains per dry standard cubic foot nor 0.033 pounds per hour.

28. Visible emissions from the silo baghouses shall not exceed 5% opacity.

29. Waste storage tanks shall be sealed to prevent volatile organic compound emissions to the atmosphere except during loading.

30. The licensee shall not load any storage silo, or operate either pug mill, unless the corresponding baghouse is installed and operating properly.

31. A quarterly report shall be submitted to the WCAPCD by the licensee listing the following data from all waste streams containing volatile organic compounds or classified as F001, F002, F003, F005, or D001: generator name, date received, quantity received, volume percent volatile organic compounds. This report shall also include complete annual chemical

analyses for F001, F002, F003, F005, and D001 waste streams and a summary with supporting calculations for halogenated and total volatile organic compound emissions.

32. The company shall perform ambient monitoring for 1,1,2,2-tetrachloroethane, benzene, carbon tetrachloride, chloroform, dibromochloromethane, methylene chloride, tetrachloroethene, trichloroethene, vinyl chloride, cadmium, and total chrome in accordance with Condition VI.C of this license.

33. The licensee shall flush all paved roads and parking lots with water once a day, weather permitting.

PART VI

ENVIRONMENTAL MONITORING

A. GROUNDWATER MONITORING PROGRAM

1. The licensee shall maintain and operate a detection monitoring program for groundwater consisting of groundwater wells located as shown on Figure 1 of Attachment 15 of this license. The licensee shall collect background groundwater quality data for these wells as described in Attachment 15 of this license. The licensee shall sample and analyze water from the monitoring wells in accordance with Attachment 15 of this license and the procedures specified below:

   (a) The static water elevation shall be determined by methods giving precision to 1/8 inch or D.01 foot prior to purging water from the wells for sampling. Measurements shall be made from the top of the casing with the elevation of all casings in the monitoring well system related to a permanent reference point, using United States Geological Survey datum.

   (b) The samples obtained shall be representative of groundwater. To insure a representative sample, the licensee shall purge a volume of water equal to or greater than 3 times the amount of water in the well casing, or as determined by pH and specific conductance stabilization, or until dry before obtaining a sample for analysis as specified in Attachment 15 of this license. Wells shall be sampled within 48 hours after purging where recovery rates allow. Where wells are pumped dry during purging, recovery rates shall be determined and samples taken as soon as sufficient recovery occurs.

   (c) Non-dedicated pumps or sampling equipment shall be thoroughly cleaned and rinsed before use in each monitoring well. Procedures shall minimize the potential for cross-contamination and interference with analytical methods.

   (d) Water pumped from each monitoring well shall be discharged to the ground away from the well to avoid recycling of the flow if uncontaminated. If analysis indicates that contamination has occurred, purge water shall be properly handled.

   (e) All wells shall be clearly labeled, securely capped, and locked when not in use.

   (f) Prior to undertaking well or pump replacement or repair, the licensee shall obtain the approval of the Chief of the Waste Management Division.

(g) The licensee must submit proposed revisions to the sampling and analysis plan to the Chief of the Waste Management Division for approval prior to implementation.

2. The licensee shall, for detection monitoring, determine groundwater quality at each monitoring well at least semiannually during the active life of the facility and the post-closure period. The licensee shall sample and analyze groundwater at each well semiannually, for the primary monitoring parameters listed in Table 3a of Attachment 15 of this license. The groundwater at each well shall be sampled and analyzed annually for the secondary monitoring parameters listed in Table 3b of Attachment 15 of this license. The groundwater at each well shall be sampled and analyzed for the tertiary parameters listed in Table 3c of Attachment 15 of this license for background purposes as specified in Attachment 15 of this license.

3. The licensee shall determine the groundwater flow rate and direction in the regional aquifer at least annually, and develop a groundwater contour map from this data. A groundwater flow net diagram of the monitor well system shall, on an annual basis, be developed from the data to evaluate vertical and horizontal gradients. This annual groundwater reporting shall also include a summary of all statistical analyses. This information must be submitted to the Chief of the Waste Management Division no later than March 1 following each calendar year, in addition to the reporting requirements of Condition I.E.9.(c) of this license.

4. The licensee shall use background groundwater quality levels based on the mean and variance of no less than 4 separate sampling events. Where replicate samples are taken, the mean of the replicate samples shall be considered a sampling event.

5. During the background establishment period (not longer than two years from the effective date of this license) as referenced in Attachment 15 of this license, an Interim Detection Program shall be maintained for the parameters listed in Tables 3a and 3b of Attachment 15 of this license, and evaluated statistically as specified in Attachment 16 of this license. The Interim Detection Program shall utilize the t-test with continuity correction (Attachment 16, Part B of this license) for all parameters listed in Tables 3a and 3b (except for the major ions as identified in Table 3b) of Attachment 15 of this license and the sign test (Attachment 16, Part A of this license) for the major ions listed in Table 3b of Attachment 15 of this license. If the test indicates that the difference is significant, the licensee shall repeat the same procedure for all affected parameters on Table 3 of Attachment 15 of this license, in quadruplicate portions, from a fresh groundwater sample collected from the appropriate monitoring well(s). If this second round of analysis confirms that the difference is significant based on statistical evaluation as described within Condition VI.A.5. the licensee shall conclude that a statistically significant change has occurred and proceed to

Condition VI.A.6., A.7. or A.9. accordingly. The Interim Detection Program shall be conducted during the background period. The licensee must submit within 20 months of the effective date of this license a final statistical program to the Chief of the Waste Management Division for approval prior to implementation, as per the outline in Figure 1 of Attachment 16 of this license.

6. If the licensee determines pursuant to Condition VI.A.5 that there is a statistically significant increase for constituents listed in Table 3a of Attachment 15 of this license, the licensee shall:

   (a) Notify the Director immediately by calling the Chief of the Waste Management Division, the Waste Management Division District Supervisor, or Department of Natural Resources 24-hour emergency response telephone at 1-800-292-4780.

   (b) Provide follow-up notification to the Chief of the Waste Management Division in writing within seven days. The notification shall indicate what parameters or constituents have shown statistically significant increases.

   (c) Immediately sample the groundwater in all monitoring wells within 1000 feet of the affected well, determine the concentration of all constituents identified in Appendix VIII of 40 CFR Part 261 that are present in groundwater and for which approved analysis methods exist, and analyze for any additional parameters listed in Table 3 of Attachment 15.

   (d) Immediately take steps to determine the cause of the contamination and eliminate the source of discharge.

   (e) Within 90 days of the determination, submit to the Director an application for a license modification to establish a compliance monitoring and corrective action program meeting the requirements of R 299.9612 and 40 CFR §264.99 and 40 CFR §264.100, which are adopted by reference in R 299.11003. The application shall include the following information:

      (i) An identification of the concentration of any Appendix VIII constituents found in the groundwater.

      (ii) Any proposed changes to the groundwater monitoring system at the facility necessary to meet the requirements of R 299.9612 and 40 CFR §264.99.

      (iii) Any proposed changes to the monitoring frequency, sampling and analysis procedures or methods, or statistical procedures used at the facility necessary to meet the requirements of R 299.9612 and 40 CFR §264.99.

(iv) A detailed description of corrective actions that will achieve compliance with 1929 P.A. 245 and its administrative rules, including a schedule of implementation.

(v) A plan for a groundwater monitoring program that will demonstrate the effectiveness of the corrective action. Such a groundwater monitoring program may be based on a compliance monitoring program developed to meet the requirements of R 299.9612 and 40 CFR §264.99.

(f) During the period before the license modification is granted, the licensee shall provide the Chief of the Waste Management Division, or his or her designee, with weekly telephone updates and written reports regarding the progress to date in determining the cause of contamination and eliminating the discharge. The licensee shall include in the written report the results of all samples from environmental monitoring conducted by the licensee.

7. If the licensee determines pursuant to Condition VI.A.5. that a statistically significant increase in hazardous constituents has occurred in groundwater, he or she may attempt to demonstrate that a source other than the licensed facility caused the increase or that the increase resulted from error in sampling, analysis or evaluation. While the licensee may make a demonstration under this condition in addition to, or in lieu of, submitting a license modification application within the time specified in Condition VI.A.6.(e) the licensee is not relieved of the requirement to submit a license modification application within the time specified unless the Director determines that the demonstration made under this condition successfully shows that a source other than the licensed facility caused the increase or that the increase resulted from error in sampling, analysis or evaluation. In making a demonstration under this condition, the licensee shall:

(a) Notify the Director within seven days of the determination that it intends to make a demonstration under this condition.

(b) Within 90 days of the determination, submit a report to the Director for his or her review and approval, which demonstrates that a source other than the licensed facility caused the increase, or that the increase was caused by error in sampling, analysis or evaluation.

(c) Within 90 days of the determination, submit to the Director for his or her review and approval an application for a license modification to make any appropriate changes to the groundwater monitoring program at the facility.

(d) Continue to monitor groundwater in compliance with this license.

8. In the event that the Director determines from the findings of Condition VI.A.5 that a statistically significant increase in hazardous constituents has occurred in groundwater, and the Director finds in accordance with Section 47 of Act 64, that there is an imminent and substantial threat to human health, welfare, or the environment, the licensee shall immediately cease waste receipt and treatment at the facility until instructed by the Chief of the Waste Management Division that waste receipt and treatment may resume.

9. Within 30 days of sampling, the licensee shall conduct a trend analysis of those secondary monitoring parameters identified in Table 3b of Attachment 15 of this license by determining if statistically significant increases of these parameters have occurred above the background levels determined in accordance with Attachment 16 of this license. A statistically significant increase shall be determined using the sign test specified in Attachment 16, Part A of this license for the major ions and t-test with continuity correction as specified in Attachment 16, Part B of this license for the remaining secondary parameters. In the event that the concentration of the secondary parameters listed in Table 3b show a statistically significant increase in any monitoring well as compared to background, the licensee shall, within seven days notify the Director in writing. The notification shall indicate what parameters or constituents have shown statistically significant increases. This interim statistical procedure shall be replaced by the procedure on the schedule specified in Attachment 16 of this license following completion of the maximum 2 year background data trend analysis.

B. SURFACE WATER MONITORING

1. The licensee shall conduct a surface water monitoring program of surface water drainage from the site by collecting samples once each quarter after a twenty-four hour, 0.5 inch or greater rainfall, from those locations shown on Figure 1 of Attachment 17 of this license. If no 0.5 inch or greater rainfall event occurs in any given quarter, sampling of the sediment pond discharge as shown on Plate 2 of Attachment 17 of this license will be performed in that quarter. The licensee shall analyze each sample for those constituents listed on Table 4 of Attachment 17 of this license, using the procedures specified in Attachment 17 of this license. The licensee shall record the quantity of rainfall during each storm event during which sampling occurs.

2. The licensee shall submit results of each monitoring event to the Surface Water Quality Division, Southeast Michigan Field Office in addition to the Chief of the Waste Management Division on the schedule specified in Condition 1.E.9.(c) of this license.

3. The licensee shall determine if statistically significant increases of parameters listed in Table 4 of Attachment 17 of this license have occurred over background levels for surface

water in the drains. A statistically significant increase shall be determined as follows:

(a) For parameters listed in Table 4a, the student's t-test with continuity correction as specified in Attachment 16, Part B of this license as the interim statistical procedure.

(b) For parameters listed in Table 4b and c with n values of 4 or more, using the sign test procedures in Attachment 16, Part A of this license as the interim statistical procedure.

(c) Following the 2-year background trend analysis (which utilized an interim statistical procedure) the statistical procedures specified in Attachment 16 of this license shall be implemented according to the schedule in that Attachment.

4. In the event that the sampling and analysis of surface waters shows a statistically significant increase over background, the licensee shall do the following:

(a) Notify the Director immediately by calling the Chief of the Waste Management Division, the Waste Management Division District Supervisor, or Department of Natural Resources 24-hour emergency response telephone at 1-800-292-4780.

(b) Provide follow up notification to the Chief of the Waste Management Division in writing within seven days.

(c) If and when water is present, immediately test surface drains for constituents listed in Table 3a of Attachment 15 of this license.

(d) Within 30 days of sampling, determine whether a discharge to surface waters is occurring, or will occur during subsequent storm events, determine the source of the discharge, and take immediate steps to eliminate and prevent any such discharge.

5. The licensee may petition the Director to discontinue surface water monitoring under this license in the event a permit for each surface water discharge is issued by the MDNR under the National Pollutant Discharge Elimination System (NPDES). Any violation of an NPDES permit is considered a violation of the terms of this license.

6. The licensee may petition the Director to discontinue surface water monitoring under this license in the event the surface water discharge is redirected to the sanitary sewer system under an Industrial Wastewater Discharge Permit issued by the Wayne County Department of Public Service, Division of Public Works. Any violation of the Industrial Wastewater Discharge Permit is considered a violation of the terms of this license.

C. AMBIENT AIR MONITORING

1. Within 120 days of the effective date of this license, the licensee shall operate the ambient air monitoring program specified in Attachment 18 of this license which shall be considered representative of ambient air. The licensee shall sample at all monitoring locations in accordance with Attachment 18 of this license. Monitors shall be operated on a six-day schedule. The licensee shall submit detailed sampling and analytical procedures for approval by the Chief of the Waste Management Division within 60 days of the effective date of this license. The procedures must include:

   (a) The sorbent tubes to be used for gaseous organics.

   (b) A protocol for sample preservation, transportation, and storage.

   (c) The time between sample collection and analysis for each parameter.

   (d) A detailed description of QA/QC procedures for sampling and analysis including a duplicate sampler for organics at the monitoring location of highest predicted impact.

2. The licensee shall submit the results of the air monitoring to WCAPCD, in addition to the Chief of the Waste Management Division, on the schedule specified in Condition I.E.9.(c) of this license.

3. The licensee may use the Wayne Disposal, Inc. (MID 048 090 633) air monitoring system to fulfill the air monitoring obligations of Condition VI.C. of this license.

4. The Director may waive the requirements of Condition VI.C.1. if the licensee demonstrates that such monitoring is not required, or that a lesser degree of monitoring can be utilized, to demonstrate compliance with this license.

D. SEDIMENTATION BASIN

1. The licensee shall conduct a sedimentation basin monitoring program of the soils accumulated in the sedimentation basin on an annual basis. Individual samples taken from the locations depicted on Plate 3 of Attachment 19 of this license shall be analyzed for the constituents listed on Table 5 of Attachment 19 of this license.

2. If the sedimentation basin soil analysis conducted under Condition VI.D.1. establishes that levels of contaminants exist that may create a threat to human health, welfare, or the environment, the licensee shall remove and properly dispose of the contaminated soils.

3. If a threat exists as outlined under Condition VI.D.2., the licensee shall develop and submit to the Chief of the Waste Management Division for approval, prior to implementation, a plan to control the accumulation of contamination.

INDEX OF ATTACHMENTS

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ATTACHMENT 1

Waste Analysis Plan

270.14 (B)(3)

WASTE ANALYSIS PLAN

This Waste Analysis Plan (WAP) outlines the procedure utilized by MDI to ensure that the following objectives are met:

1. Only waste types allowed by our permit are approved and accepted for storage or treatment.

2. Wastes that are incompatible with each other are not commingled.

3. Waste shipments arriving for storage or treatment meet the description and characteristics as represented by the generator.

In order to meet these objectives MDI uses a dual phase waste screening procedure consisting of the following elements:

A. <u>Approval Screening Process</u>

1) Waste to be Treated
2) Waste to be Stored
3) Land Disposal Restrictions
4) Waste Approval Re-Evaluation

B. <u>Quality Assurance of Incoming Wastes</u>

A detailed description of these elements follows.

A. APPROVAL SCREENING PROCESS

1) Waste to be Treated

The approval screening process is a waste evaluation procedure that takes place before delivery of the candidate waste to the site for storage or treatment. MDI requires that the generator of a waste describe in detail the waste, its generating process and actual and potential constituents.

A "Generator Waste Characterization Report" (attached as "Attachment 1") to this Waste Analysis Plan must be filled out by the generator. MDI will accept other forms of documentation of waste characterization as long as all pertinent information on the MDI preprinted form is included. Preprinted forms are supplied to the generators by MDI at no charge and are the preferred method of presentation of waste information.

The Generator Waste Characterization Report with the supporting analytical information forms the base of information upon which MDI determines if the waste can be accepted for treatment. The analytical information, process description and physical characteristics plus a sample (one pint typically) provide MDI technicians with adequate information to decide if the waste can be accepted or if additional data is required before a decision can be reached. If the generator does not provide sufficient information, the generator is contacted and requested to upgrade the information in written form, before the approval process will continue on the waste stream.

When it is determined that a candidate waste stream can be safely handled at the facility in accordance with all permit requirements it is assigned a unique approval number. An approval letter is sent to the generator serving as notification that the waste may be shipped to the facility and that it will be accepted, provided the waste that arrives for treatment is the waste that has been evaluated and approved in the pre shipment screening process. for purposes of record keeping, both a computerized and manual file are opened and maintained at the facility. The manual (hard copy) file contains all

A. APPROVAL SCREENING PROCESS

1) Waste to be Treated (Continued)

information regarding classification of the waste including:

a) The completed Waste Characterization Report form (or equivalent information).

b) All laboratory analysis from the generator and MDI lab used to support the classification of the waste.

c) General correspondence regarding the waste between MDI and the generator.

d) Notes and additional information compiled by MDI personnel from conversations with the generator or testing of the sample supplied by the generator.

Table I-A shows the testing procedures and criteria utilized by MDI personnel to evaluate wastes both in the pre-shipment approval process and the quality assurance process for incoming waste loads.

2) Waste to be Stored

The approval screening process is a waste evaluation procedure that takes place before delivery of the candidate waste to the site for storage. MDI requires that the generator of a waste describe in detail the waste, its generating process and actual and potential constituents.

A "Generator Waste Characterization Report" (attached as "Attachment 1") to this Waste analysis Plan must be filled out by the generator. MDI will accept other forms of documentation of waste characterization as long as all pertinent information on the MDI preprinted form is included. Preprinted forms are supplied to the generators by MDI at no charge and are the preferred method of presentation of waste information.

A. **APPROVAL SCREENING PROCESS**

2. Waste to be Stored (Continued)

The Generator Waste Characterization Report with the supporting analytical information forms the base of information upon which MDI determines if the waste can be accepted for storage. The analytical information, process description and physical characteristics plus a sample (one pint typically) provide MDI technicians with adequate information to decide if the waste can be accepted or if additional data is required before a decision can be reached. If the generator does not provide sufficient information, the generator is contacted and requested to upgrade the information in written form, before the approval process will continue on the waste stream.

When it is determined that a candidate waste stream can be safely handled at the facility in accordance with all permit requirements it is assigned a unique approval number. An approval letter is sent to the generator serving as notification that the waste may be shipped to the facility and that it will be accepted, provided the waste that arrives for storage is the waste that has been evaluated and approved in the pre shipment screening process. For purposes of record keeping, both a computerized and manual file are opened and maintained at the facility. the manual (hard copy) file contains all information regarding classification of the waste including:

a) The completed Waste Characterization Report form (or equivalent information).

b) All laboratory analysis from the generator and MDI lab used to support the classification of the waste.

c) General correspondence regarding the waste between MDI and the generator.

d) Notes and additional information compiled by MDI personnel from conversations with the generator or testing of the sample supplied by the generator.

A. **APPROVAL SCREENING PROCESS**

2. Waste to be Stored (Continued)

Table I-B shows the testing procedures and criteria utilized by MDI personnel to evaluate wastes both in the pre-shipment approval process and the quality assurance process for incoming waste loads.

3) Land Disposal Restriction

a) Special Requirements for F001 thru F005 Solvent Bearing Wastes

Effective November 7, 1986 the U.S. EPA issued regulations restricting land disposal of F001 through F005 hazardous wastes.

Land disposal (placement of wastes in a landfill, surface impoundment or waste pile) of the F001-F005 waste series is prohibited unless the waste either meets an extractability performance standard or has been excepted from the ban by any one of a variety of ways specified in the regulations.

The regulations allow direct disposal of restricted wastes or disposal of residuals after treatment if the waste passes the new "TCLP" by leaching less than specified concentrations of each of the listed solvent constituents.

EXCEPTION FROM THE BAN

The EPA recognizes that case specific situations and a shortfall of treatment capacity make exceptions and variances from the ban necessary, at least temporarily. They have therefore set up procedures to handle these situations. These exceptions fall into two basic categories: Generator specific exceptions and nationwide variances. Each category is address below.

A. **APPROVAL SCREENING PROCESS**

3) Land Disposal Restriction (Continued)

a) Special Requirements for F001 thru F005 Solvent Bearning Wastes

Generator Specific Exceptions

Generators may receive case-by-case extensions under Sec. 268.5 or file a petition under 268.6 for exemption from the ban. If a generator receives an extension or exemption, MDI will evaluate the waste utilizing the approval screening process above, and will require documentation of receipt of the extension/exemption.

Nationwide Variance

In order for Michigan Disposal (MDI) to accept any of the wastes subject to the nationwide variance, it is required by the regulation that the generator notify MDI that the waste is subject to a variance. This must be done before the waste is shipped and with each additional shipment thereafter. The notification must contain the following information.

a) The waste is not prohibited from land disposal.

b) EPA hazardous waste number.

c) Corresponding treatment standards and all applicable prohibitions set forth in 268.32 or RCRA, Section 3004 (d).

d) Manifest number associated with the shipment of waste.

e) Waste analysis data, where available.

f) The date the waste is subject to the prohibition.

It is necessary that the generator provide back-up documentation to verify the applicability of the variance to the waste. If a waste falls into the CERCLA or RCRA remedial action categories, a letter from the appropriate regulatory agency is the most appropriate documentation.

A. APPROVAL SCREENING PROCESS

3. Land Disposal Restrictions (Continued)

A copy of the variance notification will be kept in the manual (hard copy) file for each generator, as well as being attached to the original manifest.

MDI's manifest/check-in procedure includes a verification check to determine that a letter of variance exists prior to completion of the manifest documentation and acceptance of the load for storage or treatment.

b) Special Requirements for "California List" Waste

The determination as to whether a waste is covered by the regulation must be based on the status of the waste "at the point of generation". However, each waste is reviewed for applicability for the "California List," as listed below:

1) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing the following metals (or elements), or compounds of these elements are metals at concentrations greater than or equal to those specified below:

a)	Arsenic and/or compounds (as As)	500 mg/l
b)	Cadmium and/or compounds (as Cd)	100 mg/l
c)	Chromium VI and/or compounds (as Cr VI)	500 mg/l
d)	Lead and/or compounds (as Pb)	500 mg/l
e)	Mercury and/or compounds (as Hg)	20 mg/l
f)	Nickel and/or compounds (as Ni)	134 mg/l
g)	Selenium and/or compounds (as Se)	100 mg/l
h)	Thallium and/or compounds (as Ti)	130 mg/l

A. **APPROVAL SCREENING PROCESS**

3. Land Disposal Restrictions (Continued)

b) Special Requirements for "California List" Waste

2) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing free cyanides at concentrations greater than or equal to 1,000 mg/l (no accepted).

3) Liquid hazardous wastes having a pH less than or equal to two (2.0).

4) Liquid hazardous wastes containing "Polychlorinated Biphenyls" at concentrations greater than or equal to fifty (50) ppm (not accepted at this facility).

5) Liquid hazardous wastes that is primarily water containing HOC's in total concentration equal to or greater than 1,000 mg/l and less than 10,000 mg/l total HOC's (not accepted).

6) Hazardous waste containing HOC compounds in total concentration greater than or equal to 1,000 mg/kg. The chemical names of the affected HOC's are listed in Appendix III of 40 CFR Section 268.

Wastes in items 2, 4, 5 and 6 are now prohibited from land disposal and will not be accepted for treatment, unless the waste is subject to an exception or variance, as demonstrated by the generator.

MDI requires Notification and Certification forms as required by the regulation. The generator must submit a completed Notification/Certification form with each shipment.

c) Dioxin Containing Wastes

Waste meeting the listing description of hazardous waste numbers F023, F026, F027 and F028 are not accepted.

A. **APPROVAL SCREENING PROCESS**

3. Land Disposal Restrictions (Continued)

d) First and Second Third Wastes

1) Hard-Hammer Wastes (those waste for which EPA has established treatment standards).

Generators offering wastes meeting any of the listing description of the "First, and Second Third Wastes" are required to provide analytical data establishing that the waste meets the constituent concentrations in waste extract specified in Table CCWE of 268.41 and/or constituent concentrations in waste specified in Table CCW of 268.43, either, or both of the tables may be applicable to a particular waste. If waste does not meet the CCWE or CCW table requirements a treatability study will be conducted in accordance with the provisions of Tab X, Section 5. After treatment is complete, prior to shipping waste for final disposal, post-treatment analysis is performed to confirm successful treatment, as described in Tab X, Section 4.

Approved wastes are accepted only with the proper Notification/Certification forms, as specified in 268.7.

Hazardous wastes requiring Notification/Certification with every shipment will be highlighted on the hard copy of the approval file and on the computer display to assist the manifest clerks.

Examples of properly filled forms will be placed in a special file for comparison purposes. A secondary safety mechanism to insure compliance is that all wastes requiring such forms are examined by the shipment coordinator,

A. **APPROVAL SCREENING PROCESS**

3. Land Disposal Restrictions (Continued)

d) First and Second Third Wastes

1) laboratory manager and/or compliance manager.

2) Soft-Hammer Wastes (those wastes for which EPA has not established treatment standards).

Generators offering wastes specified in 268.10 for which treatment standards under Subpart D of Part 268 are not applicable, including those wastes which are subject to the statutory prohibitions of RCRA Section 3004 (d) or codified prohibitions under 268.32, but not including wastes subject to specific treatment technologies, will be approved for disposal if the generator provides MDI with a copy of the demonstration and certification the generator provided to the Regional Administration pursuant to 268.8.

A copy of the valid demonstration and certification will be kept in the manual (hard copy) file for each generator as well as having the Notification/Certification form being attached to the manifest.

PROTOCOL REGARDING TREATMENT OF LAND DISPOSAL RESTRICTED WASTE K061 ELECTRIC ARC FURNACE DUST (EAF)

STAGE #1 Preapproval and Screening

Waste streams designated for treatment at MDI are subject to a simulated bench style (treatability study) to verify compatibility with MDI process.

STAGE #2 Technical Approval

Approval is only granted upon completion of the "Treatability Study" and a successful technical review has been established according to the MDI Waste Analysis Plan (W.A.P.).

STAGE #3 Waste Reception

Loads arriving to MDI must have the following documentation:

a) A valid MDI approval number.

b) Required notification of a restricted waste requiring treatment.

STAGE #4 Treatment/Post Treatment

K061 dusts will be treated in batches, a record of which is kept by Operations/Laboratory to track manifest numbers and their respective status.

The following BDAT/TCLP parameters will be analyzed to verify compliance:

Cadmium
Chromium
Lead
Nickel

Batches passing BDAT performance standards will be released to WDI after the proper certification forms with the relevant manifest numbers and corresponding chemical analyses are filed.

Copies of the various relevant forms are provided.

PROTOCOL REGARDING LAND DISPOSAL RESTRICTED WASTES
F006, F007, F008, F009, F010, F011, F012 AND F019

STAGE #1 Preapproval and Screening

Waste streams designated for treatment at MDI are subject to a bench style "Treatability Study" to verify compatibility with the MDI process.

STAGE #2 Technical Approval

Approval is only granted upon completion of the "Treatability Study" to verify compatibility with the MDI processes.

STAGE #3 Waste Reception

Loads arriving to MDI must have the following documentation:

a) Valid MDI approval number.
b) Required Notification and/or Certification/Demonstration (where applicable).

STAGE #4 Treatment/Post Treatment

Batch treated wastes are held in numerical boxes pending sampling and laboratory analysis for the following:

TCLP on Waste Extract:	Cadmium Chromium Lead Nickel Silver
Total Concentrations:	Cyanide (Total) Cyanide (Amenable)

Batches passing BDAT performance standards will be released to WDI after the proper Certification/Notification forms with the relevant manifest numbers and chemical analysis are filed.

Copies of the various relevant forms are provided.

PROTOCOL REGARDING LAND DISPOSAL
RESTRICTED WASTE CODE K062

In spite of the TCLP/BDAT standards issued by EPA regarding chromium and lead concentrations; neutralization of this waste stream with lime followed by stabilization using the MDI process, results in delisting of the stream, provided that D-series EP Toxicity analysis indicates compliance; the exemption eligibility under 40 CFR 261.3(c)(2)(ii).

STAGE #1 Preapproval and Screening

Waste streams bearing the code K062 designated for treatment at MDI are subject to a bench style "Treatability Study" to achieve exemption status via:

a) Neutralization with lime.

b) Stabilization to render suitable for the landfill.

This study also ensures compatibility of the waste with our MDI process.

STAGE #2 Technical Approval

Approval is only granted upon completion of the "Treatability Study" and a successful technical review has been established according to the MDI Waste Analysis Plan (W.A.P.)

STAGE #3 Waste Reception

Loads arriving to MDI must have the following documentation:

a) Valid MDI approval number.

b) Required notification of a restricted waste requiring treatment.

PROTOCOL REGARDING LAND DISPOSAL
RESTRICTED WASTE CODE K062 (Continued)

STAGE #4 Treatment/Post Treatment

Compatible batches are initially neutralized with lime followed by stabilization. Treated wastes are held in numerical boxes-tanks' pending sampling and laboratory analyses for the RCRA EP Toxic metals in addition to Copper and Zinc (Michigan metals): Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver and Zinc.

Cyanides and sulfides are pre-screened in the preapproval and Waste Acceptance Process; if any are detectable in excess of the EP Toxic limits, these two parameters will be tested.

Batches passing the above listed standards will be released to the non-hazardous cell after the proper Certification/Notification forms with relevant manifest numbers and chemical analysis are filed.

Copies of the various relevant forms are provided.

PROTOCOL REGARDING DETOXIFICATION OF D-LISTED HAZARDOUS WASTES

"Exemption Eligibility 261.3(d)(1); Act 64 299.9203(d)(5)(a)"

D-listed wastes (D001, D002, D004-D011) are treated at MDI to detoxification levels under the MDL using stabilization techniques.

STAGE #1 Preapproval and Screening

Waste streams bearing the codes D001, D002, D004-D011 designated for treatment at MDI are examined by the technical department for suitability for detoxification. Those that are not suitable for this process will be highlighted on the hard copy of the approval and in the remarks section on the computer file.

STAGE #2 Technical Approval

Approval is only granted upon satisfying our Waste Analysis Plan (W.A.P.)

STAGE #3 Waste Reception

All D-listed wastes will be received according to our Waste Analysis Plan.

STAGE #4 Treatment

STAGE #5 Post Treatment

Treated residue is held, sampled and EP-toxicity (RCRA + Copper + Zinc) test will be conducted to insure non-hazardous status compliance. (Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver and Zinc).

Batches passing the EP-toxic limits will be released to the non-hazardous cell after the proper paperwork has been completed.

Copies of the various relevant forms are provided.

A. APPROVAL SCREENING PROCESS

4. Waste Approval Re-Evaluation

MDI requires that the Generator Waste Characterization Report and supporting documentation be updated whenever any one of the following occur:

a) There has been a change in the waste generating process.

b) Inspection of a waste shipment reveals that the waste does not meet the description/classification of the current approval record for the waste stream.

c) One year has passed since the last approval of the waste.

B. QUALITY ASSURANCE OF INCOMING WASTES

The quality assurance program for incoming wastes is conducted to assure that loads received for disposal have been pre-evaluated according to the Approval Screening Process and the waste actually received for disposal is as expected based on information and samples presented for pre-approval.

When a load of waste arrives at the facility the following step-wise procedure is followed:

1) The driver presents the manifest and any other shipping documents to a MDI manifest checker in the hazardous waste reception/laboratory building.

2) MDI personnel examine the manifest and other shipping documents to ensure that the shipment was intended for disposal at the MDI facility.

3) MDI personnel sample or directly supervise the sampling of waste shipment is described below, under "Sampling Procedure".

4) The manifest checker determines if the waste stream has been pre-approved by one of the following methods:

B. **QUALITY ASSURANCE OF INCOME WASTES (Continued)**

4) a) He enters the waste stream approval number (usually entered by the generator or transporter on the manifest form) into the waste stream data base computer system. If the system finds the approval it responds by displaying information regarding the waste stream on the computer display screen. The checker proceeds to step 6.

b) If the approval number is not written on any of the shipping documents the manifest checker uses the data base search features to scan the file for an approval matching the generator waste type and waste description shown on the manifest. If a match is found the checker proceeds to step 6.

c) If use of an approval number or data base search does not locate approval information in the computer file the manifest checker or other assigned personnel accesses the manual approval files to determine if the waste stream has been pre-approved. If a match is found the checker proceeds to step 6. If pre-approval documentation is not found after proceeding through steps A, B and C the checker goes to step 5.

5) If a thorough search of the computerized and manual records reveals that the waste stream has not been evaluated and approved through the Approval Screening Process. The load is not accepted unless the approval screening process is fully completed.

6) Upon determining that an approval had been issued for the waste shipment being processed, the manifest checker checks the computer or manual records for any special notes or handling instructions for the shipment. He then visually examines the load and submits the sample for testing as specified in Table I-A or I-B of this plan.

7) MDI laboratory personnel conduct any tests and make required observations specified for the particular waste description/waste type as shown on Table I. If the results of testing and observation agree with the pre-approval screening

B. **QUALITY ASSURANCE OF INCOMING WASTES (Continued)**

8) results the laboratory staff inputs this lab information into the computer data base system. The manifest checker completes the manifest and other shipping documents according to step 10.

9) If the testing/observations conducted in step 7 reveal that the shipment does not meet the description and characteristics determined in the Approval Screening Process the generator is contacted to resolve the problem. The shipment is either rejected according to step 9 or the preapproval process is started according to step 5.

10) If the decision is made to reject the shipment the manifest checker enters the reason for rejection in the computerized data base system and writes the reason for rejection on the manifest. the manifest documents are returned to the driver.

11) If the shipment is accepted for the disposal the manifest checker enters shipment information in the computerized data base system, signs and dates the manifest, disassembles the manifest copy set, gives the driver the transporter's copy of the manifest and places the remaining copies of the manifest in a holding file for later distribution according to the instructions on the manifest form. The driver is instructed to take the load to the processing facility for off-loading.

a) <u>Sampling Procedure</u>

Each incoming shipment of hazardous waste is randomly sampled, per attachment 3, and inspected to insure that the waste matches the identity of the waste designated on the accompanying manifest.

MDI personnel sample or directly supervise the sampling of waste shipments.

i) <u>Drummed Waste</u>

1. Drummed liquid waste is sampled using a coliwasa sampler or the equivalent. The sampler is

B. **QUALITY ASSURANCE OF INCOMING WASTES**

i) Drummed Waste (Continued)

1. inserted into the drum at a rate permitting liquid levels inside and outside the sampler to remain constant. When the sampler hits the bottom of the drum the sampler is closed or sealed and the sample withdrawn.

2. Sampling equipment as recommended by EPA publication SW846 Volume II, Chapter 9 are used to sample dry granular material, moist material and sticky materials. Thief, Coliwasa, or Trier sampling techniques may be used.

3. Sampling Frequency; drummed waste shipments are sampled according to the frequency established in the table below for each waste stream.

# of Drums	Separate Samples to Be Taken
1 - 5 drums	1
6 - 10 drums	2
11 - 25 drums	4
26 - 50 drums	6
51 - 80 drums	8

The samples from each waste stream are composited to form one sample for lab analysis. If during the sampling, any differences are observed between drums, the samples are not composited, but kept separate. Separate lab analyses are then done to identify any inconsistency.

b. **QUALITY ASSURANCE OF INCOMING WASTES**

ii) Bulk Shipments

1. Bulk sludge or solid shipments will be sampled in three locations with a trier or thief sampler as described in SW 846 Volume II, Chapter 9, a composite of the sample is then sent to the laboratory for evaluation.

2. Bulk liquid shipments are sampled with a weighted sampling devise, (bacon bomb type), at three different levels in the tanker; top, middle and bottom. The samples are then evenly mixed forming a composite for laboratory evaluation.

*All references in this Waste Analysis Plan are to the 3rd edition of SW846.

TABLE I-A ANALYTICAL AND FREQUENCY REQUIREMENTS

	F001 F002	F003 F005	F006 ↓ F012 F019	D001*	D002	001D 003D D004 ↓ D011	D012 ↓ D017
Color	X	X	X	X	X	X	X
Consistency	X	X	X	X	X	X	X
Odor	X	X	X	X	X	X	X
pH	X A,B	X A,B	X A,B	X A,B	X A,B	X A,B	X A,B
Compatibility Test A (if pH<2)	X	X	X	X	X	X	X
Test B	Y	Y	Y	Y	Y	Y	Y
Test C	X	X	X	X	X	X	X
Ignitability		X* A,B		X* A,B			X* A,B
40 CFR Part 261 Appendix VII	A,B	A,B	A,B				
E.P. Toxicity						A,B	A,B
Total Metal Analysis (Liquid Waste Only)	A,B	A,B	A,B	A,B	A,B	A,B	A,B
Cyanide			A,B,C				
T.O.C.	A,B	A,B		A,B			

X - Every Load & For Approval
A - For Approval
B - Process Change
Y - Every Load
C - First Load After Approval/Reapproval
* - Flash point must be greater than or equal to 90°F

U type waste must be tested for designated hazardous waste property (Reactivity, Ignitability, Corrosivity)

TABLE I-A ANALYTICAL AND FREQUENCY REQUIREMENTS

	K001	K002 K003 K004 K006 K008	K009 K010 K011 K020 K021	K028 K029 K073 K085	K031 K046 K069 K071	K048 K049 K050 K051 K052	K084 K086 K100 K101 K102
Color	X	X	X	X	X	X	X
Consistency	X	X	X	X	X	X	X
Odor	X	X	X	X	X	X	X
pH	X A,B	X A,B	X A,B	X A,B	X A,B	X A,B	X A,B
Compatibility Test A (if pH<2)	X	X	X	X	X	X	X
Test B	Y	Y	Y	Y	Y	Y	Y
Test C	X	X	X	X	X	X	X
Ignitability						X* A,B	
40 CFR Part 261 Appendix VII	A,B	A,B	A,B	A,B	A,B	A,B	A,B
E.P. Toxicity							
Total Metal Analysis (Liquid Waste Only)	A,B	A,B	A,B	A,B	A,B	A,B	A,B
Cyanide		X A,B					
T.O.C.			A,B	A,B			

X - Every Load & For Approval
A - For Approval
B - Process Change
Y - Every Load
C - First Load After Approval/Reapproval
* - Flash point must be greater than or equal to 90°F

U type waste must be tested for designated hazardous waste property (Reactivity, Ignitability, Corrosivity)

TABLE I-A ANALYTICAL AND FREQUENCY REQUIREMENTS

	K060	K062	K106	K061
Color	X	X	X	X**
Consistency	X	X	X	X**
Odor	X	X	X	X**
pH	X A,B	X A,B	X A,B	A,B
Compatibility Test A (if pH<2)		X	X	A,B
Test B		Y	Y	A,B
Test C		X	X	A,B
Ignitability				
40 CFR Part 261 Appendix VII	A,B	A,B	A,B	A,B
E.P. Toxicity				
Total Metal Analysis (Liquid Waste Only)	A,B	A,B	A,B	A,B
Cyanide	X A,B			
T.O.C.				

**May be confirmed by by MDI driver when waste is loaded into a MDI licensed vehicle

X - Every Load & For Approval
A - For Approval
B - Process Change
Y - Every Load
C - Fi t Load After Approval/Reapproval

U type waste must be tested for designated hazardous waste property (Reactivity, Ignitability, Corrosivity)

TABLE I-A

Analytical and Frequency Requirements

"U" Listed Waste*

I. Toxic Wastes ("U" Prefix)

A. Inspection of each load - visual, odor, and consistency.

B. Ignitability on each load - to be run on the following:

U001	U019	U074	U092	U125	U186	U194
U112	U239	U156	U110	U213	U002	U056
U055	U117	U140	U159	U113	U152	U161
U003	U169	U057	U115	U045	U162	U008
U031	U074	U117	U153	U169	U012	U159
U085	U124	U154	U171			

C. For "U" Wastes:

1. pH Testing/Water Reactivity
2. Ignitability
3. The concentration of the specific "U" substance(s) which describes the waste

NOTE: Michigan Disposal, Inc. does not accept these wastes in their pure commercial chemical form in quantities greater than one kilogram. These wastes are accepted only when they occur as contaminants in other materials (for example: spill clean-ups, manufacturing wastes, or waste treatment residuals).

*Applies to both the "U" listing descriptions of 40CFR261.33(f) (substances having a "U" prefix) and R299.9221, Table 205 of the Michigan Administrative Code (substances having a "U" suffix).

TABLE I-B ANALYTICAL AND FREQUENCY REQUIREMENTS

	F001 F002	F003 F005	F006 ↓ F012 F019	D001	D002	001D 003D D004 ↓ D011	D012 ↓ D017
Color	X	X	X	X	X	X	X
Consistency	X	X	X	X	X	X	X
Odor	X	X	X	X	X	X	X
pH	X A,B	X A,B	X A,B	X A,B	X A,B	X A,B	X A,B
Compatibility Test A (if pH<2)	X	X	X	X	X	X	X
Test B	Y	Y	Y	Y	Y	Y	Y
Test C	X	X	X	X	X	X	X
Ignitability		X A,B		X A,B			X A,B
40 CFR Part 261 Appendix VII	A,B	A,B	A,B				
E.P. Toxicity						A,B	A,B
Cyanide			A,B,C				
T.O.C.	A,B	A,B		A,B			

X - Every Load & For Approval
A - For Approval
B - Process Change
Y - Every Load
C - First Load After Approval/Reapproval

U type waste must be tested for designated hazardous waste property (Reactivity, Ignitability, Corrosivity)

TABLE I-B ANALYTICAL AND FREQUENCY REQUIREMENTS

	K001	K002 K003 K004 K006 K008	K009 K010 K011 K020 K021	K028 K029 K073 K085	K031 K046 K069 K071	K048 K049 K050 K051 K052	K084 K086 K100 K101 K102
Color	X	X	X	X	X	X	X
Consistency	X	X	X	X	X	X	X
Odor	X	X	X	X	X	X	X
pH	X A,B	X A,B	X A,B	X A,B	X A,B	X A,B	X A,B
Compatibility Test A (if pH<2)	X	X	X	X	X	X	X
Test B	Y	Y	Y	Y	Y	Y	Y
Test C	X	X	X	X	X	X	X
Ignitability						X A.B	
40 CFR Part 261 Appendix VII	A,B	A,B	A,B	A,B	A,B	A,B	A,B
E.P. Toxicity							
Cyanide		X A,B					
T.O.C.			A,B	A,B			

X - Every Load & For Approval
A - For Approval
B - Process Change
Y - Every Load
C - First Load After Approval/Reapproval

U type waste must be tested for designated hazardous waste property (Reactivity, Ignitability, Corrosivity)

TABLE 1-A ANALYTICAL AND FREQUENCY REQUIREMENTS

	K060	K062	K106	K061
Color	X	X	X	X**
Consistency	X	X	X	X**
Odor	X	X	X	X**
pH	X A,B	X A,B	X A,B	A,B
Compatibility Test A (if pH<2)		X	X	A,B
Test B		Y	Y	A,B
Test C		X	X	A,B
Ignitability				
40 CFR Part 261 Appendix VII	A,B	A,B	A,B	A,B
E.P. Toxicity				
Cyanide	X A,B			
T.O.C.				

X - Every Load & For Approval
A - For Approval
B - Process Change
Y - Every Load
C - First Load After Approval/Reapproval

U type waste must be tested for designated hazardous waste property (Reactivity, Ignitability, Corrosivity)

**Michigan Disposal, Inc. (MDI) drivers may confirm this information when waste is loaded into MDI licensed vehicles.

TABLE I-B

Analytical and Frequency Requirements

"U" Listed Waste*

I. Toxic Wastes ("U" Prefix)

A. Inspection of each load - visual, odor, and consistency.

B. Ignitability on each load - to be run on the following:

U001	U019	U074	U092	U125	U186	U194
U112	U239	U156	U110	U213	U002	U056
U055	U117	U140	U159	U113	U152	U161
U003	U169	U057	U115	U045	U162	U008
U031	U074	U117	U153	U169	U012	U159
U085	U124	U154	U171			

C. For "U" Wastes:

1. pH Testing/Water Reactivity
2. Ignitability
3. The concentration of the specific "U" substance(s) which describes the waste

NOTE: Michigan Disposal, Inc. does not accept these wastes in their pure commercial chemical form in quantities greater than one kilogram. These wastes are accepted only when they occur as contaminants in other materials (for example: spill clean-ups, manufacturing wastes, or waste treatment residuals).

*Applies to both the "U" listing descriptions of 40CFR261.33(f) (substances having a "U" prefix) and R299.9221, Table 205 of the Michigan Administrative Code (substances having a "U" suffix).

TABLE I

Color Comparison Procedure	The Site MDI Waste Analysis Plan (WAP) will be modified to include an explicit procedure (i) to evaluate the color of waste samples presented for pre-approval and (ii) to compare the color record created at the pre-approval step to color of incoming loads of waste.

Preapproval Evaluation Step

During our pre-delivery waste evaluation process (both at initial evaluation and annual, or intermediate, re-approval we will create a written hard copy record and an electronic record of the color of the sample presented by the generator for our evaluation. In addition, we will take a photograph of a portion of the sample supplied by the generator. The hard copy record (written on the Laboratory Characterization Record form) and the photograph will be kept in the permanent approval file. The electronic record will be stored in a 40 character field in the waste approval computer system data base. The hard copy record and electronic record are to be identical, except as otherwise provided below.

The color descriptor will be derived from the descriptive information provided by the generator on the Generator Waste Characterization Form and by our own laboratory staff. If generator's description differs fromour staff's evaluation of color, we must contact the generator to resolve the differing descriptions. While any descriptor can be used, for most purposes a descriptor from the attached list of standard common waste colors which most closely matches the sample color will be preferred. In cases where a complex (such as mixed), or variable color is expected, the electronic record can direct the system user to refer to the hard copy record for a definitive description of the color expected.

Some wastes will be excluded from the color evaluation system, because color is irrelevant or is naturally of great variability. Included are the following general waste types:

Empty Drums
Construction Debris
Tanks (whole or cut up)
Equipment such as machinery, pumps, piping

Generators are not required to provide samples of such wastes. A photograph is not taken and "not applicable" is encoded into the electronic record.

Surface impoundment clean up and site remediation activity wastes can be expected to exhibit considerable color variability. Sludges in impoundments may have stratified, oxidized or reduced, or may have otherwise been subjected to color changing conditions. These activities also often involve removal of various soil types from various depths. Because of this expected variability the electronic color field will reference the hard copy record which will then be reviewed for more descriptive information.

Waste Reception Step

Upon arrival of a load of waste at the site, the color comparison will be performed on the representative sample of waste collected for laboratory evaluation.

The previously issued approval number is entered into the computer system which responds by displaying the original pre-approval color descriptor, a notation requiring review of the approval file for complete information, or a "not applicable" notation. In addition the system will offer the opportunity to enter "Y" (for yes) or "N" (for no) indicating agreement or disagreement of the arriving waste color with the pre-approval color description. Entry of a yes response will allow acceptance of the load. Entry of a no will cause rejection of the load. A yes response is entered for a "not applicable" color descriptor.

If the incoming load sample does not conform to the preapproval descriptor (as displayed on the screen, or explained in the approval file), a discrepancy reconciliation procedure is initiated before a final decision is made to accept or reject the shipment. All observations made, contacts made, conversations held and action taken during the reconciliation process will be recorded in writing and attached to the green copy of the manifest at the conclusion of the process, irrespective of whether the load is accepted or rejected.

As part of the reconciliation process, the photograph of the pre-approval sample will be reviewed, if available*. If the photograph matches the incoming sample a yes response is entered into the system, indicating reconciliation of the discrepancy which ends the process.

If comparison with the photographic record is inconclusive, the generator (or his representative) is contacted to further investigate the discrepancy. The situation is explained to the generator and an explanation is requested. If the generator indicates that a process change has taken place, if the waste contains new of different substances, or if the shipment includes waste from a process or source not described onteh original approval, the load will be rejected. If none of these conditions are present and if the generator offers a reasonable explanation for a color change, the load may be accepted.

*Because the practice of taking photographs of pre-approval samples has not been in effect for a full one year approval cycle, not all wastes have a photograph in the approval file.

<u>Common Waste Color Descriptions</u>

Black	Light Red
Brown	Orange
Gray	Light Blue
Gray/Brown	Dark Blue
Gray/Black	Light Green
Black/Brown	Dark Green
Purple	Yellow
Pink	White
Dark Red	Colorless
	Beige

Consistency

A comparison of the incoming wastes consistency of originally approved material A single integer consistency will be used.

Code:
1 - Dust
2 - Solid
3 - Semi-Solid
4 - Sludge
5 - Liquid

If a consistency change is noted waste will be rejected unless the generator can satisfactorily explain the consistency

Odor Inspection

Any unusual odor, detected in the routine laboratory handling of a sample, such as sulfide or unexpected solvent odors requires rejection of the load unless the generator can satisfactorily explain the unusual odor.

Compatibility Test

A) A determination that acidic waste does not react violently during processing. In the course of this test, water reactivity, air reactivity and shock sensitivity are all addressed. The test method is as follows:

10 milliliters of waste is mixed rapidly with 10 milliliters of 5% sodium hydroxide solution in a 250 milliliter beaker, the waste is compatible with the process if no incompatible waste reaction occurs as defined in 40 CFR 264 Appendix V, paragraph 1.

B) A determination that the wastes being accepted are compatible with the wastes that are present in the tanks or sludge box. The test method is as follows:

A two and one-half (2.5) gallon disposable container is used as a lab scale sludge box. The mixture is started each working day by grabbing a sample of the waste left in the disposable container from the previous day. .02 milliliters of this sample are added to the lab scale system for each gallon of waste present in tanks or the actual sludge box. As prospective wastes arrive at the laboratory/office building, .02 milliliters are removed from the container for each gallon of waste to be accepted and rapidly mixed with an equal volume of waste to be

reviewed. The mixture is stirred and the waste may be accepted if no incompatible waste reactions occur, as defined in 40 CFR Sec. 264 Appendix V, paragraph 1. The mixture is then reintroduced into the lab scale sludge box.

C) A determination that the waste is compatible with the materials of construction of the tanks at Michigan Disposal. If a waste has be pH of 1.5 or less and will be held more than eight hours prior to processing, the waste may incompatible with the tanks at Michigan Disposal. When this situation occurs, the waste is stored in one of the two beer glass-lined tanks until it can be processed.

Flash Point — Used to determine the flash point of a liquid for comparison to the originally approved sample.

Test Methods:

Setaflash closed cup tester - ASTM Standard D-3278-78

Penskey-Martin Closed Cup tester - ASTM D-93-79 or D-93-80

Ignitability — Waste with a flashpoint below 90°F is not acceptable for treatment. A determination that the waste to be treated has a flash point greater than or equal to 90°F. The test methods used are as follows:

Liquids - 40 CFR 261.21a)(1)
Sludges - 10 plus or minus 0.1 grams of waste is place in an aluminum dish. Ignition is attempted with a match for 10 seconds. If ignition occurs and the waste burns vigorously and persistently, the waste is not acceptable for treatment.

40CFR Part 261 Appendix VII — The hazardous constituents for which a waste is listed. The Appendix VII constituents are presumed to be present by Michigan Disposal, Inc. personnel, and the waste handled accordingly. Specific information on a particular waste stream is normally supplied by the generator, based either on analysis or

from the 40 CFR 261 background documents which describe the basis of listing in accordance with 264.13(a)(2). If analysis is performed by Michigan Disposal (on-site or by contract lab) one of the following methods is used depending on the constituent of interest:

Method 6010 (ICP), Method 7471 (Mercury) Methods 8240 and/or 8250 (GC/MS), Method 9010 (Cyanide) from SW-846 "Test Methods for Evaluating Solid Waste".

EP Toxicity	A test to determine if a solid waste meets or exceeds the maximum concentrations of contaminants listed in 40 CFR 261.24 Table I. The test methods to be used are described in 40 CFR Part 261, Appendix II. Equivalent methods must be approved by the administrator under the procedures set forth in 40 CFR 260.10 and 260.21.
Total Metal	A test to determine if the free liquid portion of a solid waste meets or exceeds the maximum concentration of contaminants listed in 40 CFR Section 268.7(a) (Otherwise known as the "California List"). Test method TO BE USED IS 3010 FOUND IN THE 3RD eDITION OF sw 846 "Test Methods for Evaluating Solid Wastes".
Cyanide	A determination that the waste does not meet the criteria set forth in 40 CFR 261.23(a)(5). The test method to be used is Total and Amenable Cyanide Method 9010 USEPA SW-846, 1982, "Test Methods for Evaluating Solid Waste", or one of the methods presented in Attachment #2. Untreated Waste containing more than 250 ppm of reactive or releasable cyanide is not accepted for treatment.
Volatile Organic Compounds	A test to determine the total concentration of volatile organic compounds in solid waste matrices. The test method to be used is Purge and Trap Method 5030 USEPA SW-846, 1982, "Test Methods of Evaluating Solid Waste". This is followed by appropriate analytical methods, 8010, 8015 or 8020 from USEPA, SW-846. Only the constituents for which the waste was listed are analyzed.

WASTE ACCEPTANCE POLICY AND PROCEDURES

Described below is the pre-approval waste stream screening procedure completed by WDI/MDI prior to approving waste to be shipped to the facilities for treatment or disposal.

HAZARDOUS VS NON-HAZARDOUS WASTE

It is the responsibility of the generator to determine if his waste material is considered hazardous by federal or state criteria.

NON-HAZARDOUS WASTES

In order to eliminate all possible hazardous classifications and verify the waste is non-hazardous, the generator must complete our Waste Characterization form; a copy is included for your use. A responsible person at the generators facility must review and sign the form. Thoroughness in completing this form will expedite each request. Any analytical data generated to complete the waste characterization should be forwarded along with a representative sample (1 pt) of the waste. Material Safety Data Sheets (MSDS), if appropriate, should be sent with the form.

HAZARDOUS WASTES

If the generator determines his waste to be hazardous under federal or state regulation, the following information must be submitted for review:

1. A detailed chemical and physical analysis of the waste must be supplied. At a minimum, this analysis must include analytical data on the hazardous constituents for which the waste is listed. An EP Toxicity test, Reactivity (cyanide and sulfide), Volatile Organic Carbon (VOC), and Flash Point should be provided as required. Minimum analytical requirements and acceptable waste types are found in the attached tables.

   Sampling and analysis should be completed by a laboratory following EPA approved methods. Those methods and QA/QC procedures found in Test Methods for Evaluating Solid Waste U.S.E.P.A., SW-846, third edition, are recommended.

2. The generator must fill out a waste characterization form; a copy is included for your use. Thoroughness in completing this form will expedite each request. A responsible person at the generator's facility must review and sign the form.

3. A representative sample of the waste (4-8 ox.) must be sent with the waste characterization form.

APPROVAL TO SHIP

Should any analytical or technical information be missing, a letter requesting the necessary information will be sent to the generator. The approval review is stopped until the requested information is received.

After review of the sample and waste characterization information, an approval number will be assigned for the specific waste stream and generator if the waste can be accepted by MDI or WDI. Until an approval number is assigned, no shipment will be accepted by the site. A confirming letter with the approval number will be forwarded to the generator.

An approved credit application must be on file, or C.O.D. arrangements must be made prior to issuance of the approval number.

SHIPMENT OF WASTE

Once the generator has received the approval to ship, the generator can arrange for transportation and delivery to the site by a properly licensed waste hauler.

All waste shipped to MDI and hazardous wastes shipped to WDI must be accompanied by a properly completed and signed Michigan DNR Uniform Hazardous Waste Manifest. Each waste stream's approval number should be written in Section J of the manifest and appear on the face of the generator's shipping papers.

MISCELLANEOUS SITE PROCEDURES

1. All drummed material must have labels on the top as well as the side of the drums. The top label can be a sticker, tag, or written on the drum. Information should include waste type, MDI or WDI approval number and manifest number. If no labels are provided with the proper information; the drums in question will be rejected after informing the generator.

2. Empty drums must be clean (less than 1" material in the bottom) and all labels painted out to be accepted as non-hazardous.

   *Empty drums will be inspected and must not be double stacked in the truck.

3. Asbestos material must be dampened down and enclosed in double heavy gauge bags or placed in drums.

   *Special asbestos labels must be applied to containers.

If you have any questions, please contact our Lab Manager at (313) 697-7830.

SITE ADDRESS (UPS and express services only; no U.S. Mail)

Michigan Disposal, Inc./
Wayne Disposal, Inc.
49350 N. I-94 Service Drive
Belleville, Michigan 48111

MAILING ADDRESS:

Michigan Disposal, Inc./
Wayne Disposal, Inc.
1349 Huron Street
Ypsilanti, Michigan 48197

FAX NUMBER: (313) 485-6450

ENVOTECH

MANAGEMENT SERVICES, INC.

Sales Office
1349 Huron Street
Ypsilanti, Michigan 48197
(313) 485-6485

Waste Characterization Report

Envotech Management Services, Inc. (EMSI) represents the services of several independent waste treatment, recycling and disposal facilities. This Waste Characterization Report was designed to meet the needs of three of these facilities.

		Waste Management Services
MDI	**Michigan Disposal, Inc.** 49350 N. I-94 Service Drive Belleville, Michigan 48111 (313) 699-7120	Hazardous and Non-Hazardous Waste Stabilization of Solids, Semi-Solids, Slurries and Liquids. Including BDAT Treatment for Inorganic Wastes.
	Michigan Recovery Systems Inc. 36345 Van Born Road Romulus, Michigan 48174 (313) 326-3100	Hazardous and Non-Hazardous Waste Solvent Recovery, Recycling, Fuel Blending and Disposal. Drummed and Bulk Waste Handling. Organic Waste BDAT Treatment
WAYNE DISPOSAL INC. WDI	**Wayne Disposal, Inc.** 49350 N. I-94 Service Drive Belleville, Michigan 48111 (313) 697-7830	Secure Hazardous and Non-Hazardous Waste Landfill Services. Drummed and Bulk Waste Handling.

If you have any questions after reviewing the instructions, please contact the facility or EMSI at the numbers given above.

GENERATOR WASTE CHARACTERIZATION REPORT
(Separate report required for each waste stream)

Instruction: Please complete all sections of this report and supply a representative one-pint sample of the waste. The form and sample should be shipped together to Envotech Management Services, Inc. at the appropriate address below. Do not ship waste for treatment or disposal until the generator has received an approval letter and established shipment approval directly from the TSDRF. This waste approval request is being submitted for: (Check all that apply).

☐ **Treatment**
Michigan Disposal, Inc.
49350 N. I-94 Service Drive
Belleville, Michigan 48111 • (313) 699-7120

☐ **Recovery**
Michigan Recovery Systems, Inc.
36345 Van Born Road
Romulus, MI 48174 • (313) 326-3100

☐ **Landfill**
Wayne Disposal, Inc.
49350 N. I-94 Service Drive
Belleville, Michigan 48111 • (313) 697-7830

☐ **Fuel Blending**
Michigan Recovery Systems, Inc.
36345 Van Born Road
Romulus, MI 48174 • (313) 326-3100

I. FACILITY INFORMATION

US EPA ID# _____
Generator Name _____
Plant Name _____
Address _____
_____ Zip _____
Contact Person _____ Telephone ( ) _____ Ext. _____
Alternative Contact _____ Telephone ( ) _____ Ext. _____

II. INVOICING INFORMATION

Customer _____
Address _____
_____ Zip _____
Contact Person _____ Telephone ( ) _____ Ext. _____
Alternative Contact _____ Telephone ( ) _____ Ext. _____
Has an account been established _____ Yes _____ No
If Yes, list account number _____ If No, complete attached credit application and submit with sample.

III. TRANSPORTER INFORMATION

US EPA ID# _____
Name _____
Address _____
_____ Zip _____
Contact Person _____ Telephone ( ) _____ Ext. _____

IV. WASTE DESCRIPTION

1. Waste Common Name _____
2. Provide a detailed description of the process(es) generating this waste:

_____
_____
_____
_____
_____

3. Does this process meet any listing description under RCRA or Michigan Act 64 Regulations _____ Yes _____ No
If Yes, List all applicable codes.

_____

4. Is this waste ☐ EP Toxic, ☐ Ignitable, ☐ Oxidizer, ☐ Corrosive, ☐ Reactive?
☐ Michigan Act 64 Characteristically Hazardous (Copper > 100 ppm or Zinc > 500 ppm)
If Yes, List all applicable codes.

_____

5. Is this waste non hazardous under US EPA & Michigan Regulation? _____ Yes _____ No
6. If this waste is a non-hazardous liquid, it is regulated by Michigan's Act 136; List applicable codes:

_____

7. Chemical Composition

	Range Min.		Max.	
_____	_____	—	_____	%
_____	_____	—	_____	%
_____	_____	—	_____	%
_____	_____	—	_____	%
_____	_____	—	_____	%
_____	_____	—	_____	%
_____	_____	—	_____	%

NOTE: Total must be ≥ 100% in the Max. Column. Total _____ %

List all major constituents, include all herbicides, pesticides, carcinogens, pathogens and other hazardous constituents.

8. Does this facility use any listed hazardous organic solvents anywhere throughout the plant? _____ Yes _____ No
If Yes, could these enter into the waste? _____ Yes _____ No
If Yes, clarify under process description.
9. Does this waste contain any constituents listed below?

			Actual			
Cyanide	_____ No	_____ Yes	_____ PPM	_____ Total	_____ Reactive	
Sulfide	_____ No	_____ Yes	_____ PPM	_____ Total	_____ Reactive	
PCB's	_____ No	_____ Yes	_____ PPM			
Dioxins/ Furans	_____ No	_____ Yes	_____ PPM			

V. PHYSICAL CHARACTERISTICS

1. Does the waste have a characteristic odor? _____ Yes _____ No
Describe: _____
2. Color Description (Note if Multicolored or Subject to Variation) _____
3. Physical State @ 70°F
_____ Dust or Powder _____ Solid _____ Sludge _____ Liquid _____Multilayered _____Single Phase
_____ Free Liquids may be associated with this waste
4. Water Content _____ %
5. TOC _____ %
6. TOX _____ %
7. Density _____ (use lbs/gallon or lbs/yd^3)
8. pH Range _____<2 _____>2-4 _____>4-9 _____>9-12.4 _____>12.5 Actual _____
9. Flash Pt. Range _____< 90°F _____≥90°-140° _____>140°-200°F _____>200°F Actual _____
Method: _____ Closed Cup _____ Pensky-Martens _____Setaflash
10. Does this waste meet any of the Characteristics listed below?

Reactive	_____ Yes	_____ No	Pyrophoric	_____ Yes	_____ No
Explosive	_____ Yes	_____ No	Oxidizer	_____ Yes	_____ No
Shock Sensitive	_____ Yes	_____ No	Radioactive	_____ Yes	_____ No

VI. WASTE RECOVERY OR FUEL BLENDING (To be completed for wastes submitted to MRSI)

1. Heat Value _____ Btu/lb _____ Range
2. Viscosity _____ cp
3. Ash _____ %
4. Solids _____%
5. Chlorine _____%
6. Sulfur _____%

7. Total Metal Analysis	Actual
Arsenic	_____ ppm
Barium	_____ ppm
Cadmium	_____ ppm
Chromium	_____ ppm
Lead	_____ ppm
Mercury	_____ ppm
Nickel	_____ ppm
Zinc	_____ ppm

VII. LAND DISPOSAL RESTRICTIONS

Indicate below if the waste is subject to any applicable restrictions or prohibitions as outlined in 40 CFR Part 268. If the waste is subject to a land disposal restriction, the generator must supply analytical information to verify that the waste meets applicable treatment standards. Please refer to the latest version of 40 CFR Section 268 or contact EMSI.

1. Solvent Waste F001-F005 _____ Yes _____ No
   If Yes, attach TCLP analysis for F001-F005 constituents listed in Table CCWE of 40 CFR 268.41.
2. Dioxin waste F020-F023, F026-F028 _____ Yes _____ No
   If Yes, Stop Here and contact EMSI for assistance.
3. "California List" Waste
   a. Does this waste contain halogenated organic compounds (HOCs) greater than 1,000 ppm?
      _____ Yes _____ No
   b. Is this waste a liquid or does it contain any free liquids according to the paint filter liquids test?
      _____ Yes _____ No
   c. If yes to b, does the liquid portion contain any of the constituents at concentrations above those identified as the "California List"?
      _____ Yes _____ No
   d. For solid waste, Is the pH ≤ 2?
      _____ Yes _____ No
      If Yes, contact EMSI.
4. First third wastes identified 8/8/88. Refer to 40 CFR Section 268.10 _____ Yes _____ No
5. Second third wastes identified 6/8/89. Refer to 40 CFR Section 268.11 _____ Yes _____ No
6. Third third wastes identified 5/8/90. Refer to 40 CFR Section 268.12 _____ Yes _____ No

Attach all specific analyses (TCLP and/or total concentrations)

VIII. SHIPPING INFORMATION

1. Proper Shipping Name _____
2. Hazard Class _____ UN/NA# _____
3. Shipping Mode: _____ Bulk Liquid _____ Bulk Solid _____ Drums
   Other _____
4. Shipping Volume per Month _____ _____
5. Annual or Total Volume: _____ One Time Only _____

IX. CERTIFICATION (To be signed by waste generator)

I certify that all information is complete and factual (including attached information) and is an accurate representation of the known and suspected hazards, and waste generator regulations, pertaining to the waste described herein.

Name _____ _____
(signature)
Title _____ Date _____

Company _____ Phone _____

Section Instructions

SECTION I **Facility Information**

I.D. Number - Enter twelve digit number issued by the USEPA for hazardous waste. For non-hazardous liquid, enter identification number issued by the State of Michigan. Call (517) 373-2730 for assistance in obtaining this state number.

Generator - Enter name, address and the specific plant generating the waste.

Contact - Enter person or persons who have working knowledge of the waste, and are responsible for completing this form.

SECTION II **Invoicing Information**

Customer - Enter party responsible for payment of treatment and/or disposal fees.
NOTE: Changes in this section require completion of a new WCR and issuance of a new approval.

Account Number - Enter account number issued by our accounting department. Call (313) 485-6485 for assistance in obtaining this number.

SECTION III **Transporter Information**

Name & I.D. Number - Enter the hauler of the waste along with USEPA identification number if applicable.
NOTE: Transporters of hazardous waste and liquid non hazardous waste are required to be licensed by the State of Michigan. Call the Michigan DNR at (517) 373-2730 for assistance.

SECTION IV **Waste Description**

1) Enter a common name that best describes the waste.
2) Describe the specific operation or source generating the waste. Description must be as detailed and in depth as possible, use a cover letter if necessary.
3) Determine if waste is identified in 40CFR Section 261 Subpart D and/or Michigan Act 64 hazardous waste management regulations. List all applicable codes. Contact the appropriate facilities technical staff or EMSI at (313) 485-6485 for assistance.
4) Identify through analysis of the waste whether it is ignitable, corrosive, reactive or EP Toxic; as these characteristics are described in 40 CFR Section 261 Subpart C or Michigan Act 64 Rule 212.
5) Indicate whether waste is hazardous under USEPA (RCRA) and/or Michigan regulations.
6) If liquid non-hazardous waste, list applicable codes as shown in Michigan's Act 136, or on the back of a Michigan Uniform Waste Manifest. Contact the facilities technical department or EMSI for assistance.
7) List organic and inorganic constituents that are present in the waste. The "Max." column should be greater than or equal to 100%. This section is intended to provide a general description of the waste and reveal all known and suspected hazards associated with management of the waste. Please complete in as much detail as possible.
8) Inquire whether solvents are being used elsewhere in the facility and determine if they may be in contact with this waste.
9) Identify through analysis and/or previous knowledge of the process generating the waste if the waste contains any of the listed constituents.

SECTION V **Physical Characteristics**

1) Identify any typical or unusual odor associated with this waste.
2) List color(s) associated with the waste. Describe possibilities if subject to marbling, layering or other variations.
3) Identify the physical state in which the waste will be shipped. Also note whether it may contain free liquid at any time.
4) Enter percent of free water, list the analytical method used.
5) Enter total organic carbon (TOC) percentage.
6) Enter total organic halogen (TOX) percentage. This is necessary to assess H.O.C.'s. If 1000 ppm a full H.O.C. analyses might be required.
7) Enter density of the waste. Use units of lbs. per gallon or lbs. per cubic yard.
8) Enter pH range the waste is likely to be in. Enter the actual measured pH value.
9) Enter flash point range the waste falls in. Enter the actual flash point and mark the method used.
10) Identify through analysis and/or knowledge of the waste whether the waste meets any of the listed characteristics.

ECTION VI **Waste Recovery or Fuel Blending**

1) Enter the heating value of this waste; if the waste is subject to variation enter the range.
2) Enter the viscosity of this waste in units of centipoise. If any other unit is used, please specify.
3) Enter the % Ash by volume.
4) Enter the % Solids by volume.
5) Enter the % Chlorine by weight.
6) Enter the % Sulfur by weight.
7) Enter total concentrations for each specified metal. Attach analysis or supporting information.

SECTION VII **Land Disposal Restrictions**

This section applies only to wastes subject to land disposal restrictions.

The facility will return copies of notifications and certifications required by 40CFR 268, with the waste stream approval letter. The certification provided must be used for all shipments of the approved waste stream.

1) For waste identified as F001, F002, F003, F004 and F005, refer to table CCWE in 40 CFR Section 268. Through analysis of the waste, determine if listed solvents are present in concentrations exceeding table values (using TCLP). Solvents exceeding table concentrations are prohibited from land disposal.
2) Wastes containing dioxin and/or meeting the F020, F021, F022, F023, F024, F026, F027, F028 listing descriptions are not accepted for treatment, storage or disposal at this time.
3) a. Refer to 40 CFR Section 268 and determine through analysis if any applicable parameters meet or exceed prohibition (or BDAT) standards.
   b. Method 9095 of SW-846 is to be used to assess whether the waste is classified as a liquid or free liquid containing waste.
   c. Refer to Appendix III, section 268 of 40 CFR to identify Halogenated Organic Compounds of concern, TOX analysis or knowledge of the waste may be used as a surrogate for complete appendix III analysis.
   d. Solid waste with pH<2 requires treatment prior to disposal. Contact EMSI for assistance.
4) 40 CFR Section 268.10 provides a listing of all waste types restricted from land disposal August 8, 1988. If the waste meets one of the listing descriptions identified, check yes. 40 CFR Section 268 Subpart D specifies treatment standards applicable to these waste types.
5) 40 CFR Section 268.11 provides a listing of all waste types restricted from land disposal June 8, 1989. If the waste meets one of the listing descriptions identified, check yes. 40 CFR Section 268 Subpart D describes treatment standards applicable to these waste types.
6) 40 CFR Section 268.12 provides a list of all waste types restricted from land disposal, May 8, 1990. If a waste meets one of the listing descriptions or is a characteristic hazardous waste, check yes. 40 CFR Section 268 Subpart D describes treatment standards applicable to these waste types.

SECTION VIII **Shipping Information**

1) Enter proper DOT shipping name as described in 49 CFR Part 171 through 177.
2) Enter hazard class and identification number as in 49 CFR Part 171 through 177.
3) Enter physical state in which the waste is to be shipped.
4) Enter the monthly volume and frequency of waste shipments.
5) Enter total or annual volume. Indicate if the waste will be shipped one time only.

NOTE: Certain restrictions apply to the shipment of drummed waste. Contact EMSI regarding these restrictions.

REJECTED LOAD PROCEDURES

TSD Responsibilities

1. Totally Rejected Load

   a. Note reason for rejection in item 19 of manifest along with date and signature.

   b. Do not sign Item 20.

   c. Remove TSD copy and return remaining copies of the manifest to the transporter.

2. Partially Rejected Load

   a. Permission of the generator must be obtained and documented to partially reject a load.

   b. The reason for rejection, quantity rejected and generator contact name granting permission must be referenced in Item 19.

   c. *Item 13 is lined out and the new quantity inserted to reflect only the quantity accepted.

   d. Item 20 is completed.

   e. Distribute manifest copies as per accepted loads.

Transporter Responsibilities

1. Totally Rejected Load

   a. If an alternate disposal facility is available, contact the generator to obtain permission to designate a new facility.

   b. If permission is obtained, alter the manifest as follows:

      1. Item 9/10 - simply line out originally designated facility and replace with new facility information.

      2. Note in Item 19 permission granted by generator, contact name, date and transporter signature.

   c. Transport to the newly designated TSDF for acceptance.

*Must alter to ensure change noted by Keypunch.

d. The TSDF will need to be provided with an additional manifest copy since the TSDF which originally rejected the load removed the TSDF copy.

e. If no alternative disposal facility is available, return the load to the generator and obtain the generators signature and date in Item 19 acknowledging the returned load.

f. Remove transporters copy of manifest.

2. Partially Rejected Loads

a. If no alternate disposal facility is possible, return the load to the generator. Loads returned to the generator must be signed and dated by the generator in Item 19 acknowledging receipt. The only copy of the manifest the transporter will have is the transporter copy.

b. If an alternate disposal facility is possible, contact the generator to obtain permission to designate a new facility.

c. If permission is obtained, the transporter acting as an authorized contractor for the generator prepares a new manifest as follows:

1. Indicate the more appropriate US DOT description/ waste code if determined by the rejection.

2. Item 13 indicates the quantity originally rejected.

3. The original manifest number and date of rejection is to be noted in Item 19.

4. The new TSD information is to be completed.

5. The generator's name authorizing the TSDF facility is to be clearly printed in the generator line and verified by having the driver sign on the generators line. The date of the generator's approval must also be placed on the generator line.

6. The remainder of the manifest is to be completed as appropriate with the information supplied on the original manifest. The generator and MDNR 1st copy of the manifest is to be returned to the generator

d. The generator has the option of providing a replacement manifest with an original generator signature. The replacement manifest must contain, in Item 19, the original manifest number and the date of rejection. (It should be noted that the transporter copy for a partially rejected load is the shipping document only authorizing the return of the waste to the generator.)

Generators Responsibilities

1. Totally Rejected Loads

a. Permission may be granted to the transporter to designate an alternate disposal facility.

b. Loads returned to the generator must be signed and dated by the generator in Item 19 acknowledging receipt.

c. The transporter manifest copy is given to the transporter and the MDNR 2nd copy is mailed to the Department.

d. Returned rejected loads when sent out for subsequent disposal must have the original manifest number and the date of rejection noted in Item 19 on the new manifest.

2. Partially Rejected Loads

a. Permission must be granted to the TSDF to accept/reject partial loads.

b. For a load returned to the generator:

1. The manifest returned to the generator must be be signed and dated by the generator in Item 19 acknowledging receipt.

2. The transporter manifest copy is given to the transporter and the MDNR 1st and 2nd copies are mailed to the Department.

c. There are two options to designate an alternate disposal facility:

1.a. Provide a new manifest to the transporter for shipment of the load to the designated facility.

b. Returned rejected loads when sent out for subsequent disposal must have the original manifest number and the date of rejection noted in Item 19 on the new manifest.

c. Follow normal manifest distribution.

2.a. Designate the transporter to prepare a new manifest with the information specified in the section "Transporter-Partially Rejected Load 2(c)".

b. The generator and MDNR 1st copy of the manifest is to be returned to the generator by the transporter. The MDNR 1st copy of the manifest must be mailed to the Department.

TEST METHOD TO DETERMINE HYDROGEN CYANIDE RELEASED FROM WASTES

1. Scope and Application

1.1 This method is applicable to all wastes with the conditions that waste which are combined with acids do not form explosive mixtures.

1.2 This method provides a way to determine the specific rate of release of hydrocyanic acid upon contact with an aqueous acid.

1.3 This test measures only the hydrocyanic acid evolved at the test conditions. It is not intended to measure forms of cyanide other than those that are evolvable under the test conditions.

2. Summary of Method

2.1 An aliquot of the waste is acidified to pH 2 in a closed system. The gas generated is swept into a scrubber. The analyte is quantified. The procedure for quantifying the cyanide is Method 9010 starting with Step 7.3.5. of that method (attached).

3. Sample Handling and Preservation

3.1 Samples containing, or suspected of containing sulfide or a combination of sulfide and cyanide wastes, should be collected with a minimum of aeration. The sample bottle should be filled completely, excluding all head space, and stoppered. Analysis should commence as soon as possible; and samples should be kept in a cool, dark place until analysis begins.

3.2 It is suggested that samples cyanide wastes be tested as quickly as possible. Although they can be preserved by adjusting the sample pH to 12 with strong base, this will cause dilution of the sample, increase the ionic strength and, possibly, change other physical or chemical characteristics of the waste which may affect the rate of release of the hydrocyanic acid. Storage of samples should be under refrigeration and in the dark.

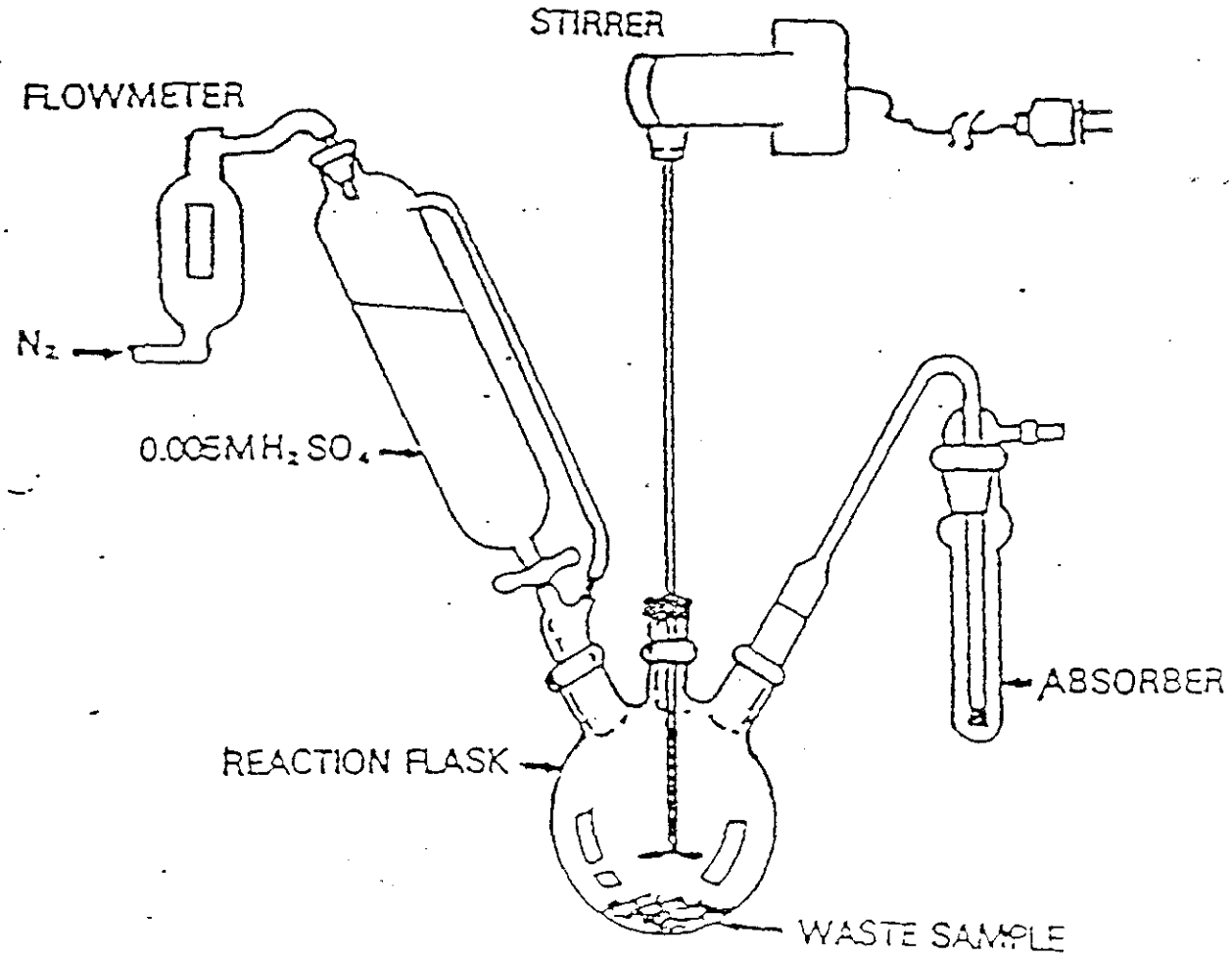
3.3 Testing should be in a ventilated hood.

4. Apparatus (see Figure 1)

4.1 Three-neck, round-bottom flask with 24/40 ground-glass joints, 500 ml.

4.2 Stirring apparatus to achieve approximate 30 rpm. This may be a rotating magnet and stirring bar combination or an overhead motor driven propeller stirrer.

4.3 Separatory funnel with pressure equalizing tube and 24/40 ground glass joint and Teflon sleeve.


STIRRER
FLOWMETER
N_2
0.005M H_2SO_4
ABSORBER
REACTION FLASK
WASTE SAMPLE

4.4 Flexible tubing for connection from nitrogen supply to apparatus.

4.5 Water pumped or oil pumped nitrogen gas with two stage regulator.

4.6 Rotameter for monitoring nitrogen gas flow rate.

5. Reagents

5.1 Sulfuric Acid 0.005 M

5.2 Cyanide reference solution: Dissolve approximately 2.5 gm KOH and 2.51 gm KCN in one liter of distilled water. Cyanide concentration in this solution is 1 mg/ml.

5.3 NaOH solution, 1.25N: dissolve 50 gm NaOH in distilled water and dilute to 1 liter with distilled water.

5.4 NaOH solution, 0.25 N: Dilute 200 ml of sodium hydroxide solution to 1 liter with distilled water.

5.5 Stock cyanide solution, 1 mg/ml: Dissolve 2.51 gm KCN and 2 gm KOH in 1 liter of distilled water. Standardized with 0.0192 N $AgNO_3$. Dilute to appropriate concentration so that 1 ml = 1 mg CN.

5.6 Intermediate cyanide solution: Dilute 50 ml of stock solution to 1 liter with distilled water.

5.7 Standard cyanide solution, 5 mg/L: Prepare fresh daily by diluting 100. ml of intermediate solution to 1 liter with distilled water and store in a glass-stoppered bottle.

5.8 Silver nitrate solution: Prepare by crushing approximately 5 gm of $AgNO_3$ crystals and drying to constant weight at 40°C. Weigh 3.3 gm dried $AgNO_3$, dissolve in distilled water and dilute to 1 liter.

5.9 Rhodanine indicator: Dissolve 20 mg p-dimethylaminobenzalrhodanine in 100 ml of acetone.

5.10 Methyl red indicator: Prepare 0.02 gm dissolved in 60 ml distilled water and 40 ml acetic acid.

6 System Check

6.1 The operation of the system can be checked using the cyanide reference solution. The reference solution can be used to verify system operation.

7 Procedure

7.1 Add 500 ml of 0.25N NaOH solution to a calibrated scrubber and dilute with distilled water to obtain an adequate depth of liquid.

Close the system and adjust the flow rate of nitrogen using the rotometer. Flow should be 60 ml/min.

7.3 Add 10 gm of the waste to be tested to the system.

7.4 With the nitrogen flowing, add enough acid to fill the system 1/2 full. While starting the 30 minute test period.

7.5 Begin stirring while the acid is entering the round bottomed flask.

7.6 After 30 minutes close off the nitrogen and disconnect the scrubber. Determine the amount of cyanide in the scrubber by Method 9010 starting with step 7.3.5. of the method (attached).

Calculations

8.1 Determine the specific rate of release of HCN.

-Concentration of HCN in scrubber (mg/l) = A
This is obtained from method 9010

-Volume of solution in scrubber (l) = L

-Weight of waste used (Kg) = W

-Time of measurement = Time N_2 stopped - Time N_2 started (seconds) = S

$$R = \text{specific rate of release} = \frac{A \cdot L}{W \cdot S}$$

Total available HCN = $R \cdot 1800$ mg/Kg

SPOT TEST FOR SAMPLE SCREENING

I. General Discussion

The spot test procedure allows a quick screening of the sample to establish if more than 50 mg/L of cyanide amenable to chlorination is present. The test also establishes the presence or absence of cyanogen chloride (CNCl). With practice and dilution, the test reveals the approximate concentration range of these compounds by the color development compared with similarly treated standards.

When chloramine-T is added to cyanides amenable to chlorination, CNCl is formed. CNCl forms a red-blue color with the mixed reagent pyridine-barbituric acid. When testing for CNCl omit the chloramine-T addition. (CAUTION: CNCl is a toxic gas; avoid inhalation.)

The presence of formaldehyde in excess of 0.5 mg/L interferes with the test. A spot test for the presence of aldehydes and a method for removal of this interference are given in Section 412A.3.

Thiocyanate (CNS-) reacts with chloramine-T, thereby creating a positive interference. The CN can be masked with formaldehyde and the sample retested. This makes the spot test specific for CNS-. In this manner it can be established if the spot discoloration is due to the presence of CN-, CNS-, or both.

SPOT TEST FOR SAMPLE SCREENING

II. Apparatus

a) Porcelain spot plate with 6 to 12 cavities.

b) Dropping pipets.

c) Glass stirring rods.

SPOT TEST FOR SAMPLE SCREENING

III. Reagents

a) Chloramine-T solution: See Section 412D.3a.

b) Stock cyanide solution: See Section 412D.3b.

c) Pyridine-barbituric acid reagent: See Section 412D.3d.

d) Hydrochloric acid, HCl, 1 + 9.

e) Phenolphthalein indicator aqueous solution.

f) Sodium carbonate, Na2CO3, ANHYDROUS.

SPOT TEST FOR SAMPLE SCREENING

IV. Procedure

If the solution to be tested has a pH value greater than 10, neutralize a 20- to 25- mL portion. Add about 250 mg Na_2CO_3 and swirl to dissolve. Add 1 drop phenolphthalein indicator. Add 1 + 9 HCl dropwise with constant swirling until the solution becomes colorless. Place 3 drops sample and 3 drops distilled water (for blanks) in separate cavities of the spot plate. To each cavity, add 1 drop chloramine-T solution and mix with a clean stirring rod. Add 1 drop pyridine-barbituric acid solution to each cavity and again mix. After 1 min, the sample spot will turn pink to red if 50 mg/L or more of CN are present. The blank spot will be faint yellow because of the color of the reagents. Until familiarity with the spot test is gained, use, in place of the water blank, a standard solution containing 40 mg CN/L for color comparison. This standard can be made by diluting the stock cyanide solution.

If CNS^- is suspected, test a second sample pretreated as follows: Heat a 20- to 25-mL sample in a water bath at 50 C; add 0.6 mL formaldehyde and hold for 10 min. This treatment will mask up to 5 mg CN/L, is present. Repeat spot testing procedure. Color development indicates presence of CNS^-. Comparing color intensity in the two spot tests is useful in judging relative concentration of CN^- and CNS^-.

ATTACHMENT 3

RANDOM SAMPLING OF DRUMS

Prior to selection of drums for sampling on a particular load of incoming waste, a reception area employee sequentially numbers each drum using two digit numbers beginning with 01. Each waste stream within a load is separately numbered. The numbers may be affixed to each drum with marker, spray paint, self-adhering stickers or other methods that will insure that the drum is locatable by its assigned number for sampling purposes.

Containers are selected for sampling by use of the random number table attached (Table 1) using the date of sampling and the number of samples needed. The procedure is best illustrated by use of an example.

Example: A shipment of 22 drums is to be randomly sampled on November 7, 1989.

Step 1--Determine number of containers to be sampled from the chart on page C-16 of the Waste Analysis Plan. In this example, 4 drums are to be sampled.

Step 2--Using the random number table select the specific containers to be sampled. Based on the date of sampling the selection is made as described in the example following.

Example date: November 7, 1989; (11-07-89)

Go to the horizontal set of numbers opposite 11 (for November)

Move across the 11 row to the set of numbers under day 7.

Starting with the first number on the first row of numbers under 11-7, count 8 digits to the right. At the eighth digit count down 9 digits. Eight and nine were selected to represent the year '89 in this example. This represents the starting point for container selection.

Read the numbers from left to right in sets of two digits (since the maximum number of containers in this example is 22). Any number greater than 22 is ignored. Any repeated numbers are ignored. If the end of a row is reached return to the far left of the next row below and continue reading numbers in groups of two. Select two digit numbers (between 01 and 22 inclusive) until the number of samples required is fulfilled.

In this example the following numbers would be selected from the table:

635 28385 37[20][0 9]8473 56308 86774 [07]305
37439 50362 441[17]1

Therefore, drums numbered 20, 09, 07 and 17 will be sampled.

Note: if a small shipment of 10 or less drums is received (numbered 0 through 9) the above method can be used with single digits.

TABLE 1. RANDOM NUMBERS

Month	Day 1,16,31	2,17	3,18	4,19	5,20	6,21	7,22	8,23	9,24	10,25
1	53872 34774	19087 81775	71440 12082	73092 34608	75448 13148	16972 42181	87945 94104	95701 00743	75411 51930	54869 94997
	04226 82404	71577 00984	56036 32404	87841 53592	92561 33328	74938 79042	38473 89672	45752 35715	89537 78155	09451 24983
	28666 44190	75524 62033	21423 48281	92238 96306	72606 80601	78075 53671	81047 92139	94519 59473	91679 90136	41676 35230
	63817 30279	14088 86454	16183 06501	50386 80292	54555 47371	76744 26190	21649 79753	21287 17698	39490 03553	34823 08134
	22359 16442	63879 47486	19438 32252	39360 95851	36758 36141	82272 69293	23383 59365	18258 54530	47224 69646	55081 28731
2	50968 28728	83325 16031	77583 65578	64794 51567	32535 83136	30239 23081	09526 26055	87099 41372	55542 32754	87317 94638
	39652 24245	96817 91200	10769 52386	39559 73921	45375 22847	41177 77163	38252 10349	49511 17540	61789 32769	51662 55606
	35493 00529	69632 29684	80284 87828	72418 80950	86311 34016	07715 88600	69730 78912	19642 39764	47146 19472	84012 04887
	45687 53919	30439 28534	96185 72365	56391 52625	50864 45132	14355 47454	98438 15189	82145 80509	33392 50866	17629 28204
	38509 93521	10481 44128	88345 84969	88768 48819	22311 41235	27985 61879	02979 98092	41184 73815	57929 91052	04860 66667
3	40389 76282	37506 60661	23395 67357	95619 10864	87813 09352	77415 98473	42302 86602	26396 64175	64359 97570	64437 55592
	59244 54664	63424 97899	44153 69231	89781 18604	02312 21658	19433 18731	01039 18933	92188 83767	56148 56261	79930 78514
	99876 17075	40934 88912	96196 58503	63613 24486	58093 45672	03381 35119	50355 08287	00448 32800	24106 04054	70572 71063
	06457 50072	18060 71023	84349 40984	59497 77742	32107 53770	11659 27315	09204 26213	57325 31470	56108 23141	16121 53929
	14297 07687	03517 10363	35783 62236	63764 45942	68889 03862	35032 14283	20642 15371	36234 12079	67596 00017	51789 90737
4	51661 57130	97442 29590	21634 79772	73801 70122	46467 47152	32061 51250	39825 08554	88726 40945	68579 33784	62025 32555
	55457 11788	16117 09698	24409 05079	76603 52563	33461 46791	81455 16888	24630 15077	47256 08529	54837 24861	95621 53483
	48508 81512	62819 27689	63744 11023	11184 87679	22218 70139	48422 09247	43406 16093	81168 28523	31406 49560	99243 85090
	1916 01602	96950 41536	39974 88287	83546 69187	45539 78263	86190 56199	35409 88248	52436 70161	98500 74702	99546 74570
	39001 77727	33095 58785	29179 45428	71416 20418	38558 78700	90627 37046	50285 68189	97489 83097	31477 13908	97472 74448
5	72348 55617	14714 21930	14851 38209	52202 03979	85970 74482	68103 76739	57644 56746	63005 08804	47081 65928	65045 58629
	19094 64359	89829 10942	53181 37758	29587 26792	43840 45872	09606 69465	16536 94055	86328 56533	16670 57295	26749 18524
	82147 77127	01652 50774	04970 83300	33760 22172	67316 52135	-62479 29610	03235 51850	15835 64828	08115 16166	32854 74206
	75968 18386	31874 52249	23015 20365	57473 32756	58268 73739	40232 52840	82512 99258	09327 55073	86030 29953	00528 67359
	81963 38095	99560 91307	99654 74279	80145 53303	11870 50485	10690 55550	21275 78369	33658 47000	89425 60573	81137 25474
6	64828 15817	80925 55226	51893 93162	15757 47430	84855 95822	75958 38949	99508 72713	22665 03244	17399 83950	66220 03784
	64347 61578	44160 06266	39118 52558	36436 56155	18293 67306	56554 57576	41529 00619	51972 09442	60298 81066	28362 41165
	54746 52337	84826 39012	59118 19851	10156 78167	41473 59025	35676 20332	77622 93718	57255 09740	26798 60087	58959 45698
	22241 41501	02993 99340	91044 67268	51888 12751	74008 33773	81383 25677	56572 16401	31379 88319	41325 33938	36342 03327
	11906 20043	10415 44425	31712 54831	85591 62237	88797 14382	29448 88487	05814 82402	42132 83708	89754 57495	57655 78644
7	76637 87609	95378 95550	86909 50609	99008 99042	50364 56664	56863 94737	68681 43498	37376 81659	07422 58435	24855 15523
	93896 47120	98926 30516	28136 49458	84145 79205	79517 93446	20369 34456	48608 11787	86056 88290	17463 66628	03035 80773
	75292 88232	14360 12459	13656 63716	70428 66917	64412 38302	06790 99805	16439 94235	42560 62912	32202 43198	97027 97104
	98792 29828	10577 48134	29433 98278	22543 74155	82187 22086	73690 79726	86492 77431	49864 69275	46450 07123	09083 92746
	63751 91049	94127 47358	59840 73667	36254 72792	67147 44659	76222 20006	93660 88690	08190 05588	76651 03461	11987 20756
8	72064 62102	39955 79462	62975 02638	00302 79476	72656 84005	18434 21895	80472 19499	80423 58643	27088 66458	78358 56606
	88227 73821	80607 61734	02600 45364	72344 71034	48570 96876	20463 75133	41733 84279	56045 79079	20213 91560	60548 95128
	44748 56504	13995 59701	88238 93488	09497 66058	36651 37927	27105 77095	72016 23683	01318 40361	34673 15811	36625 62958
	69838 51226	85736 72247	64099 84305	49877 76215	66910 30228	87356 56331	07346 36084	73126 33364	78730 47283	76795 95719
	81800 39313	57730 84410	47637 81369	51830 43536	58937 91901	60938 13970	90288 79437	50345 92034	12541 93216	58624 37392
9	11256 45661	59948 57975	92422 70057	50210 30345	55912 51638	02745 59983	92806 62853	39755 42550	31081 38560	35712 78632
	39056 86614	53645 62909	27198 04454	33789 96463	66603 48083	74302 59334	91215 26293	18112 93831	01473 10753	38229 18642
	88086 93172	68311 59164	42012 10447	45933 28344	36844 57684	06933 77651	45616 77589	28610 34307	68045 15107	62935 34149
	13648 27948	76750 19915	66815 34015	43011 27150	94264 89516	40145 80092	50588 18535	19001 82179	12572 77589	33459 35130
	16254 82661	46161 68609	58626 58428	75051 22558	49463 66646	70055 98683	10246 91760	21952 73985	68903 66934	42484 07608
October 10	69482 19109	94189 94626	09299 10649	55405 54571	57855 54921	34552 76379	40928 93696	97711 15818	31004 03243	05626 07468
	61336 36663	13010 46412	50139 30769	13048 61407	41056 60510	45253 86947	43417 28878	14936 94099	90775 42001	86675 62770
	85227 66438	12304 70011	93324 58764	87274 43105	56002 06928	71336 21692	84077 17814	33316 49494	31617 90727	39485 92302
	55705 34418	59410 32635	42984 40981	91750 27411	85142 77990	95474 76468	12019 04274	01893 23930	88771 31147	63259 28948
	95402 31746	98184 38830	97590 00066	82770 42325	28778 63571	34619 91898	28499 00279	35351 87736	83909 43736	19258 95068
11	79228 94510	57711 64366	39040 43278	69072 22003	89465 61483	44546 75524	68535 77434	18563 15479	58350 79802	10616 22735
	48103 56760	82564 33649	35176 32278	51357 85419	47462 53931	22917 96024	04784 03805	52788 83577	82269 68632	23310 46261
	70969 23677	59621 63065	73154 70467	19316 77945	43004 39893	33043 31433	47835 75234	74539 38329	57892 45997	71749 28666
	69931 20237	73246 59124	12484 22012	79731 88435	56381 99752	99357 54593	31618 64216	65938 51742	13498 09737	61504 18946
	37208 22741	41946 74109	03760 24094	40210 76617	52317 50643	01072 31679	80961 34029	56463 09594	11939 51777	64796 52452
12	68153 92327	85730 27728	64813 47667	66078 03628	95240 03808	90838 58179	42064 62987	13072 84227	24060 59438	05695 38136
	46710 47674	53747 95354	67757 25477	26396 09592	96239 50854	35914 39441	90149 67057	16955 39960	28142 45600	75486 74103
	55399 48542	12284 95298	56399 61358	87541 12998	79639 63633	87047 77234	12753 45644	47643 55781	06672 57548	64706 25457
	23677 64950	97041 43088	80145 34294	91468 01066	90350 78891	93727 46617	48045 49685	28383 37200	90473 56808	86774 07305
	41947 70066	90316 17133	11674 00826	75760 37536	33621 14199	37439 50362	44171 18495	53370 77691	28006 55318	39723 25299

Source: *Statistics with Applications to the Biological and Health Sciences.* R. D. Remington and M. A. Schork, 1970.

TABLE 1. RANDOM NUMBERS (con.)

Month	Day 11,26	12,27	13,28	14,29	15,30
1	98892 57833	73909 81674	91956 84521	60438 55374	71670 61039
	95358 77381	21912 24873	26372 12044	43234 08502	85716 08095
	28763 24589	86896 31137	87312 33216	29665 26014	07919 17679
	51203 70209	42174 10757	98531 35725	68208 61279	26705 43916
	08457 10085	35741 79416	72457 59502	46086 09051	70963 19739
2	30698 80818	90073 78320	82675 78768	49929 70495	92747 04318
	37143 41186	37373 61087	67398 16798	98542 11820	48765 24164
	36775 63628	70826 43166	89426 31415	37514 24878	35635 05311
	02560 51679	79600 27297	36434 17174	08109 07771	05909 58959
	36744 66697	08331 50201	56303 09131	55992 60232	31305 38689
3	66482 04302	29770 46201	04589 42575	99318 84406	83405 21184
	76375 41529	63940 57620	29283 94564	96598 00619	68468 97375
	93772 72925	19454 63712	21401 96662	77750 37218	02290 30796
	59013 81632	85000 35180	99975 73252	46334 59082	60743 27664
	52392 04440	45628 34976	92012 16596	28596 15493	30154 48760
4	08027 07629	04339 77570	47155 77838	34498 67455	04320 82004
	27284 29416	57313 03509	71443 42543	73335 48678	87559 77927
	20513 38581	82309 69951	22658 60958	18290 60334	30741 89647
	36076 12821	68725 37954	62888 64152	54390 59263	70109 06755
	60679 43262	43672 03653	21060 81096	71232 28930	44207 02354
5	49416 58370	63738 87515	39290 87656	36130 23490	30963 57350
	85757 39149	31739 92494	41332 33835	69882 56431	08091 01981
	12379 77731	65133 44979	90939 39584	76614 58007	24873 53876
	00757 13129	09648 87644	81689 68088	34882 04971	27565 66377
	68276 79035	18273 83412	97329 61003	65958 85510	78362 29316
6	64716 91494	45448 92281	73834 67432	52145 41582	81548 82438
	83693 11496	57066 48153	74754 56783	09233 63456	32438 96757
	31273 66797	35380 41155	44189 94360	42074 31178	27962 12666
	58005 84170	29999 73631	93033 41592	35688 71399	39902 31568
	99993 80083	03810 07234	42067 76669	89686 64064	67141 80520
7	31692 51607	89056 74472	91384 20263	16039 94191	33787 73915
	82997 38520	04853 52395	95314 36543	06636 61291	67504 57205
	03045 40582	46051 60241	04996 82236	47375 87307	85112 88439
	75768 38768	70475 00601	18578 32077	36523 30843	07057 76326
	21033 13175	30743 45814	92222 76704	00197 51267	33224 40236
8	99092 60991	12571 71753	69214 37885	82939 50725	25987 69761
	07204 93573	85112 29610	30375 64836	13439 08235	67650 72530
	82859 57254	07771 21393	64657 42013	92757 03028	24224 24918
	30497 51407	73900 15699	58653 18065	23072 48698	38082 48040
	09725 18075	45858 54968	43743 82050	78412 79456	53032 30984
9	95330 01985	24138 10514	42539 91907	23694 37097	39566 34045
	09760 32388	03601 49925	66124 54146	67213 52234	48384 19443
	08534 61967	15537 93831	84645 40792	47562 95494	62087 18064
	11234 59330	48348 57195	36782 03046	82136 36057	93951 70020
	91016 48762	80221 59683	27504 21123	94711 11807	80582 48359
October 10	34708 05374	60704 47178	97247 24875	26259 62622	14657 10354
	47132 62839	62198 53445	60630 76219	02772 48651	66449 19215
	55825 93302	43019 45861	53495 16106	12783 37248	83533 25440
	17201 18184	10510 27159	83008 20544	41665 99439	70666 28974
	33045 17219	66737 59080	78489 12626	60661 53933	70062 14289
11	01923 33647	98442 59295	83318 33425	76412 87062	01295 11083
	07202 76476	71868 54845	19468 41564	68694 59662	55905 26898
	68835 68242	95750 11033	58634 78411	08523 19313	29327 47526
	68525 06496	17446 41378	32368 92019	66401 56783	43308 82641
	80319 33515	97373 43064	16221 99697	37951 07947	12835 49391
12	64209 96929	26044 49789	54545 67200	21325 15056	51345 06309
	30156 29121	73074 42395	41721 50643	19565 06364	47203 19579
	59467 14232	89098 68717	14753 73356	47781 54165	82842 00121
	53764 83212	26675 64184	64455 29023	83181 13674	08878 87829
	81727 35572	95469 36825	91882 93082	68323 14965	34766 32151

ATTACHMENT 4

NOTIFICATION AND CERTIFICATION

The following notifications and certifications are required for the shipment of restricted wastes from the generators to MDI or from MDI to the final disposal facility.

Included in this attachment are the following:

Attachment 4 Page #	From:	To:	Notification/Certification Purpose
B	MDI	Hazardous Land Disposal Facility	Certify proper treatment of F006, F007, F008, F009, F010, F011, F012, waste types.
C	MDI	Hazardous Land Disposal Facility	Certify proper treatment of F019 waste type.
D	MDI	Hazardous Land Disposal Facility	Certify proper treatment of K061 waste type.
E	MDI	Hazardous Land Disposal	Certify proper treatment of K062 waste type.
F	MDI	Non-Haz Land Disposal	Certify proper treatment of K062 waste type.
G	Generator (also MDI to Haz Land Disposal)	MDI	F001-F005 Wastes have been properly treated.
H	Generator	MDI	"California List" wastes have been properly treated or require treatment.
I	Generator	MDI	F019 Waste requires treatment.
J	Generator	MDI	F006, F007, F008, F009, F010, F011 F012 Waste requires treatment.

Michigan Disposal, Inc.

Corporate Offices
1349 Whittaker Road
Ypsilanti, Michigan 48197
(313) 485-6464 • Fax (313) 485-6450

NOTICE AND CERTIFICATION

BATCH NUMBER: _____ DATE: _____

The wastes identified on manifest number(s) _____

and bearing the EPA Hazardous Waste Number(s) _____ _____ are subject to the land disposal restrictions of 40 CFR Part 268. The wastes comply with the treatment standards specified in 268.32 or 268.43, or the prohibition levels specified in 268.32 or RCRA section 3004(d) The treatment standards or prohibition levels applicable to each waste are identified below:

F006, F007, F008, F009, F011 and F012

Applicable treatment standard:	mg/kg	F010 mg/kg	Waste Analysis
Cadmium	0.066		_____
Chromium(Total)	5.2		_____
Lead	0.51		_____
Nickel	0.32		_____
Silver	0.072		_____
CYANIDE(TOTAL)	590	1.5	_____
CYANIDE(AMENABLE)	30	0.10	_____

REQUIRED CERTIFICATION FROM TREATMENT FACILITY TO DISPOSAL FACILITY FOR WASTE MEETING TREATMENT STANDARDS IN 268.41, 268.43.

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40CFR Part 268 Subpart D and all applicable prohibitions set forth in 40CFR 268.32 or RCRA section 3004(d) without dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

_____
Authorized Signature

Printed on Recycled Paper

Michigan Disposal, Inc.

MDI

Post Office Box 5116
Dearborn, Michigan 48128
(313) 326-0204

F019

<NOTICE AND CERTIFICATION>

<NOTIFICATION>

The wastes identified on manifest number _____ and bearing the EPA Hazardous Waste Number(s) _____ _____ are subject to the land disposal restrictions of 40 CFR Part 268. These wastes are "soft-hammer" wastes not subject to a treatment standard in 40 CFR 268.42. Furthermore, these wastes are not California list wastes per 268.32. If disposed in a surface impoundment or landfill prior to May 8, 1990, these units must meet the minimum technological standards of 268.5(h)(2). Before being placed in a qualifying landfill or impoundment, the waste must be accompanied by a valid demonstration and certification.

CERTIFICATION OF A TREATMENT OR RECOVERY FACILITY
THAT SOFT-HAMMER WASTES HAVE BEEN PROPERLY TREATED

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with treatment as specified in the generator's demonstration. I am aware that there are significant pentalties for submitting false information, including the possibility of fine and imprisonment.

_____
Authorized signature

Michigan Disposal, Inc.

ENVIRONMENTAL PROTECTION FACILITY
49350 N. I-94 Service Drive
Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

NOTICE AND CERTIFICATION

BATCH NUMBER: _____ DATE: _____

The wastes identified on manifest number(s) _____

and bearing the EPA Hazardous Waste Number(s) (K061) _____ are subject to the land disposal restrictions of 40 CFR Part 268. The wastes comply with the treatment standards specified in 268.41 or 268.43, or the prohibition levels specified in 268.32 or RCRA section 3004(d). The treatment standards or prohibition levels applicable to each waste are identified below:

Hazardous waste description	Constituents of concern	Nonwastewater: Total composition, mg/kg	Nonwastewater: TCLP, mg/L	Waste analysis
K061 — Emission control dust/sludge from the primary production of steel in electric furnaces — high-zinc subcategory (≥15% zinc) interim standards effective until 8/8/90	Cadmium	—	0.14	
	Chromium (total)	—	5.2	
	Lead	—	0.24	
	Nickel	—	0.32	

REQUIRED CERTIFICATION FROM TREATMENT FACILITY TO DISPOSAL FACILITY FOR WASTES MEETING TREATMENT STANDARDS IN 268.41, 268.43.

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d) without dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

_____
Authorized Signature

Michigan Disposal, Inc.

ENVIRONMENTAL PROTECTION FACILITY
49350 N. I-94 Service Drive
Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

<NOTICE AND CERTIFICATION>

BATCH NUMBER: _____ DATE: _____

The wastes identified on manifest number(s) _____

and bearing the EPA Hazardous Waste Number(s) _____ _____ are subject to the land disposal restrictions of 40 CFR Part 268. The wastes comply with the treatment standards specified in 268.41 or 268.43, or the prohibition levels specified in 268.32 or RCRA section 3004(d). The treatment standards or prohibition levels applicable to each waste are identified below:

Hazardous waste description	Constituents of concern	TCLP, mg/L	Total composition, mg/kg	
		Nonwastewater		waste analysis
K062 — Spent pickle liquor generated by steel finishing operations at facilities within the iron and steel industry (SIC codes 331 and 332)	Chromium (total)	0.094	0.32	_____
	Nickel	—	0.44	_____
	Lead	0.37	0.04	_____

REQUIRED CERTIFICATION FROM TREATMENT FACILITY TO DISPOSAL FACILITY FOR WASTES MEETING TREATMENT STANDARDS IN 268.41, 268.43.

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d) without dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

_____
Authorized Signature

Michigan Disposal, Inc.

ENVIRONMENTAL PROTECTION FACILITY
49350 N. I-94 Service Drive
Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

BATCH NUMBER:_____ DATE:_____

The wastes identified on manifest number(s)

and bearing the EPA Hazardous Waste Number K062 have been treated utilizing lime in accordance with regulations set forth in 40 CFR 261.3(c)(2)(ii)and are, therefore, not subject to BDAT standards for K062. The following analyses have been conducted with respect to RCRA/MDNR characteristic parameters:

E.P. Toxicity	Concentration, mg/l	EPA-SW-846 Methodology
Arsenic		1310, 7061
Barium		1310, 7080
Cadmium		1310, 7130
Chromium		1310, 7190
Lead		1310, 7420
Mercury		1310, 7470
Selenium		1310, 7741
Silver		1310, 7760
Copper		1310, 7210
Zinc		1310, 7950
Ignitability		1010
Corrosivity (pH)		9040
Cyanide, Total		9010
Sulfide, Reactive		9030

Based on the analytical data given above, this material is approved for disposal at WDI ___ hazardous landfill or ___ non-hazardous landfill.

_____
Authorized Signature

CORPORATE OFFICES
1349 WHITTAKER ROAD
YPSILANTI, MICHIGAN 48197
(313) 485-6464 • FAX: (313) 485-6450

Michigan Disposal, Inc.

Corporate Offices
1349 Whittaker Road
Ypsilanti, Michigan 48197
(313) 485-6464 • Fax (313) 485-6450

NOTICE AND CERTIFICATION:

WASTES MEETING THE TREATMENT STANDARD

The wastes identified on manifest number _____ and bearing the EPA Hazardous Waste Number(s) _____ are subject to the land disposal restrictions of 40 CFR Part 268. The wastes comply with the treatment standards specified in 268 Subpart D, the applicable prohibitions of Section 268.32, or RCRA section 3004(d). The treatment standards or prohibition levels applicable to each waste are identified below:

waste analysis	SOLVENT-CONTAINING WASTES	TCLP Extract Concentration (mg/l) Wastewater	Other
_____	Acetone (F003)	0.05	0.59
_____	n-Butyl alcohol (F003)	5.00	5.00
_____	Carbon disulfide (F005)	1.05	4.81
_____	Carbon Tetrachloride (F001)	0.05	0.96
_____	Chlorobenzene (F002)	0.15	0.05
_____	Cresols (cresylic acid) (F004)	2.82	0.75
_____	Cyclohexanone (F003)	0.125	0.75
_____	1,2-dichlorobenzene (F002)	0.65	0.125
_____	Ethyl acetate (F003)	0.05	0.75
_____	Ethyl benzene (F003)	0.05	0.053
_____	Ethyl ether (F003)	0.05	0.75
_____	Isobutanol (F005)	5.00	5.00
_____	Methanol (F003)	0.25	0.75
_____	Methylene chloride (F001, F002)	0.20	0.96
_____	Methyl ethyl ketone (F005)	0.05	0.75
_____	Methyl isobutyl ketone (F003)	0.05	0.33
_____	Nitrobenzene (F004)	0.66	0.125
_____	Pyridine (F005)	1.12	0.33
_____	Tetrachloroethylene (F001, F002)	0.079	0.05
_____	Toluene (F005)	1.12	0.33
_____	1,1,1-Trichloroethane (F001, F002)	1.05	0.41
_____	1,1,2-Trichloro-1,2,2-trifluoroethane (F002)	1.05	0.96
_____	Trichloroethylene (F001, F002)	0.062	0.091
_____	Trichlorofluoromethane (F002)	0.05	0.96
_____	Xylene (F003)	0.05	0.15

As required by 40 CFR 268.7(a)(2), the following certification is made for these restricted wastes:

> I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possiblity of a fine and imprisonment.

WAYNE DISPOSAL, INC.
MI0048090633

ENVIRONMENTAL PROTECTION FACILITY
49350 N. I-94 Service Drive
Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-1532

MICHIGAN DISPOSAL, INC
MI0000724831

4-H

Land Disposal Restrictions - Notification/Certification
40 CFR 268.7(a) (To be attached to manifest)

Manifest Number _____ EPA Hazardous Waste Number _____

Part 1

This shipment contains the following restricted hazardous waste subject to the corresponding treatment standards and prohibitions. (Check all that apply.)

	Treatment Standard TCLP Extract Concentration (mg/l)		Prohibition Level	
SOLVENT-CONTAINING WASTES	Wastewater	Other	Filtrate	Total
___ Acetone (F003)	0.05	0.59		
___ n-Butyl alcohol (F003)	5.00	5.00		
___ Carbon disulfide (F005)	1.05	4.81		
___ Carbon Tetrachloride (F001)	0.05	0.96		
___ Chlorobenzene (F002)	0.15	0.05		
___ Cresols (cresylic acid) (F004)	2.82	0.75		
___ Cyclohexanone (F003)	0.125	0.75		
___ 1,2-dichlorobenzene (F002)	0.65	0.125		
___ Ethyl acetate (F003)	0.05	0.75		
___ Ethyl benzene (F003)	0.05	0.053		
___ Ethyl ether (F003)	0.05	0.75		
___ Isobutanol (F005)	5.00	5.00		
___ Methanol (F003)	0.25	0.75		
___ Methylene chloride (F001, F002)	0.20	0.96		
___ Methyl ethyl ketone (F005)	0.05	0.75		
___ Methyl isobutyl ketone (F003)	0.05	0.33		
___ Nitrobenzene (F004)	0.66	0.125		
___ Pyridine (F005)	1.12	0.33		
___ Tetrachloroethylene (F001, F002)	0.079	0.05		
___ Toluene (F005)	1.12	0.33		
___ 1,1,1-Trichloroethane (F001, F002)	1.05	0.41		
___ 1,1,2-Trichloro-1,2,2-trifluoroethane (F002)	1.05	0.96		
___ Trichloroethylene (F001, F002)	0.062	0.091		
___ Trichlorofluoromethene (F002)	0.05	0.96		
___ Xylene (F003)	0.05	0.15		
CALIFORNIA LIST WASTES				
___ Liquids containing Free Cyanides	-	-	≥ 1000 mg/l CN	
___ Liquids containing Arsenic and/or compounds	-	-	≥ 500 mg/l As	
___ Liquids containing Cadmium and/or compounds	-	-	≥ 100 mg/l Cd	
___ Liquids containing Chromium VI and/or compounds	-	-	≥ 500 mg/l Cr^{+6}	
___ Liquids containing Lead and/or compound	-	-	≥ 500 mg/l Pb	
___ Liquids containing Mercury and/or compounds	-	-	≥ 20 mg/l Hg	
___ Liquids containing Nickel and/or compounds	-	-	≥ 134 mg/l Ni	
___ Liquids containing Selenium and/or compounds	-	-	≥ 100 mg/l Se	
___ Liquids containing Thallium and/or compounds	-	-	≥ 130 mg/l Tl	
___ Corrosive liquids	-	-	pH ≤ 2.0	
___ Liquids containing PCBs	Incineration	Incineration		≥ 50 ppm
___ Wastes containing halogenated organic compounds	-	Incineration		≥ 1000 mg/kg

Evaluation of this waste is based on:

___ (analysis attached) TOTAL METALS

___ Knowledge of waste (materials used/processes employed)

_____ Signature _____ Date

Part 2

HOC - CERTIFICATION

I, the undersigned, under penalty of law do hereby certify that the hazardous waste material submitted for acceptance to Wayne/Michigan Disposal, Inc. under waste code number does not contain Halogenated Organic Compounds (HOC) in total concentrations greater than or equal 1,000 mg/Kg.

COMPANY NAME _____

AUTHORIZED SIGNATURE _____

Michigan Disposal, Inc.

ENVIRONMENTAL PROTECTION FACILITY
49350 N. I-94 Service Drive
Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

NOTICE AND CERTIFICATION FOR SOFT-HAMMER WASTES

The wastes identified on manifest number _____ and bearing the EPA Hazardous Waste Number(s) _____ _____ are subject to the land disposal restrictions of 40 CFR Part 268. These wastes are "soft-hammer" wastes not subject to a treatment standard in 40 CFR 268.42. Furthermore, these wastes are not California list wastes per 268.32. If disposed in a surface impoundment or landfill prior to May 8, 1990, these units must meet the minimum technological standards of 268.5(h)(2). Before being placed in a qualifying landfill or impoundment, the waste must be accompanied by a valid demonstration and certification.

available treatment exists

I certify under penalty of law that the requirements of 40 CFR 268.8(a)(1) have been met and that I have contracted to treat my waste (or will otherwise provide treatment) by the practically available technology which yields the greatest environmental benefit, as indicated in my demonstration. I believe that the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

_____
Authorized signature

Michigan Disposal, Inc.

Corporate Offices
1349 Whittaker Road
Ypsilanti, Michigan 48197
(313) 485-6464 • Fax (313) 485-6450

WASTES DO NOT MEET LAND PROHIBITION TREATMENT STANDARDS

NOTIFICATION

The wastes identified on manifest number _____ and bearing the EPA Hazardous Waste Number(s) _____ _____ are subject to the land disposal restrictions of 40CFR Part 268. The wastes do not meet the treatment standards specified in Part 268 Subpart D or do not meet the prohibitions specified in 268.32 or RCRA section 3004(d). The treatment standards or prohibition levels applicable to each waste are identified below:

APPLICABLE TREATMENT STANDARD:

Hazardous waste description	Constituents of concern	Nonwastewater* Total composition, mg/kg	Nonwastewater* TCLP, mg/L	Wastewater, total composition, mg/L	Effective d
F006, F007, F008, F009, F010, F011, F012					
-Spend cyanide	Cadmium	—	0.066	—	6/8/89
	Chromium (total)	—	5.2	0.32	
Plating Bath Solutions	Lead	—	0.51	0.04	
from Electroplating	Nickel	—	0.32	0.44	
Operations	Silver	—	0.072	—	
	CYANIDE (TOTAL)	590	—	1.9	
	CYANIDE (AMENABLE)	30	—	0.1	

*Does not apply to F010, see 40CFR 268.43

HOC - CERTIFICATION

I, the undersigned, under penalty of law do hereby certify that the hazardous waste materials submitted for acceptance to Wayne/Michigan Disposal, Inc. under waste code number does not contain Halogenated Organic Compounds (HOC) in total concentrations greater than or equal 1,000 mg/kg.

COMPANY NAME: _____

AUTHORIZED SIGNATURE: _____

Printed on Recycled Paper

ATTACHMENT 2

Inspection Schedule

FACILITY INSPECTION INSTRUCTIONS

PURPOSE: The purpose of this document is to provide the individual(s) conducting facility inspections with information as to exactly what is to be inspected and at what interval or frequency the specific item is to be reviewed. The information contained herein should be available to the inspector during the course of the inspection to assure that the inspection form is properly completed.

INSPECTION TIMES: There are four general categories that encompass all the inspection items:

1. Emergency & Safety Equipment
2. Security Devices
3. Monitoring Equipment
4. Operating and Structural Equipment

The accompanying outline lists these major categories, sub-categories and the specific items that must be inspected/evaluated. Some elements of the specific items requiring evaluation are explained in the outline.

REPORT FORMS: Specific items vary with respect to the frequency in which they must be evaluated. The following intervals are used:

1. Annual
2. Quarterly
3. Monthly
4. Weekly
5. Daily

Instead of providing (5) inspection report forms, the general inspection forms are to be used that; (1) Annual and Quarterly intervals; (2) Monthly and weekly intervals, and (3) Daily intervals. Therefore some parts of each report form may not be applicable during the course of an inspection. A separate inspection form for all tanks has also been included. This form will be completed at Daily, Weekly, and Annual intervals as required by the specific items to be inspected.

INSPECTION SCHEDULE: The inspections are to be conducted at the times indicated below:

1.	Annual	- May of each year
2.	Quarterly	- February, May, August, November
3.	Monthly	- During the first full week of each calendar month
4.	Weekly	- Friday of each week
5.	Daily	- Each day the facility is handling hazardous waste

INSPECTION REMARKS: If you have any questions regarding the content of the inspection report, particularly acceptable or unacceptable conditions of specific items, contact the operating supervisor or the general manager. All unacceptable conditions must be identified and explained or otherwise noted in the remarks section of the report. You must also indicate what corrective action is necessary and the date when the condition will be corrected or made satisfactory.

INSPECTION RESPONSE: It is the purpose of the inspections to ensure that the facility is properly equipped and constructed for safe operation. Any deficiencies must be corrected. It is the inspector's responsibility to initiate action to correct any deficiencies.

FACILITY INSPECTION INSTRUCTIONS OUTLINE

I. MONITORING EQUIPMENT

Daily A. (Tank Level Indicators): Verify that all units are operating. Inspect electrical lines and the unit itself for signs of deterioration or damage.

Daily B. (High Level Bin Indicators): Verify that all units are operating. Inspect electrical lines and light bulbs for signs of deterioration and/or damage.

Daily	C.	(Air System Gauges): Check air pressure gauges for signs of leakage, deterioration or damage. Inspect pH meter for proper operation and condition.
Daily	D.	(Overfilling Control Equipment): Physically inspect electrical lines for the same. Ascertain the functional status of each unit.
Daily	E.	(Presence of Liquids or Signs of Leakage into Secondary Containment) Check liquid level in secondary containment, if liquid waste is detected, pump containment dry. For tanks, empty tank and conduct an annual inspection to locate and correct the primary tank failure. See Tab II-E, page 16 for tank inspection procedures. For containers, locate and remove or over-pack the leaking container.

II. SAFETY AND EMERGENCY EQUIPMENT

Quarterly	A.	(Fire Extinguishers): Verify that the units are at the locations and in the number(s) indicated in the Inspection Report. Inspect to determine that all units are maintaining adequate discharge pressure. Inspect the units for deterioration and damage. Verify that maintenance/service contract(s) are being fulfilled by the vendor.
Monthly	B.	(Self-Contained Breathing Apparatus): Verify that the units are at the location(s) and in the number indicated in the Inspection Report. Inspect in-service and reserve oxygen cylinders for appropriate volume/pressure. Inspect breathing hose(s), mouthpiece(s), facemask(s) and strap(s) for evidence of deterioration or damage.
Weekly	C.	(Power Generators): Ascertain the location, availability and functional status of these units. See the Inspection Report for general location, type and number of units.
Weekly	D.	(Pumps): Determine the location and functional status of all units. Nonfunctional units are to be turned over to maintenance department for inspection and repair.

Daily	E.	(Water Truck): Inspect the vehicular portion of the unit to determine its mechanical-functional status. If mechanical problems exist that would render the unit unavailable for emergency duty, refer the unit to maintenance staff for repairs and fittings for wear, damage or deterioration.
Daily	F.	(Earthmoving Equipment): Refer to the "Earthmoving Equipment" list in the Inspection Report. Determine the present, on-site availability of the listed equipment in the event this equipment could be utilized in an emergency condition such as a fire or spill clean-up.
Monthly	G.	(Respirators): Check and inventory the respirators and specific use cartridges. Inspect the masks and straps for deterioration. Reorder additional supplies if inventory is low.
Daily	H.	(Radio & Telephone Communications): Verify functional status of base stations and radio equipment used in the waste processing areas. Verify telephone service is functional at hazardous waste manifest office, solid waste office, and waste processing facility.
Daily	I.	(Internal Emergency Fire Valves): Inspect for deterioration, physical damage or leakage. Ascertain operational status of each unit.
Daily	J.	(Emergency Alarm): Check functional status.
Weekly	K.	(Safety Shower and Eye Wash): Inspect for leaks or deterioration of pipes. Ascertain the eye wash is functioning properly and the water supply is sufficient.
Monthly	L.	(Protective Clothing and Gloves): Check inventory of gloves, disposable coveralls, ear, eye and foot protection equipment. Reorder if low inventory. Check to see if uniforms are in sufficient supply.
Monthly	M.	(Equipment Beepers): Inspect loading equipment for the operational status of reversing beepers.

III. OPERATIONAL AND STRUCTURAL EQUIPMENT

Daily	A.	(Pugmill Mixer Integrity): Inspect pugmill for leaks, any signs of corrosion, signs of frictional wear (especially on the paddles) and see if proper maintenance is being performed.
Daily	B.	(Air Pollution Control Equipment): Ascertain that equipment is operating properly. Inspect for any emissions from bag houses. Check for vibrations at fan and blower housings. If units is not operating, related waste acceptance and processing must stop until repairs are affected.
Daily	C.	(Piping): Inspect the condition of all pipe runs; joints, valves and pumps for signs of leakage or cracking.
Weekly	D.	(Storage Buildings): Inspect tracks on large doors to assure proper sliding and closing. Check rubber flashing around doors for tears or deterioration. Inspect walls for leaks or cracks.
Weekly	E.	(Container Storage Area): Ascertain the integrity of the containment system is satisfactory. Check for leaks or cracks in dikes and make sure no run-off is apparent.
Weekly	F.	(Screw Conveyor): Inspect screw flights for unusual wear, inspect hangers, trough and cover. Look for leakage at joints and required maintenance at hangers.
Weekly	G.	(Sweeper Truck Operation): Ascertain that equipment is operating properly. Inspect the vehicular portion, vacuum motor, suction lines, sweepers, hydraulic lines and fitting. If any condition exists that may render the unit inoperable, refer the unit to the maintenance staff for repairs.
Annual	H.	(Concrete/Tank Inspections): Ascertain that the structural and containment concrete is not degraded. Perform tank inspections described on Tab II-E, Page 16. An outside contractor will be used for these inspection.

IV. SECURITY DEVICES

Daily Monthly Quarterly	(Security Devices): Security devices are checked by Wayne Disposal personnel. After the inspector has completed his inspection for Wayne Disposal, he must complete items on MDI's inspection form and sign it to verify completion of inspection.

DAILY INSPECTION REPORT
MICHIGAN DISPOSAL, INC. WASTE PROCESSING PLANT
MID 000 721 831

	STATUS	NORTH	EAST
1. MONITORING EQUIPMENT			
a) Air System Gauges	( )		
b) Level of Air System Chemicals	( )		
i) Sulfuric Acid	( )		
ii) Sedium Hypochlorite	( )		
2. SAFETY AND EMERGENCY EQUIPMENT (See Attached Check List)			
a) Internal Emergency Fire Valves	( )		
b) Emergency Alarm	( )		
c) Water Truck, Pump and Adequate Hose	( )		
d) Earth Moving Equipment	( )		
e) Radio and Telephone Communications	( )		
3. OPERATING AND STRUCTURAL EQUIPMENT			
a) Air Pollution Control Equipment	( )		
b) No Indication of Leakage from Container Storage Area Retaining Walls	( )		
c) Container Storage Area(s)			
1) No containers leaking	( )	( )	( )
2) Level in spill and rainwater retention trench must be empty	( )	( )	( )
3) Container unloading area - no spill	( )	( )	( )
4) All containers are properly labeled, labels are viable	( )	( )	( )
5) Number of containers in storage	( )	( )	( )

3. OPERATING AND STRUCTURAL EQUIPMENT

c) Container Storage Area(s) (Continued)

	STATUS	NORTH	EAST
6) Containers are separated by at least 2' aisles	( )	( )	( )
d) Access Roads - Clean	( )		
e) Electrical Lockouts are Operational	( )		
f) Pipe runs, joints, valves and pumps; no leaks	( )		
i) Pumping Station	( )		
ii) East Pugmill room	( )		
iii) West Pugmill room	( )		

4. SECURITY DEVICES

a) Main Entrance Gate is Functional and Manned by Security ( )

Note: Indicate ( ) for acceptable conditions, ( ) for unacceptable conditions. All unacceptable conditions must be numbered and explained in remarks section; include corrective action necessary and date of completion. If spill of hazardous waste is observed, an incident report should be filled out stating the nature of the spill, type of waste, corrective measures and whether contingency plan was exercised.

Remarks: _____

(Use back of sheet if necessary)

Inspection Date: _____ Signed: _____

Inspection Time: _____ Title: _____

Security: _____

Date Corrective Actions Were Completed: _____

EMERGENCY AND DECONTAMINATION EQUIPMENT

DESCRIPTION	NO.	LOCATION (See Pg A-5)	STATUS
1. Fire Extinguisher (C02) Used only for small localized fires.	9	Pug-Mill Building	( )
	2	East Maintenance Bldg.	( )
	3	West Maintenance Bldg.	( )
	1	Safety Office	( )
	1	Employee Building	( )
	2	Manifest Office	( )
	1	Guard Office	( )
2. Self-Contained Breathing Apparatus With two extra 30 min. air tanks	3	Safety Office	( )
3. Emergency Hip Pacs Used for egress only with 5 min. air tanks	4	Safety Office	( )
4. Rescue Equipment			
Stokes Basket	1	Safety Office	( )
Miller Wincher	1	Safety Office	( )
Tripod	1	Safety Office	( )
Harnesses	2	Safety Office	( )
Nylon Straps	2	Safety Office	( )
Oxygen Units	1	Safety Office	( )
	1	Laboratory	( )
5. 3,000 Gallon Water Truck with 1 1/2" & 3" hi-pressure and 150' of fire hose. Used for small fires.	1	West Maintenance Bldg.	( )
6. Water Pumps (Moving waste waters, sludge for repair work)			
6" elec. 1200 GPM	2	East Maintenance Bldg.	( )
4" elec. 450 GPM	2	East Maintenance Bldg.	( )
3" elec. 300 GPM	11	East Maintenance Bldg.	( )
3" gas 300 GPM	3	East Maintenance Bldg.	( )
7. Earth Moving Equipment Used for containment, isolation, clean-up, and smothering fires.			
Cat D-8 Dozer	3	Equipment Parking Area	( )
Cat D-7 Dozer	2	Equipment Parking Area	( )

F. **EMERGENCY AND DECONTAMINATION EQUIPMENT** (Cont.)

7. Earth Moving Equipment (Cont.)

DESCRIPTION	NO.	LOCATION	STATUS
Cat 627 Earth Mover	9	Equipment Parking Area	( )
Cat 988 Wheel Loader	1	Equipment Parking Area	( )
Cat 980 Wheel Loader	1	Equipment Parking Area	( )
Cat 966 Wheel Loader	1	Equipment Parking Area	( )
Cat Steel Wheel Compactor	4	Equipment Parking Area	( )
NW 95-70	1	Equipment Parking Area	( )
8. Emergency Power Generators			
Cat 185 KW 220/440 3 phase	1	East Maintenance Bldg.	( )
Cat 45 KW 220/440 3 phase	1	East Maintenance Bldg.	( )
Gas KW 110/220	1	East Maintenance Bldg.	( )
9. Communications			
Telephones	5	Manifest Office	( )
	7	Reception Office	( )
	3	Maintenance Garage	( )
	2	Main Gates	( )
Radios			
Base Units	1	Main Office	( )
	2	Maintenance Garage	( )
	2	Main Gates	( )
	1	Manifest Office	( )
	1	Reception Office	( )
	1	Processing Plant	( )
	1	Front End Loader	( )
	1	D-5	( )
	1	D-7	( )
Hand Held	20	Various Vehicles	( )

10. Personal Protective Equipment			
Respirators:	3	Willson 1600 (full face)	( )
	4	Glenaire 9500 (half face)	( )
	24	Organic vapor/Acid Gas Cartridge w/Attached HEPA Filters	( )
	12	Ammonia and Methyl Amine Cartridges	( )
	36	Disposable Dust Filters	( )
Coveralls:	36	Polycoated tyvek Suites	( )
Goggles:	12	Chemical Splash, Fog Free	( )
Gloves:	48	Rubber with Grip	( )
	48	Cloth	( )
11. Absorbants:	10	40lb. bags Oil Dry East Maintenance Building	( )

WEEKLY/MONTHLY INSPECTION REPORT
MICHIGAN DISPOSAL, INC.
MID 000 724 831

		FREQUENCY	STATUS
1.	SAFETY AND EMERGENCY EQUIPMENT (See Attached Check List)		
a)	Pumps	Weekly	( )
b)	Eye Wash Stations	Weekly	( )
c)	Self Contained Breathing Apparatus	Monthly	( )
d)	Respirators and Cartridges	Monthly	( )
e)	Protective Clothing and Equipment	Monthly	( )
f)	Equipment Beepers	Monthly	( )
g)	Fire Extinguishers - Adequate Pressure	Weekly	( )
2.	OPERATING AND STRUCTURAL EQUIPMENT		
a)	Storage Buildings		
	1) Condition of doors	Weekly	( )
	2) Condition of retaining walls	Weekly	( )
b)	Discharge Conveyors		
	1) Overall operation satisfactory	Weekly	( )
	2) Condition (Maintenance, cleaning)	Weekly	( )
c)	Screw Feeders		
	1) Satisfactory condition	Weekly	( )
	2) No sign of leakage	Weekly	( )
d)	Container Storage Area		
	1) Containment System Integrity	Weekly	( )
e)	Sweeper Truck	Weekly	( )
3.	SECURITY DEVICES		
a)	Fence	Monthly	( )
b)	Berms and Fence	Monthly	( )
c)	Warning Signs	Monthly	( )

Note: Indicate ( ) for acceptable conditions, ( ) for unacceptable conditions. All unacceptable conditions must be numbered and explained in remarks section; include corrective action necessary and estimated date of completion.

Remarks: _____

Inspection Date: _____ Signed: _____

Inspection Time: _____ Title: _____

Security: _____

Date Corrective Actions Were Completed: _____

EMERGENCY AND DECONTAMINATION EQUIPMENT

DESCRIPTION	NO.	LOCATION (See Pg A-5)	STATUS
1. Fire Extinguisher (C02) Used only for small localized fires.	9	Pug-Mill Building	( )
	2	East Maintenance Bldg.	( )
	3	West Maintenance Bldg.	( )
	1	Safety Office	( )
	1	Employee Building	( )
	2	Manifest Office	( )
	1	Guard Office	( )
2. Self-Contained Breathing Apparatus With two extra 30 min. air tanks	3	Safety Office	( )
3. Emergency Hip Pacs Used for egress only with 5 min. air tanks	4	Safety Office	( )
4. Rescue Equipment			
Stokes Basket	1	Safety Office	( )
Miller Wincher	1	Safety Office	( )
Tripod	1	Safety Office	( )
Harnesses	2	Safety Office	( )
Nylon Straps	2	Safety Office	( )
Oxygen Units	1	Safety Office	( )
	1	Laboratory	( )
5. 3,000 Gallon Water Truck with 1 1/2" & 3" hi-pressure and 150′ of fire hose. Used for small fires.	1	West Maintenance Bldg.	( )
6. Water Pumps (Moving waste waters, sludge for repair work)			
6" elec. 1200 GPM	2	East Maintenance Bldg.	( )
4" elec. 450 GPM	2	East Maintenance Bldg.	( )
3" elec. 300 GPM	11	East Maintenance Bldg.	( )
3" gas 300 GPM	3	East Maintenance Bldg.	( )
7. Earth Moving Equipment Used for containment, isolation, clean-up, and smothering fires.			
Cat D-8 Dozer	3	Equipment Parking Area	( )
Cat D-7 Dozer	2	Equipment Parking Area	( )

F. **EMERGENCY AND DECONTAMINATION EQUIPMENT** (Cont.)

7. Earth Moving Equipment (Cont.)

DESCRIPTION	NO.	LOCATION	STATUS
Cat 627 Earth Mover	9	Equipment Parking Area	( )
Cat 988 Wheel Loader	1	Equipment Parking Area	( )
Cat 980 Wheel Loader	1	Equipment Parking Area	( )
Cat 966 Wheel Loader	1	Equipment Parking Area	( )
Cat Steel Wheel Compactor	4	Equipment Parking Area	( )
NW 95-70	1	Equipment Parking Area	( )
8. Emergency Power Generators			
Cat 185 KW 220/440 3 phase	1	East Maintenance Bldg.	( )
Cat 45 KW 220/440 3 phase	1	East Maintenance Bldg.	( )
Gas KW 110/220	1	East Maintenance Bldg.	( )
9. Communications			
Telephones	5	Manifest Office	( )
	7	Reception Office	( )
	3	Maintenance Garage	( )
	2	Main Gates	( )
Radios			
Base Units	1	Main Office	( )
	2	Maintenance Garage	( )
	2	Main Gates	( )
	1	Manifest Office	( )
	1	Reception Office	( )
	1	Processing Plant	( )
	1	Front End Loader	( )
	1	D-5	( )
	1	D-7	( )
Hand Held	20	Various Vehicles	( )

10. Personal Protective Equipment			
Respirators:	3	Willson 1600 (full face)	( )
	4	Glenaire 9500 (half face)	( )
	24	Organic vapor/Acid Gas Cartridge w/Attached HEPA Filters	( )
	12	Ammonia and Methyl Amine Cartridges	( )
	36	Disposable Dust Filters	( )
Coveralls:	36	Polycoated tyvek Suites	( )
Goggles:	12	Chemical Splash, Fog Free	( )
Gloves:	48	Rubber with Grip	( )
	48	Cloth	( )
1. Absorbants:	10	40lb. bags Oil Dry East Maintenance Building	( )

QUARTERLY/ANNUAL INSPECTION REPORT
Including
SECONDARY CONTAINMENT STRUCTURES
MICHIGAN DISPOSAL, INC.

	FREQUENCY	STATUS
1. SAFETY AND EMERGENCY EQUIPMENT (See Attached Check List)		
a) Fire Extinguishers		
1) Proper location	Quarterly	( )
2) Recharge schedule followed	Quarterly	( )
2. OPERATING AND STRUCTURAL EQUIPMENT		
a) No cracks or leaks in the floor or walls of:		
1) Retaining Walls		
a) North	Annually	( )
b) East	Annually	( )
c) West	Annually	( )
2) Drum Storage Areas	Annually	( )
3) Tank Farm	Annually	( )
4) Haul Routes/Loading Area	Annually	( )

Note: Indicate ( ) for acceptable conditions, ( ) for unacceptable conditions. All unacceptable conditions must be numbered and explained in remarks section; include corrective action necessary and estimated date of completion.

Remarks: _____

_____

_____

_____

_____

Inspection Date: _____ Signed: _____

Inspection Time: _____ Title: _____

Date Corrective Actions Were Completed: _____

EMERGENCY AND DECONTAMINATION EQUIPMENT

DESCRIPTION	NO.	LOCATION (See Pg A-5)	STATUS
1. Fire Extinguisher (C02) Used only for small localized fires.	9	Pug-Mill Building	( )
	2	East Maintenance Bldg.	( )
	3	West Maintenance Bldg.	( )
	1	Safety Office	( )
	1	Employee Building	( )
	2	Manifest Office	( )
	1	Guard Office	( )
2. Self-Contained Breathing Apparatus With two extra 30 min. air tanks	3	Safety Office	( )
3. Emergency Hip Pacs Used for egress only with 5 min. air tanks	4	Safety Office	( )
4. Rescue Equipment			
Stokes Basket	1	Safety Office	( )
Miller Wincher	1	Safety Office	( )
Tripod	1	Safety Office	( )
Harnesses	2	Safety Office	( )
Nylon Straps	2	Safety Office	( )
Oxygen Units	1	Safety Office	( )
	1	Laboratory	( )
5. 3,000 Gallon Water Truck with 1 1/2" & 3" hi-pressure and 150′ of fire hose. Used for small fires.	1	West Maintenance Bldg.	( )
6. Water Pumps (Moving waste waters, sludge for repair work)			
6" elec. 1200 GPM	2	East Maintenance Bldg.	( )
4" elec. 450 GPM	2	East Maintenance Bldg.	( )
3" elec. 300 GPM	11	East Maintenance Bldg.	( )
3" gas 300 GPM	3	East Maintenance Bldg.	( )
7. Earth Moving Equipment Used for containment, isolation, clean-up, and smothering fires.			
Cat D-8 Dozer	3	Equipment Parking Area	( )
Cat D-7 Dozer	2	Equipment Parking Area	( )

F. **EMERGENCY AND DECONTAMINATION EQUIPMENT** (Cont.)

7. Earth Moving Equipment (Cont.)

DESCRIPTION	NO.	LOCATION	STATUS
Cat 627 Earth Mover	9	Equipment Parking Area	( )
Cat 988 Wheel Loader	1	Equipment Parking Area	( )
Cat 980 Wheel Loader	1	Equipment Parking Area	( )
Cat 966 Wheel Loader	1	Equipment Parking Area	( )
Cat Steel Wheel Compactor	4	Equipment Parking Area	( )
NW 95-70	1	Equipment Parking Area	( )
8. Emergency Power Generators			
Cat 185 KW 220/440 3 phase	1	East Maintenance Bldg.	( )
Cat 45 KW 220/440 3 phase	1	East Maintenance Bldg.	( )
Gas KW 110/220	1	East Maintenance Bldg.	( )
9. Communications			
Telephones	5	Manifest Office	( )
	7	Reception Office	( )
	3	Maintenance Garage	( )
	2	Main Gates	( )
Radios			
Base Units	1	Main Office	( )
	2	Maintenance Garage	( )
	2	Main Gates	( )
	1	Manifest Office	( )
	1	Reception Office	( )
	1	Processing Plant	( )
	1	Front End Loader	( )
	1	D-5	( )
	1	D-7	( )
Hand Held	20	Various Vehicles	( )

10. Personal Protective Equipment			
Respirators:	3	Willson 1600 (full face)	( )
	4	Glenaire 9500 (half face)	( )
	24	Organic vapor/Acid Gas Cartridge w/Attached HEPA Filters	( )
	12	Ammonia and Methyl Amine Cartridges	( )
	36	Disposable Dust Filters	( )
Coveralls:	36	Polycoated tyvek Suites	( )
Goggles:	12	Chemical Splash, Fog Free	( )
Gloves:	48	Rubber with Grip	( )
	48	Cloth	( )
1. Absorbants:	10	40lb. bags Oil Dry East Maintenance Building	( )

TANK INSPECTION REPORT
MICHIGAN DISPOSAL, INC.
MID 000 724 831

	FREQUENCY	(TANK NUMBER STATUS) 16	17	18	19	20	21	22	23	24	25	26	27
1. LIQUID STORAGE TANKS													
a. Signs of corrosion, erosion, or leaking of fixtures or seams	Daily	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
b. Area surrounding tank for signs of leakage	Daily	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
c. Indication of spill in tank loading area	Daily	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
d. Indication of leakage from pipes or valves	Daily	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
e. Indication of leakage from dike surrounding tanks	Daily	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
f. Operational status of waste feed cut-off control and tank level indicator	Daily	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
** Assess condition of tank													
1) No signs of cracks or leaks	Annual	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
2) Integrity of seams	Annual	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
3) Shall Thickness (attach copy of test results)	Annual	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

TANK INSPECTION REPORT
MICHIGAN DISPOSAL, INC.
MID 000 724 831

	FREQUENCY	(TANK NUMBERS) 1	2	3	4	5	6
2. DUST STORAGE TANKS							
a. Signs of corrosion, leaking of fixtures and seams	Daily	( )	( )	( )	( )	( )	( )
b. Area surrounding tank for signs of leakage	Daily	( )	( )	( )	( )	( )	( )
c. Indication of spill in tank loading area	Daily	( )	( )	( )	( )	( )	( )
d. Indication of leakage from pipes or valves	Daily	( )	( )	( )	( )	( )	( )
e. Operational status of high level indicator alark and waste feed cut-off	Daily	( )	( )	( )	( )		
f. **Assess condition of tank							
1. No signs of cracks or leaks	Annual	( )	( )	( )	( )	( )	( )
2. Integrity	Annual	( )	( )	( )	( )	( )	( )
3. Shell thickness (Attach results)	Annual	( )	( )	( )	( )	( )	( )

TANK INSPECTION REPORT
MICHIGAN DISPOSAL, INC.
MID 000 724 831

		FREQUENCY	(TANK NUMBERS) 7	8	9	10	11	12
3	SLUDGE STORAGE TANKS							
a.	Above ground portion for signs of corrosion, corosion, or leaking of fixtures and seams	Daily	( )	( )	( )	( )	( )	( )
b.	Area surrounding tank for signs of leakage	Daily	( )	( )	( )	( )	( )	( )
c.	Level of waste in tank and operational status of high level indicator alarm	Daily	( )	( )	( )	( )	( )	( )
d.	Indication of spill in tank loading area	Daily	( )	( )	( )	( )	( )	( )
e.	Presence of liquids or signs of leakage into secondary containment	Daily	( )	( )	( )	( )	( )	( )
f.	** Assess condition of tank:							
	1) No signs of cracks or leaks	Annual	( )	( )	( )	( )	( )	( )
	2) Integrity	Annual	( )	( )	( )	( )	( )	( )
	3) Shell thickness (Attach results)	Annual	( )	( )	( )	( )	( )	( )

TANK INSPECTION REPORT
MICHIGAN DISPOSAL, INC.
MID 000 724 831

		FREQUENCY	TANK #'s 14	15
4.	PUGMILLS			
a.	Signs of corrosion, or leaking of fixtures and seams	Daily	( )	( )
b.	Area surrounding tank for signs of leakage	Daily	( )	( )
c.	Assess condition of tank:			
	1) No signs of cracks or leaks	Annual	( )	( )
	2) Integrity	Annual	( )	( )
	3) Shell thickness (Attach results)	Annual	( )	( )

Note: Indicate ( ) for acceptable condition, (x) for unacceptable conditions must be numbered and explained in remarks section; include corrective action action necessary and estimated date of completion. If spill is hazardous waste is observed, an incident report should be filled out stating contingency plan was exercised.

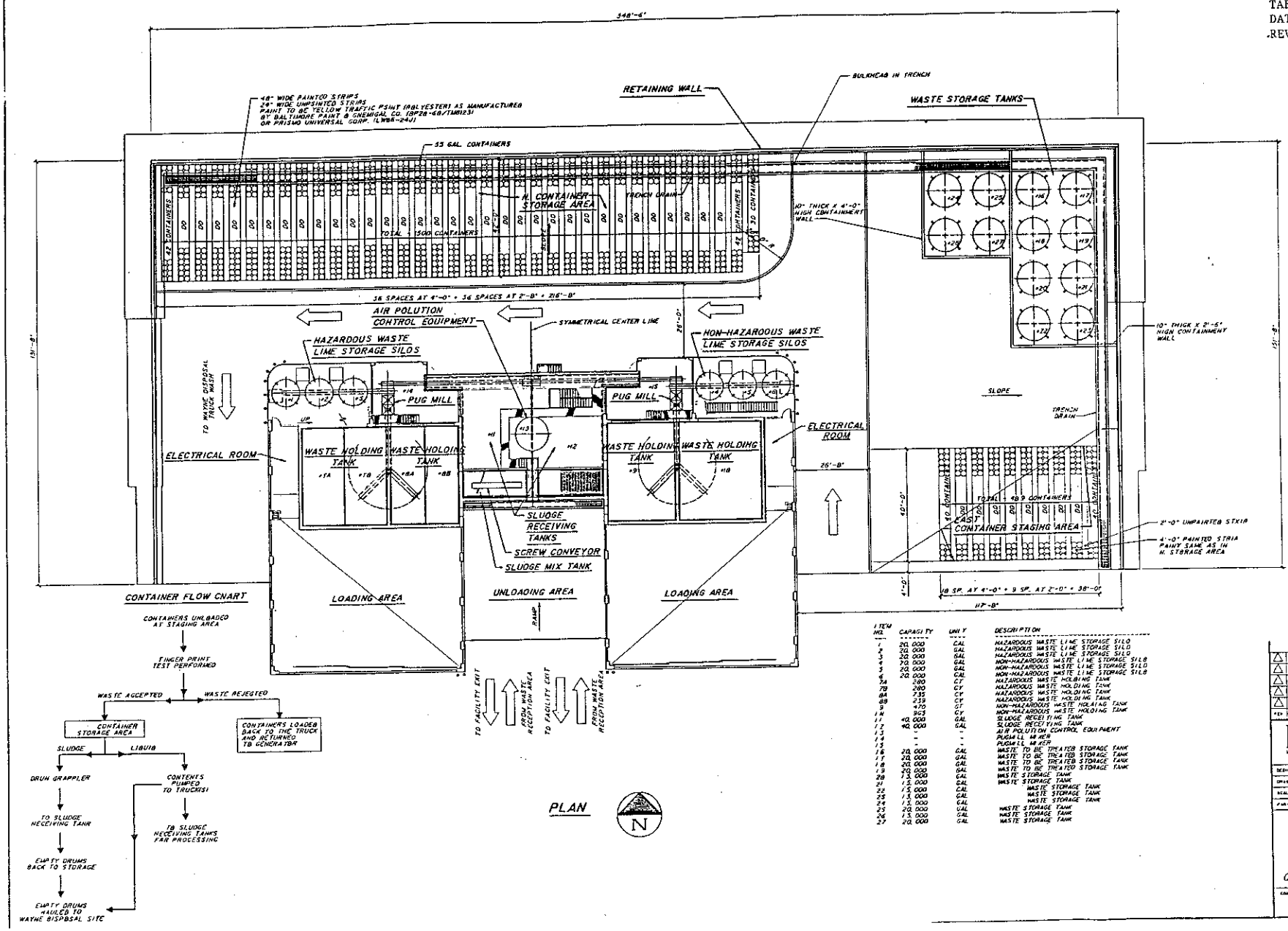
Remarks:

Inspection Date: _____ Signed: _____

Inspection Time: _____ Title: _____

Date Corrective Action(s) Was(Were) Completed: _____

** See attached for procedure.



ITEM NO.	CAPACITY	UNIT	DESCRIPTION
1	20,000	GAL	HAZARDOUS WASTE LIME STORAGE SILO
2	20,000	GAL	HAZARDOUS WASTE LIME STORAGE SILO
3	20,000	GAL	HAZARDOUS WASTE LIME STORAGE SILO
4	20,000	GAL	NON-HAZARDOUS WASTE LIME STORAGE SILO
5	20,000	GAL	NON-HAZARDOUS WASTE LIME STORAGE SILO
6	20,000	GAL	NON-HAZARDOUS WASTE LIME STORAGE SILO
7A	280	CY	HAZARDOUS WASTE HOLDING TANK
7B	280	CY	HAZARDOUS WASTE HOLDING TANK
8A	235	CY	HAZARDOUS WASTE HOLDING TANK
8B	235	CY	HAZARDOUS WASTE HOLDING TANK
9	470	CY	NON-HAZARDOUS WASTE HOLDING TANK
10	963	CY	NON-HAZARDOUS WASTE HOLDING TANK
11	40,000	GAL	SLUDGE RECEIVING TANK
12	40,000	GAL	SLUDGE RECEIVING TANK
13	-	-	AIR POLUTION CONTROL EQUIPMENT
14	-	-	PUGMILL MIXER
15	-	-	PUGMILL MIXER
16	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
17	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
18	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
19	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
20	15,000	GAL	WASTE STORAGE TANK
21	15,000	GAL	WASTE STORAGE TANK
22	15,000	GAL	WASTE STORAGE TANK
23	15,000	GAL	WASTE STORAGE TANK
24	15,000	GAL	WASTE STORAGE TANK
25	20,000	GAL	WASTE STORAGE TANK
26	15,000	GAL	WASTE STORAGE TANK
27	20,000	GAL	WASTE STORAGE TANK

NO.	DESCRIPTION	BY	DATE	CHK'D
△				
△				
△				
△				
△				

ISD/ McNAMEE PORTER & SEELEY
ENGINEERS ARCHITECTS

DESIGNED H. NOBRI | CHECKED N. LEE
DRAWN J. HIRYN | ISSUED DATE JUNE 1988
SCALE 1/16"=1'-0" | CHGD DATE

MICHIGAN DISPOSAL, INC.
DELEGATION OF
WASTE SOLIDIFICATION OPERATION

TRAFFIC FLOW AND CONTAINER MANAGEMENT

CONTRACT | SHEET SUPP.-14

PROCEDURE FOR LIQUID TANK INSPECTION

Annual Inspection of Tanks:

Step 1 - Empty tanks completely.

Step 2 - Thoroughly clean interior of tanks by water blasting and remove any sedimentation from bottom of the tanks.

Step 3 - Do a thorough visual check of the interior and exterior of the tanks looking for cracks or leaks and also inspect the integrity of all seams.

Step 4 - Have a certified testing lab determine the shell thickness of all tanks. A copy of their test report must be attached to the inspections form.

Step 5 - Make any necessary repairs and document the procedure used and have person responsible for the repairs sign document to verify the completion and integrity of the repairs.

ATTACHMENT 3

Personnel Training Program

PERSONNEL TRAINING

SECTION OUTLINE

A. Personnel Training, Introduction and Overview

B. Employee Training Program Outline

C. Training Course Outline By Topic

1. Introduction
2. Hazard Recognition
3. Planning
4. Emergency Procedures
5. Personal Protective Equipment
6. Facility Programs
7. Operations
8. Record Keeping and Reporting
9. Groundwater
10. Job Specific Training

D. Certification of Training

E. Location and Retention of Training Records

TABLES

TABLE II-L-1 Job Titles, Descriptions and Minimum Qualifications.

TABLE II-L-2 Job Titles and Personnel Names

TABLE II-L-3 Training Requirements by Title

A. **PERSONNEL TRAINING**

All facility personnel involved in the management of hazardous waste are required to complete a program of classroom and on the job training to ensure their personal safety and facility compliance in hazardous waste management practices. At a minimum the training includes 24 hours of hazardous waste management, safety and emergency response training as required by SARA Title III. Particular attention is directed to staff participation in contingency plan participation, use of personal protection equipment, emergency and monitoring equipment and the facility internal communication system.

Newly hired or reassigned staff are provided with 24 hours of training and instructed in their specific responsibilities before assuming their duties. During the employees first six months any required training not covered as part of the 24 hour requirement, discussed above, will be completed by the Technical Director. During this period on the job training will be provided by the employee's direct supervisor. The new employee will not be allowed to work unsupervised until all required formal training is completed. All required formal training will be completed during the first six months of employment.

Each employee will receive at least eight hours of refresher training on an annual basis.

The personnel training program is directed by the company's Technical Director, this individual is required to posses a MS in Chemistry or the equivalent in education and experience as well as five years experience in hazardous waste management.

As necessary, specific training topics may be hired out to experienced and qualified firms. In either case training follows the general outline provided below:

B. EMPLOYEE TRAINING PROGRAM OUTLINE

GOAL:

Personnel involved with hazardous substances and waste materials will be able to understand and demonstrate site operation, emergency spill response procedures, and other emergency response procedures, in accordance with their job assignments.

OBJECTIVE:

Personnel involved with hazardous materials and waste handling will be able to:

- Recognize potential hazards of hazardous materials and waste, including hazards associated with routine handling and spills
- Understand regulations applicable to hazardous material and waste management; EPA, OSHA, MDNR, DOT and Wayne County
- Understand regulations, permit conditions and company practices relative to the employee's specific job assignment
- Understand the proper procedures for response to fires explosions and groundwater contamination incidents
- Demonstrate the proper use of emergency equipment and personal safety equipment
- Understand the proper use of emergency communication equipment
- Understand the proper use plant equipment during normal operations, planned and emergency shutdown procedures

DURATION:

Initial training lasts for a minimum of 24 hours (three normal working days), refresher courses are completed on an annual basis and are a minimum of 8 hours in duration.

C. TRAINING COURSE OUTLINE BY TOPIC

1. INTRODUCTION:

An overview of the course content and objectives including a review of applicable regulation promulgated by EPA, OSHA, DOT and MDNR, including:

- The Resource Conservation and Recovery Act (RCRA)
- 40 CFR Parts 262, 263, 264 and 270
- Michigan Department of Natural Resources, (MDNR), Regulations, Act 64
- RCRA and Act 64 Permit Requirements

2. HAZARD RECOGNITION:

A review of identification systems and hazards associated with hazardous wastes and materials, including;

- Hazardous wastes accepted by the company, acceptance criteria, chemical and physical characteristics of the wastes, location and use of waste characterization reports
- Use and location of material safety data sheets
- The MSDA system for identifying chemical and physical hazards
- Chemical exposure limits, inhalation and skin absorption
- Oxygen deficiency
- Physical safety hazards, lifting, running, heat stress, moving equipment, electrical lockouts
- Emergency medical treatments for chemical exposure and physical accidents
- Question and answer period related to HAZARD RECOGNITION

C. **TRAINING COURSE OUTLINE BY TOPIC** (Cont.)

3. PLANNING:

A review of the provisions made for dealing with an accident, spill or incident which may threaten human health or the environment, including:

- Plant site plan review, secondary containment structures, tank farm, drum storage area, sludge receiving tanks, sludge storage tanks and admix (cement kiln dust) storage silos
- Waste analysis plan and the acceptance of compatible wastes
- Company organizational structure and organizational structure of emergency response teams
- Location and organization of the Contingency Plan, pointing out the location of response procedures for fire or explosions, spill response, emergency shutdown actions and evacuation routes
- Plant emergency response equipment, yard hydrants, fire extinguishers and emergency showers
- Role of the emergency coordinator and off site emergency services
- Question and answer period related to PLANNING.

4. EMERGENCY PROCEDURES:

A review of the planned actions in the event of an emergency spill, fire or explosion or any other event which may present a threat to human health or the environment. This is accomplished through a review of the Contingency Plan, including:

- Emergency coordinators names, primary job description, telephone number(s), address, primary and alternate coordinators

4. EMERGENCY PROCEDURES: (Cont.)

- Off site emergency services for fire, hospital, ambulance and spill response, telephone numbers and address of primary and alternate response teams

- Emergency communication system, use of the radio and telephone

- Location, inspection, maintenance use and decontamination of emergency equipment identified in the contingency plan

- Decontamination of emergency response equipment

- Emergency response procedures for fires or explosions

- Emergency response procedures for spills

- Emergency response procedures for incidents of chemical exposure or contamination

- Shutdown of operations, emergency evacuation

- Requirements to notify Government, MDNR Northville Office, Wayne County Department of Health, Wayne County Air, Wayne County Department of Public Works and Van Buren Township

- Reporting requirements

- Question and answer period related to EMERGENCY PROCEDURES

5. PERSONAL PROTECTIVE EQUIPMENT:

Instruction and demonstration in the use of personal protective equipment, (PPE), including:

- The need for PPE, engineered solutions to hazardous environments vs. the use of PPE

- Air monitoring for LEL, oxygen, dust and individual hazardous constituents

5. PERSONAL PROTECTIVE EQUIPMENT: (Cont.)

- Respiratory equipment, half and full face respirators, cartridge protection and supplied breathing air, SCBA's
- Protective clothing including, full body suits, gloves and boots
- Recognizing heat stress
- Question and answer period related to PPE

6. FACILITY PROGRAMS:

Instruction and review in specific facility operating requirements and programs, including:

- Waste Analysis Plan, waste stream approval, waste stream acceptance and sampling techniques
- Treatment requirements for different waste types
- Security system
- Facility inspections
- Description of container storage areas
- Description of tank storage areas
- Question and answer period related to FACILITY PROGRAMS.

7. OPERATIONS:

An overview and instruction in plant operations including a review of standard operating procedures for the following:

- Drum unloading, storage and emptying drums
- Bulk liquid unloading into tank farm and/or sludge receiving tanks, bulk liquid transfers

7. OPERATIONS: (Cont.)

- Bulk solid unloading into sludge receiving tanks
- Bulk unloading of pneumatic tankers
- Operation and maintenance of feed, transfer and stacking conveyors
- Operation and maintenance of pumps
- Operation and maintenance of the wet air scrubber
- Neutralization, precipitation, blending, solidification and stabilization processes
- Pozzolanic stabilization of hazardous and non-hazardous wastes
- Treatment requirements for specific waste types
- Actions to be taken in the event of a planned facility shutdown, including securing all tanks, pumps and storage areas and maintenance of stored waste during shutdown.
- Question and answer period related to OPERATIONS.

8. RECORD KEEPING and REPORTING:

An overview of record keeping and reporting requirements related to permit conditions with specific instruction in the following:

- Maintenance of a facility operating log
- Maintenance of waste stream approval files, hard copy and computer files
- Waste stream re-approval notifications
- Maintenance and reporting of daily operating logs, hard copy and computer logs

8. RECORD KEEPING and REPORTING: (Cont.)

- Biennial reporting requirements
- Wayne County reporting requirements, Air Pollution Control, Department of Public Health, Department of Public Works
- Ambient air monitoring program and reporting requirements
- Groundwater monitoring and reporting requirements
- Surface water monitoring and reporting requirements
- Sediment/soil monitoring and reporting requirements
- Other reporting requirements imposed by the operating license
- Question and answer period related to RECORD KEEPING and REPORTING

9. GROUNDWATER:

A review of actions to be taken in the event of groundwater contamination including:

- Reporting to the EPA Regional Administrator and Director of the MDNR
- Response to the groundwater contamination event through installation of recovery wells, containment systems or other specified equipment associated with a corrective or remedial action.
- Question and answer period related to GROUNDWATER

10. JOB SPECIFIC:

In addition to the training listed above, a new or reassigned employee will receive job specific training from his/her immediate supervisor during the first six months of employment or reassignment.

D. CERTIFICATION OF TRAINING

Facility: Michigan Disposal, Inc. MID 000 724 831

Employee Name: _____

Employer: _____

Job Title: _____

PROGRAM ELEMENTS COMPLETED

1. INTRODUCTION:

An introduction to the course content and regulations effecting the hazardous waste management industry, specifically RCRA, ACT 64, CAA, DOT Regulation.

2. HAZARD RECOGNITION:

Review and discussion of identification systems and hazards associated with hazardous wastes and materials.

3. PLANNING:

A review of the provisions already made in the event of an emergency, including a thorough review of the contingency plan.

4. EMERGENCY PROCEDURES:

A review of planned actions in the event of a fire or explosion, spill, chemical exposure incident or any other event which may present a threat to human health or the environment.

5. PERSONAL PROTECTION EQUIPMENT:

Instruction and demonstration in the use of personal protection equipment.

PROGRAM ELEMENTS COMPLETED (Cont.)

6. FACILITY PROGRAMS:

   Instruction and review of facility operations and programs.

7. OPERATIONS:

   An overview and instruction in specific plant operations including review of standard operating procedures.

8. RECORD KEEPING and REPORTING:

   A review of record keeping and reporting requirements relative to various permit conditions.

9. GROUNDWATER:

   A review of actions to be taken in the event of a groundwater contamination incident.

10. JOB SPECIFIC:

    Training to be completed by the direct supervisor relative to the specific job requirements.

I have participated in an (initial, annual update) training program on _____ covering the following topics, referenced above:

_____

Signature _____

E. LOCATION AND RETENTION OF TRAINING RECORDS

All employee training records are kept on file in the waste reception office at the company's Belleville, Michigan site and/or in the employees personnel file located at the company's corporate office; 1349 Whittaker Rd., Ypsilanti, Michigan 48197.

All records are retained for at least three years after termination of an employee.

TABLE II-L-1

JOB TITLES, DESCRIPTIONS AND MINIMUM QUALIFICATIONS

PRESIDENT:

Responsible for oversight of all company operations and programs.

Minimum Qualifications: B.S. in Engineering or a related field with 2-5 years experience in hazardous waste management. Or the equivalent in experience and training.

VICE PRESIDENT:

Responsible for oversight of plant operations, technical departments and environmental monitoring.

Minimum Qualifications: B.S. in Engineering or a related field with 2-5 years experience in hazardous waste management. Or the equivalent in experience and training.

ENVIRONMENTAL ENGINEER:

Responsible for implementation and oversight of environmental monitory programs, plant process changes and new equipment specifications.

Minimum Qualifications: B.S. Engineering degree, Chemical preferred, with 2-5 years experience in environmental monitoring or hazardous waste.

TECHNICAL DIRECTOR:

Responsible for waste stream approval, treatment and testing of treated wastes. Responsible for safety programs, specify protective equipment, coordinating all training and supervision of Laboratory and Waste Acceptance staffs.

Minimum Qualification: M.S. in Chemistry with five years experience in hazardous waste management, or the equivalent in experience and training.

LABORATORY MANAGER/LABORATORY CHEMIST:

Responsible for waste stream approvals, acceptance and testing of treated wastes.

Minimum Qualifications: B.S. in Chemistry or the equivalent in experience and a B.S. in a related field.

TABLE II-L-1 (Cont.)

LABORATORY TECHNICIAN:

Responsible for the performance of fingerprinting tests for waste stream approval and acceptance. Work is performed under the supervision of a Laboratory Manager or Chemist.

Minimum Qualifications: Associate Chemistry degree or the equivalent in experience.

SHIPMENT COORDINATOR:

Responsible for scheduling waste shipments to the facility as required. Responsible for resolving any discrepancies related to shipping papers or waste classification in accordance with procedures detailed in the waste analysis plan.

Minimum Requirement: High School Education.

MANIFEST CLERK:

Responsible for receiving the manifest and waste shipments to the facility. Responsible for signing manifests after approval is received from Technical Department and if necessary shipment coordinator.

Minimum Requirement: High School Education

DRUM/BULK LOAD SAMPLER:

Responsible for sampling and verifying quantity of waste on all shipments to the facility. Samples are presented to the Laboratory Chemist or a Technician for review.

Minimum Requirement: High School Education

TABLE II-L-1

PLANT SUPERVISOR:

Responsible for day to day operations including waste processing, waste storage, supervision of plant staff, maintenance, safety, security and emergency response.

Minimum Requirements: High School education and 5 years of hazardous waste management experience.

PLANT OPERATORS:

Responsible for operation of heavy equipment, process equipment and maintenance of equipment in hazardous waste service.

Minimum Requirements: 24 Hours of training in hazardous waste management, safety and emergency response.

PLANT LABORERS:

Responsible for maintenance and housekeeping of equipment and areas involved with hazardous work management.

Minimum Requirements: 24 Hours of training in hazardous waste management, safety and emergency response.

TABLE II-L-3

TRAINING REQUIREMENTS BY TITLE
(Item Numbers Correspond To Listing Under Training Outline)

TITLE:	REQUIRED TRAINING ELEMENTS:
Vice President	1,2,3,4,5,6,7,8,9,10
Environmental Engineer	1,2,3,4,5,6,7,8,9,10
Techincal Director	1,2,3,4,5,6,7,8,9,10
Lab Manager	1,2,3,4,5,6,7,8,10
Labratory Chemists	1,2,3,4,5,6,8,10
Lab Technician(s)	1,2,3,4,5,6,8,10
Manifest Clerk(s)	1,2,3,4,5,6,8,10
Bulk/Drum Load Samplers	1,2,3,4,5,6,10
Plant Supervisor	1,2,3,4,5,6,7,8,9,10
Plant Operators	1,2,3,4,5,6,7,10
Plant Laborers	1,2,3,4,5,6,7,10

ATTACHMENT 4

Contingency Plan

CONTINGENCY PLAN and EMERGENCY PROCEDURES

Michigan Disposal, Inc.
49350 N. I-94 Service Drive
Belleville, Michigan 48111

For ease of implementation the contingency plan has been organized into several sections, each section begins with a lower case letter and page numbers follow.

CONTINGENCY PLAN ORGANIZATION

PAGE	TOPIC
A.	GENERAL INFORMATION, FACILITY OPERATIONS, SITE PLANS EVACUATION ROUTES and LOCATION OF EMERGENCY EQUIPMENT
B.	EMERGENCY COORDINATORS and CONTACTS
C.	LIFE THREATENING EMERGENCIES; FIRES AND EXPLOSIONS
D.	HAZARDOUS WASTE SPILLS AND LEAKAGE
	I. TANK SPILLS II. TANK LEAKAGE III. CONTAINER STORAGE AREAS IV. OTHER SPILLS V. POST EMERGENCY REPORT
E.	AUTHORIZATION to COMMIT MICHIGAN DISPOSAL'S RESOURCES
F.	EMERGENCY RESPONSE EQUIPMENT on SITE
G.	COORDINATION OF EMERGENCY RESPONSE TEAMS

The contingency plan is to be implemented in the event of any fire or explosion involving or threatening to involve hazardous wastes and any spill or release of hazardous waste which may pose a threat to human health or the environment.

CONTINGENCY PLAN and EMERGENCY PROCEDURES

A. GENERAL INFORMATION

1. On Site Copy Locations:

   a. Manifest Office
   b. Guard Office
   c. Safety Office

2. Off Site Copy Locations:

   a. MDI Main Office (Ypsilanti, MI)
   b. Van Buren Police Department
   c. Van Buren Township Hall
   d. Van Buren Fire Department
   e. Michigan DNR (Lansing, MI)
   f. Willow Run Fire Department
   g. Wayne County Sheriff's Department
   h. Huron Valley Ambulance Service
   i. Beyer Memorial Hospital

All amendments to this plan are subject to the authorization of Walter Tomyn, President of MDI, and by the Michigan Department of Natural Resources. Dave Lusk, Vice-President, will be responsible for updating all site copies. Off site copies will be distributed by certified mail, return receipt requested with instructions to destroy all previous copies.

Michigan Disposal, Inc. operates a hazardous waste stabilization facility at the above address. A site plan showing pertinent mechanical features is found on pages A-4, A-5.

A. DESCRIPTION OF FACILITY OPERATIONS

MDI is an enclosed liquid hazardous waste treatment facility. Treatment consists of material being placed into either the east or west sludge feed tanks at the south end of the facility. Waste is fed through a screw conveyor to pugmills at the east or west ends of the facility and mixed with lime containing materials to effect a solidified state. The mixture is discharged by means of a screw feeder onto stacking conveyors and placed into tanks to slake. After the solidification reaction has completed, the treated waste is removed for direct landfilling at an approved licensed landfill facility. (MDI's closed facility is equipped with a wet air scrubber for particulate, odor and emission control.)

Liquid hazardous wastes to be treated in MDI's pozzolanic solidification process, are temporarily stored in six 20,000 gallon vertical storage tanks and two 40,000 gallons sludge feed tanks. Additional storage for liquid waste is available in six 15,000 gallon tanks.

Electric arc furnace dust, (K061), may be used as a supplement to the solidification agents and stored only in three 100 cubic yard silos on the west side of the plant. Lime kiln flue dust, cement kiln flue dust and lime are also used for solidification and may be stored in all six silos. The dusts are fed from the silos to the closest pugmill at a controlled rate to effect treatment of liquid wastes.

Listed hazardous wastes from specific and non-specific sources are stored and treated in the silos, sludge receiving, sludge storage tanks and pugmills on the west side of the plant (Tanks, 1,2,3,7,8,11,14). Characteristically, hazardous and non-hazardous wastes will similarly be stored and treated on the east side of the plant (Tanks 4,5,6,9,10,12 and 15). In both cases treatment consists of blending the waste in sludge feed tanks prior to treatment in the pugmill or sludge storage tanks. Conditioning chemicals such as sodium hypochlorite, soluble sodium silicates, or activated charcoal may be added during such a blending procedure.

A. DESCRIPTION OF FACILITY OPERATIONS (Continued)

Drummed liquid hazardous waste is stored on a concrete pad at the east area of MDI's property. The drum holding containment area slopes 12 inches to the east providing proper drainage to a trench measuring 28" x 24" x 277', running along the north and east retaining wall. This drainage trench is constructed within the containment area to contain and control all liquid run-off. Drums are handled by removing the tops or bungs and immediately emptying the contents with a vacuum truck or directly into the south sludge box using the barrel forklift. The empty drums are then placed into a roll-off box for disposal. By the spring of 1990 drums may be treated as follows. With the use of a barrel forklift, the drums are placed on a conveyor which feeds into a drum crusher mounted over the south sludge box. Hydraulically, the crusher punctures the bottom of the drums with a spike and then smashes the drums forcing all the liquid out. The liquid drains directly into the sludge box below and the barrel is ejected into a roll-off box for disposal.

MDI will also be storing liquid and sludge hazardous waste which is not suitable for treatment. These wastes will be stored in tanks numbered 18,19,21,22 and 23 located in the northeast corner of the drum storage area. Wastes stored in tanks numbered 12, 18, 19, 21, 22 and 23 and containers in the east staging area may be flammable and/or combustible.

The disposal operations are supported and directed from the office/laboratory building located near the entrance to the site. The office building serves as the control, communications and shipment evaluation center for the operation. All waste shipments are checked for conformity to their expected, typical properties before being allowed to proceed from the reception area to the treatment area. the facility records are maintained at the office/laboratory building.

EMERGENCY COORDINATORS and CONTACTS

EMERGENCY COORDINATORS:

PRIMARY:	DON ROESER	HOME:	697-8129
	257 Roland Drive	WORK:	697-7830
	Belleville, MI 48111		699-7120
ALTERNATES:	DAVID LUSK	HOME:	484-4632
	307 Elm	WORK:	485-6464
	Ypsilanti, MI 48197		697-7830
			699-7120
	BUTCH HAWTHORNE	HOME:	697-6690
	15933 Elwell	WORK:	697-7830
	Belleville, MI 48111		699-7120
	JOHN WILLIAMS	HOME:	930-0622
	3513 Barton Farms Drive	WORK:	485-6460
	Ann Arbor, MI 48105		697-7830
			699-7120

AMBULANCE SERVICE

PRIMARY:	HURON VALLEY AMBULANCE SERVICE	1-994-4111
	TAYLOR AMBULANCE SERVICE	699-1111

FIRE DEPARTMENT

PRIMARY:	VAN BUREN TOWNSHIP	697-9444
	WILLOW RUN AIRPORT	483-6700

POLICE DEPARTMENT

PRIMARY:	VAN BUREN TOWNSHIP	699-2550
	WAYNE COUNTY SHERIFF	721-2222
	STATE POLICE, YPSILANTI	482-1211

HOSPITALS

PRIMARY:	BEYER MEMORIAL, YPSILANTI	484-2345
	ST. JOSEPH'S MERCY, ANN ARBOR	573-3000
	UNIVERSITY OF MICH, ANN ARBOR	764-5102
	WAYNE COUNTY GENERAL, WESTLAND	722-2500

POISON CENTER

UNIVERSITY OF MICH, ANN ARBOR	764-7667

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

PEAS HOTLINE	1-800-292-4706
NAT'L RESPONSE CENTER	1-800-424-8802

C. LIFE THREATENING EMERGENCIES; FIRES AND EXPLOSIONS

The following portions of the contingency plan and emergency procedure establish step by step instructions for dealing with emergency situations. However, if any employee in the active hazardous waste treatment area or waste reception area encounters an emergency situation which they believe to present an imminent threat to human health or the environment, the individual employee is authorized to evacuate the area immediately.

Any available route away from the area may be used either on foot or by vehicle (See Page A-4 for evacuation routes). The employee should proceed to a safe area and contact the emergency coordinator. The emergency coordinator will issue instructions at that time.

If in the opinion of the emergency coordinator a general evacuation of the entire site is warranted, he will notify all persons on-site by radio and fire an emergency flare. All employees work under supervision of a supervisor in direct radio contact with the emergency coordinators. Evacuation notice will be given verbally to these employees.

Upon receiving the evacuation order by radio or upon observing the flare, all employees, including persons in the non-hazardous areas, must immediately proceed to the main entrance gate on the I-94 Service Drive by any available route which avoids the hazardous waste treatment area.

Supervisors will be responsible for accounting for all of their subordinates to the coordinator.

The emergency coordinator will issue instructions to the staff based on his evaluation of the seriousness, duration and extent of the emergency, generally following the outline in section II of this procedure.

C. **LIFE THREATENING EMERGENCIES; FIRES AND EXPLOSIONS:** (Cont.)

I. IN THE EVENT OF FIRE OR EXPLOSION INVOLVING HAZARDOUS WASTE OR HAZARDOUS WASTE CONSTITUENTS WHICH COULD THREATEN HUMAN HEALTH OR THE ENVIRONMENT, TAKE THE FOLLOWING STEPS: (IN THE EVENT OF A SPILL SEE SECTION D.)

a. Shut down all processing and ancillary equipment.

b. Contact the emergency coordinator(s) - see list in TAB II-G, Section B. (Note: Coordinators may be available through radio contact.)

c. Indicate nature of emergency and receive instructions from emergency coordinator.

d. If an emergency coordinator cannot be reached immediately, contact the Van Buren Fire Dept. (697-9444), then follow the emergency coordinator procedures listed below.

II. THE EMERGENCY COORDINATOR (OR DESIGNEE) SHALL:

a. Assess extent of emergency.

b. Contact appropriate emergency support agencies if needed.

c. Designate someone in charge at incident area to temporarily supervise immediate control action, radio report(s) to coordinator for update on conditions and notification of all personnel.

d. Take precautions to prevent spreading of fire to other hazardous wastes or waste disposal areas.

e. Remove NON-MDI, and NON-ESSENTIAL MDI personnel from incident area particularly during operating hours.

C. **LIFE THREATENING EMERGENCIES; FIRES AND EXPLOSIONS:**

II. THE EMERGENCY COORDINATOR (OR DESIGNEE) SHALL: (Cont.)

f. Assemble all personnel at the emergency coordinating center for instructions and personnel count. Direct company personnel in responding to fire or explosion if appropriate or wait for outside emergency personnel and assist in their containment efforts.

g. If appropriate, prepare self-contained breathing apparatus' and distribute. Note: Van Buren Fire Department has agreed to provide additional equipment if needed.

h. Prevent additional traffic from entering incident area (get assistance from gate attendants and security).

i. Clear road(s) for emergency vehicles and equipment.

j. Contact the "Technical Director" or "Lab Manager" if on duty, or check waste inventory log located in the emergency coordinating center for information to identify the nature of wastes in the incident area to determine potential hazards such as toxic, irritating or asphyxiating gases generated as a result of fire or explosion.

k. The emergency coordinator shall determine the need to evacuate the site and/or surrounding local areas based on his evaluation of:

1. The areal extent of the incident

2. The nature of wastes involved especially including the potential for generation of hazardous gases.

3. Weather conditions (especially wind)

C. **LIFE THREATENING EMERGENCIES; FIRE AND EXPLOSIONS:**

II. THE EMERGENCY COORDINATOR (OR DESIGNEE) SHALL: (Cont.)

4. An estimate of the time required and equipment needed to bring the incident under control.

5. Any other special conditions or factors he is aware of at the time that may have a bearing on the severity of the incident.

l. In the event of fire, consider smoke visibility or toxic fume hazard on I-94 freeway and advise Van Buren Police Dept. personnel for action.

m. If evacuation of surrounding local areas is advisable, indicate same to local authorities and assist the appropriate officials in determining whether evacuation is necessary and, if so, assist in determining what areas should be evacuated. Van Buren Police will co-ordinate evacuation activities if necessary.

n. If an evacuation response is appropriate contact the National Response Center (800-424-8802) and report the following:

1. Name and phone number of reporter.

2. Name and address of facility.

3. Time and type of incident.

4. Name and quantity of material involved, to the extent known.

5. The extent of injuries, if any.

6. Possible hazards to human health, or the environment, outside the facility.

C. **LIFE THREATENING EMERGENCIES; FIRES AND EXPLOSIONS:**

II. THE EMERGENCY COORDINATOR (OR DESIGNEE) SHALL: (Cont.)

o. Immediately after the incident, make an assessment to determine the need for disposing of recovered waste, contaminated soil or surface waters or any other material that results from a release, fire, or explosion at the facility (assume materials are hazardous). Obtain a sample of wastes involved in the incident for possible chemical analysis so that the cause of the incident can be definitely determined.

p. The emergency coordinator must evaluate the nature of materials (such as fire suppressants, neutralizing agents, waste residuals) in the affected area of the facility to determine if special clean-up efforts must be initiated before operation is resumed. Any necessary clean-up must be completed before operation is resumed.

Fire fighting efforts or other emergency response efforts are not expected to generate incompatible wastes for treatment and disposal. Nonetheless, any residue must be evaluated through the provision of the Waste Analysis Plan, TAB II-C, prior to treatment and disposal of the residue.

q. The emergency coordinator must ensure that all emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed.

r. The owner or operator must notify the Regional Administrator, Director of the Michigan Department of Natural Resources and local authorities, that the facility is in compliance with paragraphs (o & q) of this Section before operations are resumed in the affected area(s) of the facility.

C. LIFE THREATENING EMERGENCIES; FIRES AND EXPLOSIONS:

II. THE EMERGENCY COORDINATOR (OR DESIGNEE) SHALL: (Cont.)

s. The owner or operator must note in the operating record the time, date and details of any incident that requires implementing the Contingency Plan. Within 15 days after the incident, he must submit a written report on the incident to the Regional Administrator and the Director of the Michigan Department of Natural Resources. The report must include:

1. Name, address, and telephone number of the owner or operator.

2. Name, address, and telephone number of the facility.

3. Date, time, and type of incident (e.g. fire, explosion).

4. Name and quantity of material(s) involved.

5. The extent of injuries, if any.

6. An assessment of actual or potential hazards to human health or the environment, where this is applicable.

7. Estimated quantity and disposition of recovered material that resulted from the incident.

8. Emergency equipment used in response to the emergency and description of how the equipment was cleaned and prepared for future use.

9. Description of the steps taken to prevent a similar incident in the future.

C. **LIFE THREATENING EMERGENCIES; FIRES AND EXPLOSIONS:**

III. MEDIA RESPONSE

In the event of direct inquires or calls regarding the incident from the press, radio, or television contact Walt Tomyn, David Lusk, John Williams, or Don Vilnius who will prepare a news release. No reporters, etc. shall be allowed in the incident area without permission from the emergency coordinator. Until such permission is granted, reporters or other media people shall be refused entry or temporarily detained in the employee building pending information from one of the contacts listed above, or entry permission from the emergency coordinator.

D. HAZARDOUS WASTE SPILLS AND LEAKAGE

I. TANK SPILLS

1. Spills from overfilling liquid storage tanks 16 and 21.

   a) Immediately stop all tank loading operations.

   b) Lower tank level by emptying into sludge feed tanks and/or immediately processing liquid.

   c) Wash down spillage on tank with portable on site water blaster, into diked area.

   d) Pump water and spillage into sludge feed tanks for processing.

   e) Remove and repair waste feed cut-off unit and document operability of unit after repairs are made.

2. Spills from overfilling tanks 17 through 20 and 22 through 27.

   a) Immediately stop tank loading operations.

   b) Lower tank level by pumping into an adjacent tank.

   c) Wash down spillage on tank with on-site portable water blaster, into diked area.

   d) Pump water and spillage into adjacent tank or into a tanker.

   e) Make arrangements for disposal at a properly licensed facility.

D. **HAZARDOUS WASTE SPILLS AND LEAKAGE**

I. TANK SPILLS (Cont.)

3) Spills from overfilling tanks 1 through 15 and spills that occur at tank loading areas - all tanks;

a) Immediately stop all tank loading operations.

b) Lower tank level by immediately processing the contacts.

c) Using an on-site vacuum truck, immediately pick up all spilled materials and return to;

i. Sludge feed tanker
ii. The tank it spilled from
iii. Sludge storage tanks

d) Once all available waste has been picked up and placed back into storage; clean the outside of the tank and any other contaminated surface with a water/detergent solution under pressure. The outside of the tank and any contaminated surface should be rinsed two additional times to remove remaining contaminants.

e) Collect and treat all washwaters as a hazardous waste. Processing at MDI or shipping off-site to a properly licensed hazardous waste facility for treatment and disposal.

f) Investigate the cause of the spill and document the results. Remove and repair any faulty high level indicator alarm units. Repair any other parts that may have caused the spill and have the repair person sign documentation to verify completion and operability.

* Rules 3301 and 3302 of the Michigan Department of Public Health and Section 1910.94 (d) (11) of 29 CFT for Confined Space Entry must be enforced when entering tanks.

D. **HAZARDOUS WASTE SPILLS AND LEAKAGE**

II. TANK LEAKAGE

1. Leaks in liquid storage tanks 16 and 21

a) Immediately stop all tank loading operations.

b) Empty contents of leaking tank into sludge feed tanks and/or process contents.

c) Wash down spillage on the tank with on-site portable, high pressure water and detergent washer, pump water and spillage from diked area into sludge feed tanks.

d) Thoroughly clean interior of tanks with high pressure water washer . After tanks are clean, remove contaminated water from tanks and place in sludge feed tanks for processing.

*e) Send qualified personnel into tank to inspect the damaged area of tank where the leak occurred. Document the work involved to repair the tank and also inspect the integrity of the rest of the tank for any repair work needed.

*f) After determining work procedure, do all necessary repair work to secure integrity of the tank. Before doing any burning or welding, check the tank to ensure there is not an explosive atmosphere inside. Properly ventilate the tanks and keep fire extinguishers within reach.

g) After work is completed, test tank by filling with clean water. Document repair work and test results and have supervising officer sign it to verify completion and operability.

D. **HAZARDOUS WASTE SPILLS AND LEAKAGE**

II. TANK LEAKAGE (Cont.)

2. Leaks in liquid storage tanks 17 through 20 and 22 through 27.

a) Immediately stop all tank loading operations.

b) Empty contents of tank into a tanker truck or adjacent storage tank.

c) Pump accumulated waste from secondary containment area into tanker truck or an adjacent tank, preferably the same tank used in 2(b).

d) Thoroughly clean interior of tanks with on-site water blast unit. Remove contaminated water from tank. Place water in a tanker truck and make arrangements for disposal of materials from 9b), (c) and (d) at a properly licensed hazardous waste management facility.

* e) Send qualified personnel into tank to inspect the damaged area of tank where the leak occurred. Document the work involved to repair the tank and also inspect the integrity of the rest of the tank for any repair work needed.

* f) After determining work procedure, do all necessary repair work to secure integrity of the tank. Before doing any burning or welding, check the tank to ensure there is not an explosive atmosphere inside. Properly ventilate the tanks and keep fire extinguishers within reach.

g) After work is completed, test tank by filling with clean water. Document repair work and test results and have supervising officer sign it to verify completion and operability.

D. **HAZARDOUS WASTE SPILLS AND LEAKAGE**

II. TANK LEAKAGE (Cont.)

3) Leaks that fall into secondary containment tanks 7 through 12

a) Immediately stop all tank loading operations.

b) Empty contents of tank by processing and pumping to an alternate tank that is capable of storing the same type of wastes.

c) Pump accumulated waste from secondary containment system.

*d) Thoroughly clean interior of tanks with water blast unit. After tanks are clean, remove contaminated water from tanks and place in a sludge tank for processing.

*e) After determining work procedure, do all necessary repair work to secure integrity of the tank. Before doing any burning or welding, check the tank to ensure there is not an explosive atmosphere inside.

f) After work is completed, test tank by filling with water. Document repair work and test results and have supervising officer sign it to verify completion and operability.

4) Leaks that fall outside a diked area but within facility containment structure, tanks 1 through 6, 14 and 15.

a) Immediately stop all tank loading operations.

b) Empty contents of tank by processing and/or pumping to an alternate tank that is capable of storing the same type of wastes.

D. **HAZARDOUS WASTE SPILLS AND LEAKAGE**

II. TANK LEAKAGE

4) *c) Thoroughly clean interior of tanks with water blast unit. After tanks are clean, remove contaminated water from tanks and place in a sluge tank for processing.

*d) After determining work procedure, do all necessary repair work to secure integrity of the tank. Before doing any burning or welding, check the tank to ensure there is not an explosive atmosphere inside.

e) After work is completed, test tank by filling with water. Document repair work and test results and have supervising officer sign it to verify completion and operability.

5) Leakage from pipe runs, joints valves and/or pumps:

a) Stop all pumping or loading operations.

b) Empty pipe runs allowing waste to flow or be pumped back into the original tank or tank farm secondary containment.

c) Pump waste from secondary containment system.

d) Thoroughly clean piping, valves, joints or pumps. Collect contaminated rinsewaters and make arrangements for disposal at a properly licensed hazardous waste management facility.

e) After determining work procedure, do all necessary repair work to secure integrity of the pipe, joints, valves or pumps.

D. **HAZARDOUS WASTE SPILLS AND LEAKAGE**

II. TANK LEAKAGE (Continued)

5) f) After work is completed, test the pipe, joint, valve or pump under pressure with clean water. Document repair work and test results and have supervising officer sign it to verify completion and operability.

* Rules 3301 and 3302 of the Michigan Department of Public Health and Section 1910.94 (d) (11) of 29 CFT for confined Space Entry must be enforced when entering tanks.

D. HAZARDOUS WASTE SPILLS AND LEAKAGE

III. CONTAINER STORAGE AREA SPILLS

All containers are stored in the container storage areas described in Tab VIII of this application. The areas are designed for the secure secondary containment of any spilled waste.

A daily inspection is performed to insure the integrity of both the container storage area and any containers in storage. Any spills or leaks detected during the inspection are immediately cleaned-up. Further any spills or leaks detected during the normal daily operations are also immediately cleaned-up.

Due to the continuous monitoring of the area, rapid response time to spills or leaks, complete secondary containment in the area and the minimal potential impact on human health or the environment a spill or leak from a container in the container storage area is not considered grounds to implement the contingency plan.

Larger spills impacting the container storage area should be managed as described below in (D) Other Spills.

IV. OTHER SPILLS

In the event of a spill or release, not specifically addressed above, which could threaten human health or the environment the following steps should be taken:

1. Contact the Emergency coordinator for instructions.

D. **HAZARDOUS WASTE SPILLS AND LEAKAGE**

IV. OTHER SPILLS (Cont.)

2. The Emergency Coordinator shall give directions to:

a) Isolate the area of the spill to prevent contact with any personnel.

b) If necessary, ascertain the characteristics of the spilled waste for special handling requirements. This precaution should not be necessary since all wastes are expected to be chemically compatible, however, the information may be obtained from the waste log or if they are on duty, the Technical Director or Laboratory Manager.

c) Vacuum any available spilled waste with the vacuum truck. any remaining residue should be contained with absorbents and shoveled into containers in preparation for disposal.

d) If the spill occurred in a paved area the pavement should be cleaned with water and detergent solution under high pressure and then rinsed twice with clean water. Being sure to collect all spent cleaning and rinsing solutions with the vacuum truck.

e) All waste management areas including all roadways and receiving areas are paved, none-the-less, in the event the spill occurs in an unpaved area, all visible contamination should be removed. At least six inches of "clean" soils surrounding the contaminated area should also be removed. Samples should then be taken for chemical analysis to confirm the absence of any contaminants from the spilled waste.

D. **HAZARDOUS WASTE SPILLS AND LEAKAGE**

IV. OTHER SPILLS (Cont.)

2. f) All residues from the clean-up of a hazardous waste spill should be classified as a hazardous waste and disposed of at a properly licensed hazardous waste management facility.

3. The Emergency coordinator shall assist in the preparation of the appropriate reports described below.

V. POST EMERGENCY REPORT

Within 15 days of any situation requiring implementation of the contingency plan the emergency coordinator shall prepare a report to be submitted to the Director of Health and Safety, Michigan Disposal President, the Regional Director of U.S. EPA and the director of Michigan's DNR. At a minimum the report shall detail the following:

1. Name address and phone number of the reporter. Name address and phone number of all emergency response team leaders used to correct the emergency.

2. A description of what caused the plan to be evoked.

3. A description of how the accident escalated to an emergency.

4. A description of emergency equipment used.

5. A description of corrective action taken to resolve the emergency.

6. A description of how all response equipment was cleaned, refitted or replaced prior to start-up of the facility operations.

7. Corrections required to prevent a similar occurrence.

E. AUTHORIZATION TO COMMIT MICHIGAN DISPOSAL'S RESOURCES

September 07, 1989

Re: Michigan disposal, Inc.

To whom it may concern:

This letter is provided as a generic authorization to any contractor or supplier contacted for emergency services in the event the contingency plan is evoked.

In accordance with 40 CFR 264.55, this letter shall serve as corporate authorization to those persons listed as emergency coordinators to commit the resources needed to carry out the contingency plan for the facility referenced above.

Sincerely,

MICHIGAN DISPOSAL, INC.

David M. Lusk
Vice President

EMERGENCY AND DECONTAMINATION EQUIPMENT

DESCRIPTION	NO.	LOCATION (See Pg A-5)
1. Fire Extinguisher (C02) Used only for small localized fires.	9	Pug-Mill Building
	2	East Maintenance Bldg.
	3	West Maintenance Bldg.
	1	Safety Office
	1	Employee Building
	2	Manifest Office
	1	Guard Office
2. Self-Contained Breathing Apparatus With two extra 30 min. air tanks	3	Safety Office
3. Emergency Hip Pacs Used for egress only with 5 min. air tanks	4	Safety Office
4. Rescue Equipment		
Stokes Basket	1	Safety Office
Miller Wincher	1	Safety Office
Tripod	1	Safety Office
Harnesses	2	Safety Office
Nylon Straps	2	Safety Office
Oxygen Units	1	Safety Office
	1	Laboratory
5. 3,000 Gallon Water Truck with 1 1/2" & 3" hi-pressure and 150' of fire hose. Used for small fires.	1	West Maintenance Bldg.
6. Water Pumps (Removing waste waters sludge for repairs)		
6" elec. 1200 GPM	2	East Maintenance Bldg.
4" elec. 450 GPM	2	East Maintenance Bldg.
3" elec. 300 GPM	11	East Maintenance Bldg.
3" gas 300 GPM	3	East Maintenance Bldg.
7. Earth Moving Equipment Used for containment, isolation, clean-up, and smothering fires.		
Cat D-8 Dozer	3	Equipment Parking Area
Cat D-7 Dozer	2	Equipment Parking Area

F. **EMERGENCY AND DECONTAMINATION EQUIPMENT** (Cont.)

7. Earth Moving Equipment (Cont.)

Cat 627 Earth Mover	9	Equipment Parking Area
Cat 988 Wheel Loader	1	Equipment Parking Area
Cat 980 Wheel Loader	1	Equipment Parking Area
Cat 966 Wheel Loader	1	Equipment Parking Area
Cat Steel Wheel Compactor	4	Equipment Parking Area
NW 95-70	1	Equipment Parking Area

8. Emergency Power Generators

Cat 185 KW 220/440 3 phase	1	East Maintenance Bldg.
Cat 45 KW 220/440 3 phase	1	East Maintenance Bldg.
Gas KW 110/220	1	East Maintenance Bldg.

9. Communications

Telephones	5	Manifest Office
	7	Reception Office
	3	Maintenance Garage
	2	Main Gates
Radios		
Base Units	1	Main Office
	2	Maintenance Garage
	2	Main Gates
	1	Manifest Office
	1	Reception Office
	1	Processing Plant
	1	Front End Loader
	1	D-5
	1	D-7
Hand Held	20	Various Vehicles

10. Personal Protective Equipment

Respirators:	3	Willson 1600 (full face)
	4	Glenaire 9500 (half face)
	24	Organic vapor/Acid Gas Cartridge with Attached HEPA Filters
	12	Ammonia and Methyl Amine Cartridges
	36	Disposable Dust Filters
Coveralls:	36	Polycoated tyvek Suites
Goggles:	12	Chemical Splash, Fog Free
Gloves:	48	Rubber with Grip
	48	Cloth

11. Absorbants: 10 40lb. bags Oil Dry
East Maintenance Building

G. COORDINATION OF EMERGENCY RESPONSE TEAMS

As required under RCRA, representatives from MDI & WDI including management, supervisory and emergency response coordinators have met with the primary, local emergency response units which included representatives from the Wayne County Sheriff's Department, the Van Buren Twp. Fire and Police Departments and the Willow Run Airport Fire Department, to discuss elements of the contingency plan(s) and solicit constructive commentary on the plan(s). (See attached list of plan recipients.)

During the course of the meetings the network of previously established co-ordination between the emergency units has become apparent to MDI & WDI personnel. As a result, the Van Buren Fire Department was deemed the primary emergency contact for situations related to this sites operations. The Van Buren Fire Department will make other emergency team contacts at their discretion, usually asking for the assistance of the Van Buren Police Department/Michigan State Police. This of course does not preclude MDI & WDI personnel from exercising the option of contacting additional emergency units depending on the circumstances.

Considering the nature of the wastes handled at the site, extreme emergencies threatening the neighboring communities appears highly unlikely. In the event an off site evacuation were deemed necessary it would be coordinated by the Van Buren Police Department through their existing evacuation protocol. On-site evacuation routes are numerous as the general layout of the facility is characterized by large open spaces and relatively small active waste area, with little encumbrance to safe areas either by vehicle or on foot.

General instruction to all personnel with respect to fire situations was to assume the presence of potentially toxic fumes/smoke unless otherwise notified. The fire departments indicated that additional emergency equipment such as air-pacs, would be made available to facility personnel in the event the use of earth moving equipment was more appropriate in ending the fire.

The emergency coordinator will confer with the technical staff at the hazardous waste reception trailer to determine the nature of wastes involved in a fire (on page G-10, listing the responsibilities of the emergency coordinator). The emergency coordinator will determine the best method of

G. **COORDINATION OF EMERGENCY RESPONSE TEAMS** (Cont.)

extinguishing the fire based on the nature of wastes involved (considering potential toxicity and corrosiveness of fumes), the extent of involvement, and heat being generated. Options available for extinguishing a fire include water (low pressure from on-site tankers, high pressure from township fire trucks), foam (from township or Willow Run Airport Fire Department) and soil cover (moved to the site by earthmovers and spread by earthmovers and/or bulldozers).

If the involvement of the fire is light and low pressure water or earth cover are appropriate to quench or smother the fire the emergency coordinator may direct that method be used. If the township fire department has been called in (emergency coordinators responsibility.) The officer in charge of the responding unit will be in charge of all emergency actions associated with the fire. The fire department officer will have the authority to select the appropriate method of fire control. The emergency coordinator will carry out any instructions given by the fire department officer in charge.

The following letter indicate arrangements made with primary emergency response teams.

Michigan Disposal, Inc.

ENVIRONMENTAL PROTECTION FACILITY
49350 N. I-94 Service Drive
Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

November 28, 1989

Mr. Jim Reed
Assistant Fire Chief
Van Buren Township
46425 Tyler Road
Belleville, Michigan 48111

Dear Mr. Reed:

Due to circumstances beyond our control, the scheduled meetings to review our Site Contingency Plan were not held as planned in September and October 1989.

You, or your designee, are invited to attend a meeting on December 12, 1989, at 10:00 A.M., at our Rawsonville site to review and discuss our Site Contingency Plan. This meeting is to review the Site Contingency Plan and will not be as specific to fire hazards as the general site review planned on December 17, 1989, at 10:00 A.M., with the entire fire department personnel.

As you are aware, because of the nature of wastes handled at our facility, we are required by state and federal regulations to make arrangements with local authorities and services for emergency response services.

This single meeting will cover the Contingency Plans for both Michigan and Wayne Disposal.

If you have any questions, please contact me at 485-6464, or Mike Spomer, Site Manager, at 699-7120

Very truly yours,

Dave Lusk
Vice President

DL/bf

CC: Contingency Plan

CORPORATE OFFICES
1349 WHITTAKER ROAD
YPSILANTI, MICHIGAN 48197
(313) 485-6464 • FAX: (313) 485-6450

Printed on Recycled Paper

Michigan Disposal, Inc.

ENVIRONMENTAL PROTECTION FACILITY
49350 N. I-94 Service Drive
Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

November 28, 1989

First Lieutenant Garry Kregelka
Post Commander
Ypsilanti State Police Post
1501 Whittaker Road
Ypsilanti, Michigan 48197

Dear Lieutenant Kregelka:

Michigan Disposal, Inc. operates a hazardous waste management facility at 49350 North I-94 Service Drive, Belleville, Michigan.

Because of the nature of materials handled at our facility we are required by state and federal regulations to make arrangements with local authorities to respond to emergencies at our location.

It is our understanding that the state's Hazardous Materials Response Plan continues to provide a basis for response to emergency situations to facilities such as ours. If there would be a need to implement the plan to respond to an emergency, we would contact the Ypsilanti post.

The Van Buren Township (Wayne County) Police Department is designated as the primary emergency response authority for our facility. Their command officer in an emergency situation could request your assistance. A meeting to review the Site Contingency Plan for Wayne and Michigan Disposal is planned for 10:00 A.M. on December 12, 1989, at our site. You, or a designee, are invited to attend this meeting.

Very truly yours,

Dave Lusk
Vice President

DL/bf

CC: Contingency Plan

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Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

November 28, 1989

Mr. Steve Champagne
Assistant Fire Chief
Van Buren Township
46425 Tyler Road
Belleville, Michigan 48111

Dear Mr. Champagne:

Due to circumstances beyond our control, the scheduled meetings to review our Site Contingency Plan were not held as planned in September and October 1989.

You, or your designee, are invited to attend a meeting on December 12, 1989, at 10:00 A.M., at our Rawsonville site to review and discuss our Site Contingency Plan. This meeting is to review the Site Contingency Plan and will not be as specific to fire hazards as the general site review planned on December 17, 1989, at 10:00 A.M., with the entire fire department personnel.

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If you have any questions, please contact me at 485-6464, or Mike Spomer, Site Manager, at 699-7120

Very truly yours,

Dave Lusk
Vice President

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Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

November 28, 1989

Mr. Joseph R. Davies
Chief of Police
Van Buren Police Department
46425 Tyler Road
Belleville, Michigan 48111

Dear Mr. Davies:

Due to circumstances beyond our control, the scheduled meetings to review our Site Contingency Plan were not held as planned in September and October 1989.

You, or your designee, are invited to attend a meeting on December 12, 1989, at 10:00 A.M., at our Rawsonville site to review and discuss our Site Contingency Plan.

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If you have any questions, please contact me at 485-6464, or Mike Spomer, Site Manager, at 699-7120

Very truly yours,

Dave Lusk
Vice President

DL/bf

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Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

November 28, 1989

Mr. David Jacokes
Supervisor
Van Buren Township
46425 Tyler Road
Belleville, Michigan 48111

Dear Mr. Jacokes:

Due to circumstances beyond our control, the scheduled meetings to review our Site Contingency Plan were not held as planned in September and October 1989.

You, or your designee, are invited to attend a meeting on December 12, 1989, at 10:00 A.M., at our Rawsonville site to review and discuss our Site Contingency Plan.

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If you have any questions, please contact me at 485-6464, or Mike Spomer, Site Manager, at 699-7120

Very truly yours,

Dave Lusk
Vice President

DL/bf

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Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

November 28, 1989

Mr. Dale Berry
Executive Director
Huron Valley Ambulance, Inc.
2200 South Industrial Highway
Ann Arbor, MI 48104

Dear Mr. Berry:

Due to circumstances beyond our control, the scheduled meetings to review our Site Contingency Plan were not held as planned in September and October 1989.

You, or your designee, are invited to attend a meeting on December 12, 1989, at 10:00 A.M., at our Rawsonville site to review and discuss our Site Contingency Plan.

As you are aware, because of the nature of wastes handled at our facility, we are required by state and federal regulations to make arrangements with local authorities and services for emergency response services.

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If you have any questions, please contact me at 485-6464, or Mike Spomer, Site Manager, at 699-7120

Very truly yours,

Dave Lusk
Vice President

DL/bf

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Belleville, Michigan 48111
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November 28, 1989

Ms. Marianne Tait, RN, BSN
Occupational Health Services Mgr.
Beyer Memorial Hospital
135 South Prospect Street
Ypsilanti, Michigan 48198

Dear Ms. Tait:

Due to circumstances beyond our control, the scheduled meetings to review our Site Contingency Plan were not held as planned in September and October 1989.

You, or your designee, are invited to attend a meeting on December 12, 1989, at 10:00 A.M., at our Rawsonville site to review and discuss our Site Contingency Plan.

As you are aware, because of the nature of wastes handled at our facility, we are required by state and federal regulations to make arrangements with local authorities and services for emergency response services.

This single meeting will cover the Contingency Plans for both Michigan and Wayne Disposal.

If you have any questions, please contact me at 485-6464, or Mike Spomer, Site Manager, at 699-7120

Very truly yours,

Dave Lusk
Vice President

DL/bf

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Belleville, Michigan 48111
(313) 697-7830 • FAX: (313) 699-3499

November 28, 1989

Mr. Delbert Bowman
Safety Director
Willow Run Safety Department
Willow Run Airport
Ypsilanti, Michigan 48197

Dear Mr. Bowman:

Due to circumstances beyond our control, the scheduled meetings to review our Site Contingency Plan were not held as planned in September and October 1989.

You, or your designee, are invited to attend a meeting on December 12, 1989, at 10:00 A.M., at our Rawsonville site to review and discuss our Site Contingency Plan.

As you are aware, because of the nature of wastes handled at our facility, we are required by state and federal regulations to make arrangements with local authorities and services for emergency response services.

This single meeting will cover the Contingency Plans for both Michigan and Wayne Disposal.

If you have any questions, please contact me at 485-6464, or Mike Spomer, Site Manager, at 699-7120

Very truly yours,

Dave Lusk
Vice President

DL/bf

CC: Contingency Plan

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MICHIGAN DISPOSAL, INC.

CONTINGENCY PLAN MAILING LIST

September 7, 1989

Walter Tomyn	Michigan Disposal, President
Dave Lusk	Michigan Disposal, Vice-President
Donald Vilnius	Wayne Disposal, President
Jerry Fore	Wayne Disposal, Vice-President
Michael Spomer	Wayne Disposal, Facility Manager
Del Bowman	Willow Run Fire Department
R. Lynne Hamilton . . .	Van Buren Twp. Supervisor
Delphine Dudick	Van Buren Township
Joe Davies	Van Buren Police & Fire Dept.
Helen Foster	Van Buren Treasurer
Mark Sparks	Wayne County Sheriff Department
Marianne Tait	Beyer Memorial Hospital
Dale Berry	Huron Valley Ambulance

ATTACHMENT 5

Closure Plan

MICHIGAN DISPOSAL, INC. - MID000724831

CLOSURE PLAN

FACILITY CONDITIONS

A) **GENERAL INFORMATION:**

Michigan Disposal, Inc. processing facility will be located in the southwest corner of its 8 acres of licensed property, in an area 150' by 350'. This area will contain the following:

1) 2 - 40,000 gallon sludge receiving tanks, tank numbers 11 and 12

2) 2 - 20,000 gallon sludge storage tanks, tank numbers 16 and 17

3) 4 - 20,000 gallon liquid waste storage tanks, tank numbers 18, 19, 25 and 27

4) 6 - 100 cubic yard dust storage tanks

   a) 3 - 100 cubic yard silos for hazardous waste, tank numbers 1, 2, 3

   b) 3 - 100 cubic yard silos for non-hazardous waste or product, tanks numbers 4, 5, 6

5) 2 - pugmills rated at 7,986 gallons of liquid waste per hour. Tank numbers 14 and 15

6) 6 - screw conveyor systems

   a) 2 - dust to pugmill conveyors
   b) 2 - liquid to pugmill conveyors
   c) 2 - mixture to storage building conveyors

7) 2 - solid waste holding buildings each with a 68' x 68' loading area and each containing two solid waste holding tanks.

A) **GENERAL INFORMATION:** (Cont.)

8) 2 - solid waste storage tanks

a) 1 - 565 cubic yards, maximum volume, tank number 7

b) 1 - 470 cubic yards, maximum volume, tank number 8

9) 2 - solid waste storage tanks

a) 1 -565 cubic yards, maximum volume, tank number 9

b) 1 -470 cubic yards, maximum volume, tank number 10

10) 6 - 15,000 gallon liquid waste storage tanks; tank numbers 20, 21, 22, 23, 24 and 26.

11) 2 - Container Storage Areas

a) East Container Staging Area
b) North Container Storage Area

Maximum combined container inventory; 1,500 containers or 82,500 gallons.

B. **MAXIMUM INVENTORY**

1) The maximum hazardous waste inventory will consist of:

a) Hazardous waste to be processed/disposed:

i) 2 x 40,000 gallons in sludge feed tanks

ii) 2 x 20,000 gallons in sludge storage tanks

iii) 3 x 100 cubic yards hazardous waste dust in dust storage tanks.

iv) 1,500 containers; - 82,500 gallons

v) 4 tanks, 2,070 cubic yards total.

B. **MAXIMUM INVENTORY** (Cont.)

b) Hazardous waste in storage:

i) 4 x 20,000 gallons in storage tanks
ii) 6 x 15,000 gallons

c) Totals:

i)	Waste to be treated	202,500 gallons
ii)	Hazardous waste dust	300 cu. yds
iii)	Solid waste holding tanks	2,070 cu. yds
iv)	Liquid waste in storage	120,000 gallons

2) The maximum non-hazardous waste or admix inventory will consist of:

a) Non-hazardous materials in storage

i) 3 x 100 cubic yards, lime kiln flue dust, cement kiln flue dust, lime or cement.

C. **INVENTORY OF AUXILIARY EQUIPMENT**

See Contingency Plan; Equipment List

D. **CLOSURE PROCEDURE AND PLAN**

The facility will be closed under the supervision of an independent registered professional engineer by the following steps:

1) Removal, Treatment and Disposal of Waste Inventory

Waste inventory requiring solidification will be processed through plant equipment and disposed of at a properly licensed facility. If no stabilization agents are on hand, 850 to 1000 tons will have to be purchased to treat the 202,500 gallons of waste. This will result in the generation of at most 1519 cubic yards and 1500 empty crushed drums requiring disposal.

D. **CLOSURE PROCEDURE AND PLAN**

1) Removal, Treatment and Disposal of Waste Inventory (Continued)

If the plant equipment is unavailable or non-functioning, solidification may be performed in the hazardous waste storage tanks using a backhoe. with an experienced operator this method will yield a succesfully stabilized product, suitable for land disposal.

Waste inventory that can not be treated on-site will be transported by licensed waste haulers to properly licensed treatment and/or disposal facilities.

2) Dismantling the facility

The plant will be disassembled by a qualified contractor to be selected by MDI management.

During disassembly of the processing facility all equipment leaving the site will be decontaminated by steam cleaning or pressure washing. Provisions will be made to contain and collect wash water generated during decontamination, as described in (4) below. Approximately 2,000 gallons of wash water will be generated.

Each tank, screw conveyor, pugmill, pump, liquid feed pipe will be disconnected and moved to the adjacent drum storage area, North or East may be used, for steam cleaning and/or pressure washing, as described in (4) below.

3) Cleaning of solid waste holding tanks and sludge receiving tanks; Tank Numbers 7, 8, 9, 10, 11, 12.

The sides and bottom of the waste holding tanks referenced above will be hydroblasted to remove all solid and sludge deposits. Cleaning time for the six tanks for a crew of three is estimated to be six hours. The cleaning equipment will generate approximately 12 gallons of washwater per minute resulting in 17,280 gallons of accumulated washwater.

Following initial hydroblasting, the referenced tanks will be steam cleaned and rinsed as described in (4) below.

D. **CLOSURE PROCEDURE AND PLAN (Continued)**

4) Steam Cleaning of Equipment:

A high pressure steam and detergent cleaning apparatus will be used to clean the plant parts and equipment. After the initial cleaning, all equipment will be rinsed twice with high pressure steam. All steam cleaning will be performed on the drum storage pad, or in the case of tanks 7, 8, 9, 10, 11 and 12, within the tanks themselves. The wash water will be collected in the drum storage area sumps.

Items to be cleaned include but are not limited to the following:

- 12 Waste Storage Tanks
- 3 Hazardous Waste Storage Silos
- 2 Sludge Feed Tanks
- 4 Solid Waste Holding Tanks
- 2 Pugmills
- 6 Screw Conveyors
- 39 Pieces of Piping

Cleaning time for a crew of three is estimated to be 3 hours per rinse per waste storage tank, waste storage silo or sludge feed tank, 30 minutes per rinse per pugmill or conveyor, and 10 minutes per rinse per pipe. Approximately 3 gallons of waste wash water will be generated per minute, accumulating 35,370 gallons of wash water. Up to 60 working hours will be required from the three man crew.

After decontamination metal components may be sold for scrap or reused for their original purpose.

5) Hydroblasting Concrete Surfaces:

The concrete in and around the plant will be decontaminated by initial hydroblasting with detergent and water, followed by two clean water, high pressure rinses. All secondary containment areas, drum storage areas, sumps, loading areas, ramps, and roadways will be decontaminated. approximately 50,000 square feet of concrete will be hydroblasted by a three man crew over a course of 24 hours. The hydroblast equipment will generate approximately 12 gallons of water per minute, accumulating 17,280 gallons of wash water.

D. CLOSURE PROCEDURE AND PLAN

6) Disposal of Wash Water:

The decontamination process will cause no escape of hazardous waste or constituents. All residues are immediately collected by draining to self contained sumps in the North and East Container Storage Areas, where they can be removed or by remaining in the tank being cleaned. Approximately 69,930 gallons of waste wash water will be generated.

Collected wastewaters will be considered a hazardous waste with a primary waste code of F006 (the primary waste type received by the facility) and secondary waste codes equal to the shorter list of, all waste types accepted by the facility through the date of closure or all waste types listed on the Part A application submitted here as Tab I of the facilities application.

In either case, the washwaters will be disposed of by transferring to an on-site wastewater treatment plant jointly operated by Michigan Disposal, Inc. and Wayne Disposal, Inc. under industrial wastewater discharge permit Number D-11202 with Wayne County Department of Public Works. The facility is designed for the pre-treatment of hazardous and non-hazardous landfill leachate. A two stage process involving metals precipitation and biological treatment is followed by granulated carbon polishing if necessary. The plant is designed for extremely high metal and organic loadings and should be very capable of treating washwaters from closure activities.

Alternatively, the washwaters may be transported by a licensed hazardous waste hauling company to a licensed hazardous waste water treatment facility for pre-treatment prior to discharge to a POTW, deep-well injection or stabilization. The options are presented in order of anticipated relative cost and preference. Any properly licensed hazardous waste disposal facility should be considered for receipt of the washwaters.

D. CLOSURE PROCEDURE AND PLAN

7) Sampling and Testing of Soils:

a) Sampling - A soil sampling and testing program will be undertaken. The purpose of this program will be to determine what soils, if any, around the plant are contaminated and require disposal.

After plant decontamination, soils will be sampled at four locations indicated on TABII-M, Page 13, and any open cracks or fissures in the concrete throughout the plant. Initial soil sampling will be conducted by taking grab samples from 6" - 12" below the asphalt surface. If analysis verifies that no contamination exists then no further sampling or borings will be required. In the case of contaminated soil, the test borings will be continued.

The sampling frequency used to verify complete excavation of contaminated soils will incorporate continuous sampling of the underlying soils for the first five feet in each boring and at 2.5-foot intervals thereafter to the full extent of the boring. The depth and elevation of the soils samples will be determined from these test borings. As the soil samples are collected, each soil sample will be split into two portions. Each of these portions will be sealed in jar containers, packed in ice and transported to an analytical laboratory for chemical analyses.

All test borings will be drilled by an experienced test boring driller under the full-time supervision of an independent registered professional engineer (IRPE) or his/her representative. Careful cleaning of all soil sampling tools will be undertaken before the acquisition of samples for analysis to prevent cross-contamination. This cleaning will include thorough scrubbing of the sampling tool with a mild detergent followed by a distilled water rinse. Upon completion, all test borings will be filled with bentonite or non-shrinking cement grout.

D. **CLOSURE PROCEDURE AND PLAN**

7. Sampling and Testing of Soils (Cont.)

b) Chemical Testing and Evaluation

Chemical analysis of the soil samples discussed above will consist of analysis for all parameters shown on Table 1 below. This list has been prepared by the Technical director of Michigan Disposal, Inc. on the basis of known principal constituents in wastes accepted by the facility. The parameters listed in Table 1 were chosen as representative of the various principal waste constituents and include items which are soluble and easily conveyed or diffused through water as well as being volatile. The constituents were chosen as being representative of the worst case indicators (due to their mobility and prevalence in wastes accepted at this site) of failure of the facilities secondary containment systems.

TABLE 1

ORRGANIC PARAMETERS	DETECTION LIMIT	INORGANIC PARAMETERS	DETECTION LIMIT
Bultanol	1 ppm	Arsenic	.01 ppm
Amyl Alcohol	1 ppm	Barium	.01 ppm
Xylene	.01 ppm	Cadmium	.01 ppm
Toluene	.01 ppm	Chromium	.01 ppm
Perchloroethylene or Tetrachloroethylene	.01 ppm	Lead	.01 ppm
Trichloroethylene	.01 ppm	Mercury	.01 ppm
		Selenium	.01 ppm
		Silver	.01 ppm

D. **CLOSURE PROCEDURE AND PLAN** (Cont.)

Analysis of these parameters will be performed according to USEPA SW-846, Methods 7000, 8010, 8015 and 8020. Proposed detection limits, are listed. One portion from each of the sample pairs to be tested will be analyzed. All monitoring parameters which do not exceed the detection limits from a particular specimen will be removed from further consideration at that location. Those found to be above the detection limit will be compared to the four background results using a Student's t-test at the 5.0 percent significance level (one tailed test). Background data below the detection limit will be assumed at the detection limit for this analysis. This t-test is presented in Basic Statistical Methods for Engineers and Scientists by A.M. Neville and J.B. Kennedy (International Textbook company, 1964).

If any parameter(s) fail this test on the first specimen of any sample i.e., a statistically significant difference is observed, then the sample will be considered contaminated and deeper soil samples will be tested. The deeper samples will be tested in a similar manner but only for the parameter(s) which were found to exist in statistically significant concentrations in the sample above.

If a sample is deemed to be contaminated, a series of 4 samples will be taken North, East, South and West of the contaminated sample in a 20' radius. Sampling will be conducted as described above in (7). If the additional samples are deemed to be clean excavation of the contaminated area will include the 20 foot radius only. If one or more additional samples are also contaminated, another 20 foot radius will be specified and the procedure repeated.

Four background samples will be obtained from the closest undisturbed soil of similar type. Due to the surrounding hazardous waste landfill activities, background samples will be taken south of the facility in or around the sites reception area or south of the facility entrance along the service drive.

9) <u>Disposal of Contaminated Concrete and Soils:</u>

Any contaminated concrete and soils will be transported from the site and treated and/or disposed in properly licensed hazardous waste disposal facilities.

E. SCHEDULE OF FINAL CLOSURE

Michigan Disposal, Inc. (MDI) does not anticipate closure of its processing facility until April 1, 2050 or later. However in the event of an unplanned closure, the following schedule should be followed.

1)	Removal, treatment and disposal of waste inventory.	10 Days
2)	Dismantling the facility and segregation of the disassembled plant parts which are intended for salvage.	5 Days
3)	Hydroblast solid waste holding tanks	1 Day
4)	Steam cleaning the salvaged parts in the staging area.	7 Days
5)	Hydroblasting concrete surfaces.	3 Days
6)	Disposal of waste wash water.	7 Days
7)	Sampling and testing of concrete and underlying soils.	10 Days
8)	Disposal of contaminated concrete and soils.	10 Days
	TOTAL:	53 Days

F. DISPOSAL LOCATIONS:

Several disposal facilities are available for the various types of hazardous wastes that will be created during closure. The following is a list of the closest facilities and the type of waste they may accept from closure activities.

TYPE	FACILITY
Solid Wastes	Wayne Disposal, Inc.
Wash Waters, Liquids	Environmental Waste Control, Inc.
Flammable Liquids	Michigan Recovery Systems, Inc.

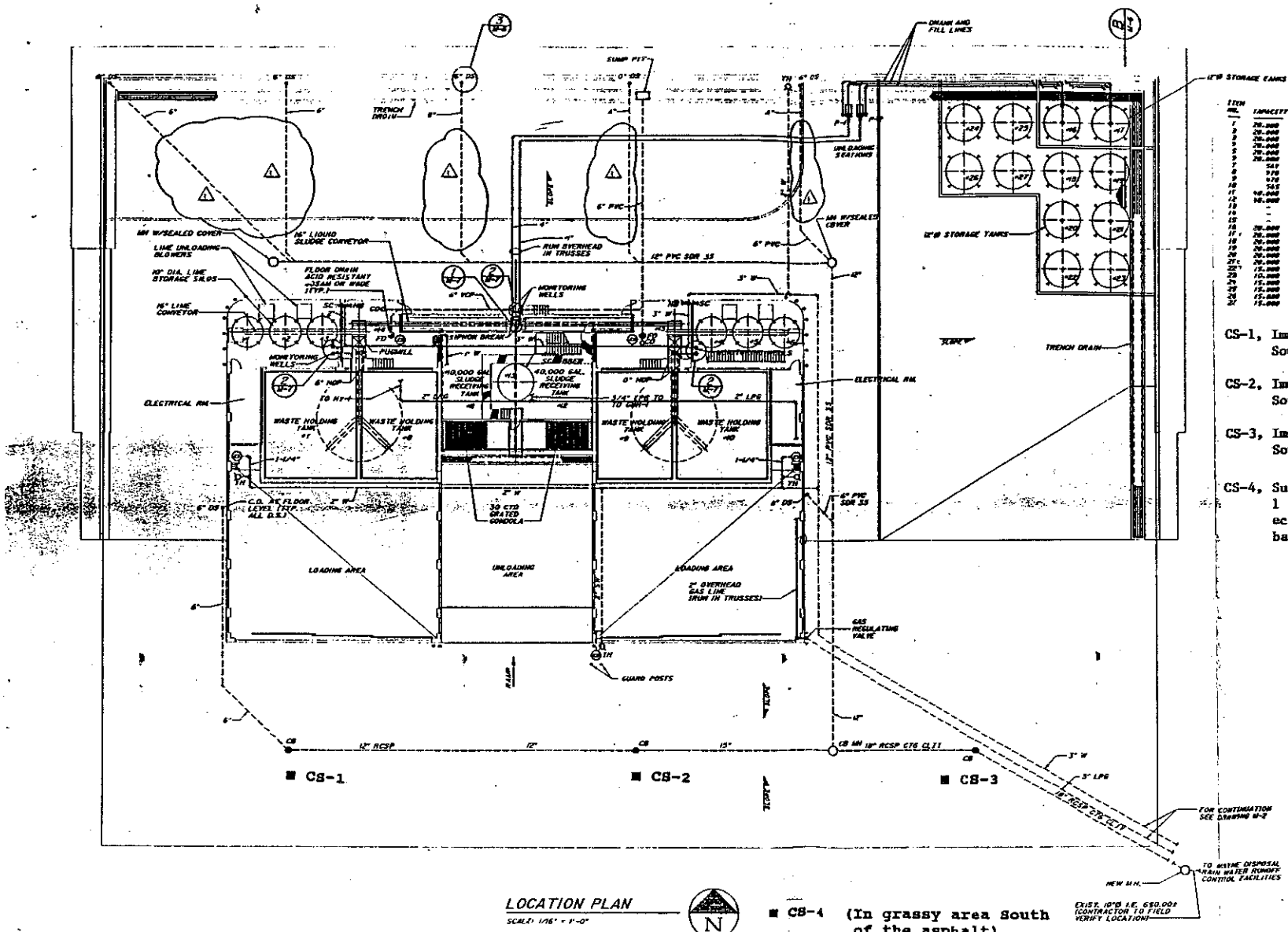
Any properly licensed facility should be considered during closure.

G. PARTIAL CLOSURE PLAN

In the event it becomes necessary to close one or more, but not all hazardous waste management units, the following steps will be required:

HAZARDOUS WASTE MANAGEMENT UNIT	CLOSURE STEPS *
Tank 1	1,2,4,6
Tank 2	1,2,4,6
Tank 3	1,2,4,6
Tank 4	1,2,4,6
Tank 5	1,2,4,6
Tank 6	1,2,4,6
Tank 7	1,2,3,4,6
Tank 8	1,2,3,4,6
Tank 9	1,2,3,4,6
Tank 10	1,2,3,4,6
Tank 11	1,2,3,4,6
Tank 12	1,2,3,4,6
Tank 13 Air Pollution Control	N/A
Tank 14	1,2,4,6
Tank 15	1,2,4,6
Tank 16	1,2,4,6
Tank 17	1,2,4,6
Tank 18	1,2,4,6
Tank 19	1,2,4,6
Tank 20	1,2,4,6
Tank 21	1,2,4,6
Tank 22	1,2,4,6
Tank 23	1,2,4,6
Tank 24	1,2,4,6
Tank 25	1,2,4,6
Tank 26	1,2,4,6
Tank 27	1,2,4,6
North Container Storage Area	1,5,6
East Container Storage Area	1,5,6

* The steps listed correspond to the descriptions under (D) - Closure Procedure and Plan found in this Closure Plan.



ITEM NO.	CAPACITY	UNIT	DESCRIPTION
1	20,000	GAL	HAZARDOUS WASTE LIME STORAGE SILO
2	20,000	GAL	HAZARDOUS WASTE LIME STORAGE SILO
3	20,000	GAL	HAZARDOUS WASTE LIME STORAGE SILO
4	20,000	GAL	NON-HAZARDOUS WASTE LIME STORAGE SILO
5	20,000	GAL	NON-HAZARDOUS WASTE LIME STORAGE SILO
6	20,000	GAL	NON-HAZARDOUS WASTE LIME STORAGE SILO
7	540	CY	HAZARDOUS WASTE HOLDING TANK
8	970	CY	HAZARDOUS WASTE HOLDING TANK
9	970	CY	NON-HAZARDOUS WASTE HOLDING TANK
10	540	CY	NON-HAZARDOUS WASTE HOLDING TANK
11	40,000	GAL	SLUDGE RECEIVING TANK
12	40,000	GAL	SLUDGE RECEIVING TANK
13	-	-	AIR POLLUTION CONTROL EQUIPMENT
14	-	-	PUGMILL MIXER
15	-	-	PUGMILL MIXER
16	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
17	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
18	20,000	GAL	FUTURE WASTE STORAGE TANK
19	20,000	GAL	FUTURE WASTE STORAGE TANK
20	20,000	GAL	FUTURE WASTE STORAGE TANK
21	20,000	GAL	FUTURE WASTE STORAGE TANK
22	15,000	GAL	FUTURE WASTE STORAGE TANK
23	15,000	GAL	FUTURE WASTE STORAGE TANK
24	15,000	GAL	FUTURE WASTE STORAGE TANK
25	15,000	GAL	FUTURE WASTE STORAGE TANK
26	15,000	GAL	FUTURE WASTE STORAGE TANK
27	15,000	GAL	FUTURE WASTE STORAGE TANK

CS-1, Immediately below asphalt, 1 foot South of the Western catch basin.

CS-2, Immediately below asphalt, 1 foot South ofthe center catch basin.

CS-3, Immediately below asphalt, 1 foot South of the East catch basin.

CS-4, Surface sample in grassy area, 1 foot South of asphalt, directly South of the covered catch basin manhole.

LOCATION PLAN

SCALE: 1/16" = 1'-0"

■ CS-4 (In grassy area South of the asphalt)

REV	DESCRIPTION	BY	DATE	CHK'D
4	ADDENDUM NO. 1	MAH	7-7-88	

ISD/McNAMEE PORTER & SEELEY ENGINEERS ARCHITECTS

DESIGNED H.L.LOPEZ

DRAWN M.J.BOW

SCALE 1/16" = 1'-0"

DATE JUNE 1988

MICHIGAN DISPOSAL INC. RELOCATION OF WASTE SOLIDIFICATION OPERATION

MECHANICAL

OVERALL PLAN

CONTRACT

SHEET M-3 OF 7

ATTACHMENT 6

Closure Cost Estimate

CLOSURE COSTS

The following assumes a worst case scenario, all tanks are full and no solidification agent is on hand. Note the presence or absence of electric arc furnace dust will have no impact on the total amount of solid waste disposed of after treating liquid inventories. In either case, the liquid volume multiplied by 1.25 determines the quantity of solid waste created, requiring disposal. Or, if no liquid is present to treat electric arc furnace dust, water may be used creating a volume of solid waste equal to 400 cubic yards, less than the total created by treating all liquid waste inventories.

1) Removal, treatment and disposal of waste inventory. Waste inventory includes 1,500 full drums and assumes purchasing of solidification agents.

   Stabilization:

   Unit Price $0.10 per gallon
   (Includes labor and materials)
   202,500 gallons @ $0.10/gallons = $20,250.00
   1,035 yard3 of stabilized waste generated

   Disposal of Stabilized Waste Inventory

   Unit Price $50.00 per cubic yard
   (Includes transportation and disposal)
   2,070 y3 (holding tanks) @ $50.00/y3 =$102,500.00
   1,266 y3 (stabilized) @ $50.00/y3 =$ 63,300.00
   100 y3 (crushed drums) @ $50.00/y3 =$ 5,000.00

2) Dismantling of the plant and segregation of the parts which are intended for salvage.

   Labor
   5 men for 40 hr. @ $30.00/hr. = $ 6,000.00

CLOSURE COSTS (Continued)

3) Steam cleaning of tanks, silos, pugmills, screw conveyors and lines by a three man crew using rented/leased equipment.

Unit Price $125.00/hour
(Includes labor and materials)

Tanks and Silos:

17 units @	3 rinse / unit	3 hours / rinse	$125 / hr	= $19,125.00

Pugmills and Conveyors:

8 units @	3 rinse / unit	0.5 hr / rinse	$125 / hr	= $ 1,500.00

Lines:

39 units @	3 rinse / unit	.166hr / rinse	$125 / hr	= $ 2,437.00

4) Hydroblasting the solid waste holding tanks and concrete surfaces by a three man crew using rented/leased equipment.

Unit Price $145.00/hour
(Includes labor and materials)

Solid Waste Tanks
4 tanks @ 4 hr/tank @ $145/hour = $ 2,320.00

Concrete Surfaces
24 hours @ $145/hour = $ 3,480.00

5) Disposal of waste washwater resultant of stream cleaning the salvaged parts and the hydroblasting of solid waste holding tanks and concrete surfaces.

Waste Wash Water
a) Hydroblasting
Solid waste tanks -- 11,520 gallons
Concrete surfaces -- 17,280 gallons

CLOSURE PLAN

5) Waste Wash Water (Continued)

b) Steam cleaning
Salvaged parts -- 33,210 gallons
Equipment -- 2,000 gallons

Unit Price $0.45 per gallon
(Includes transportation and disposal)
64,010 gallons @ $0.45/gallon = $ 28,804.50

6) Concrete and Soil Sampling and Testing.

Unit Price $600.00/sample
10 samples @ $600.00/sample = $ 6,000.00

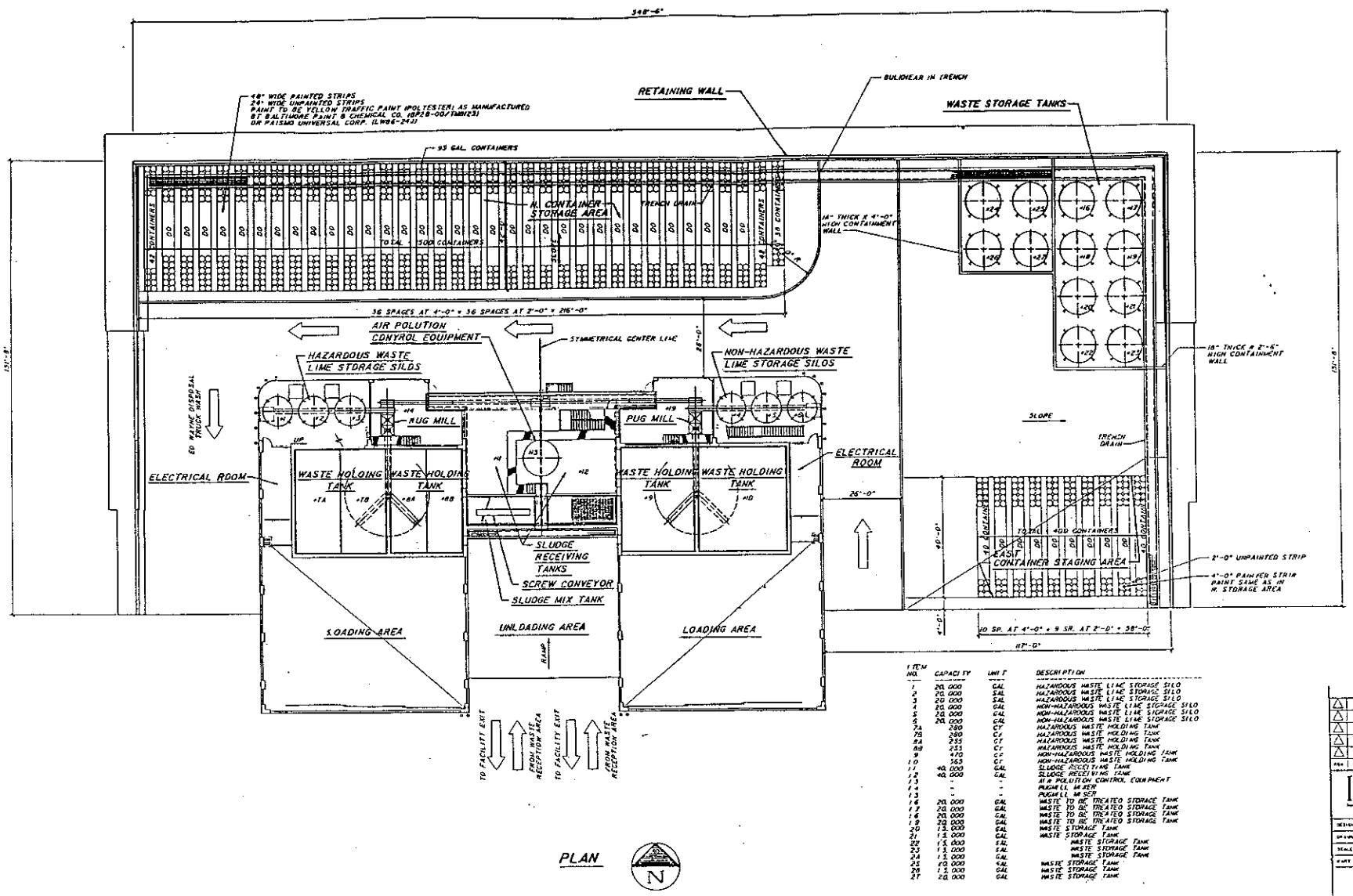
7) Engineering report preparation and closure certification.

Unit Price $ 40.00/hour
48 hours @ $ 40.00/hour = $ 1,920.00

Total: = $263,636.50

ATTACHMENT 7

Facility Drawings



PLAN

ITEM NO.	CAPACITY	UNIT	DESCRIPTION
1	20,000	GAL	HAZARDOUS WASTE LIME STORAGE SILO
2	20,000	SAL	HAZARDOUS WASTE LIME STORAGE SILO
3	20,000	SAL	HAZARDOUS WASTE LIME STORAGE SILO
4	20,000	GAL	NON-HAZARDOUS WASTE LIME STORAGE SILO
5	20,000	GAL	NON-HAZARDOUS WASTE LIME STORAGE SILO
6	20,000	GAL	NON-HAZARDOUS WASTE LIME STORAGE SILO
7A	280	CF	HAZARDOUS WASTE HOLDING TANK
7B	280	CF	HAZARDOUS WASTE HOLDING TANK
8A	255	CF	HAZARDOUS WASTE HOLDING TANK
8B	255	CF	HAZARDOUS WASTE HOLDING TANK
9	470	CF	NON-HAZARDOUS WASTE HOLDING TANK
10	565	CF	NON-HAZARDOUS WASTE HOLDING TANK
11	40,000	GAL	SLUDGE RECEIVING TANK
12	40,000	GAL	SLUDGE RECEIVING TANK
13	-	-	AIR POLUTION CONTROL EQUIPMENT
14	-	-	PUGMILL MIXER
15	-	-	PUGMILL MIXER
16	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
17	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
18	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
19	20,000	GAL	WASTE TO BE TREATED STORAGE TANK
20	15,000	GAL	WASTE STORAGE TANK
21	15,000	GAL	WASTE STORAGE TANK
22	15,000	SAL	WASTE STORAGE TANK
23	15,000	SAL	WASTE STORAGE TANK
24	15,000	GAL	WASTE STORAGE TANK
25	20,000	GAL	WASTE STORAGE TANK
26	15,000	GAL	WASTE STORAGE TANK
27	20,000	GAL	WASTE STORAGE TANK

REV	DESCRIPTION	BY	DATE	CHKD
△				
△				
△				
△				
△				

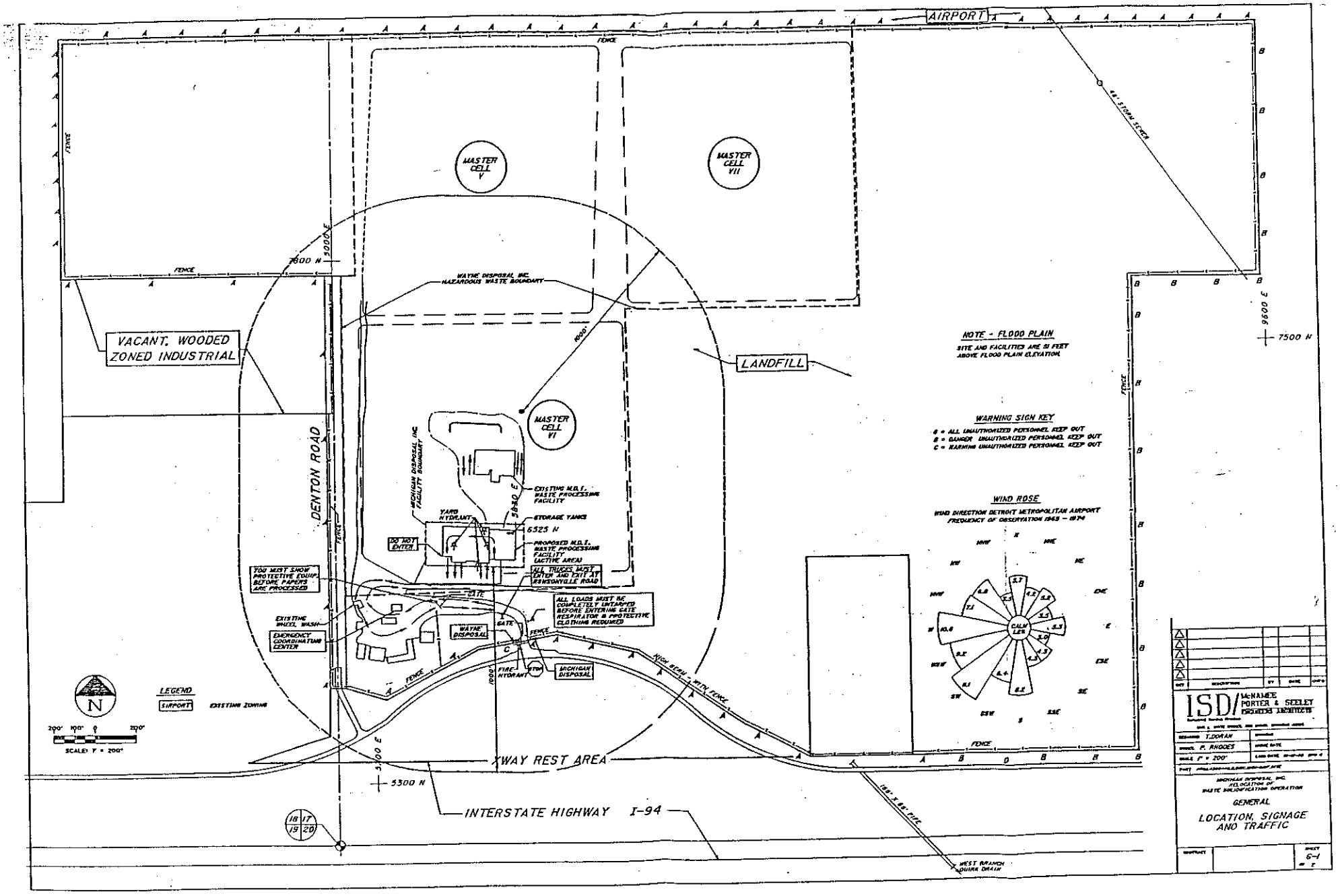
ISD/McNAMEE PORTER & SEELEY ENGINEERS ARCHITECTS

DESIGNED H. NOORI | CHECKED H. LEE
DRAWN J. HINTH | ISSUE DATE JUNE 1988
SCALE 1/16"=1'-0" | CADD DATE [illegible]

MICHIGAN DISPOSAL INC.
APPLICATION OF
WASTE SOLIDIFICATION OPERATION

Drawing S-1

CONTRACT | SHEET


AIRPORT
FENCE
MASTER CELL V
MASTER CELL VII
MASTER CELL VI
WAYNE DISPOSAL INC. HAZARDOUS WASTE BOUNDARY
VACANT, WOODED ZONED INDUSTRIAL
LANDFILL
DENTON ROAD
MICHIGAN DISPOSAL INC. FACILITY BOUNDARY
EXISTING M.D.I. WASTE PROCESSING FACILITY
STORAGE TANKS
YARD HYDRANT
DO NOT ENTER
PROPOSED M.D.I. WASTE PROCESSING FACILITY (ACTIVE AREA)
ALL TRUCKS MUST ENTER AND EXIT AT RENSONVILLE ROAD
YOU MUST SHOW PROTECTIVE EQUIP. BEFORE PAPERS ARE PROCESSED
ALL LOADS MUST BE COMPLETELY UNTARPED BEFORE ENTERING GATE RESPIRATOR & PROTECTIVE CLOTHING REQUIRED
EXISTING WHEEL WASH
EMERGENCY COORDINATING CENTER
WAYNE DISPOSAL
GATE
FIRE HYDRANT
STOP
MICHIGAN DISPOSAL
HIGH BERM - WITH FENCE
XWAY REST AREA
INTERSTATE HIGHWAY I-94
WEST BRANCH QUIRK DRAIN
LEGEND
SIRPORT
EXISTING ZONING
SCALE: 1" = 200'
NOTE - FLOOD PLAIN
SITE AND FACILITIES ARE 51 FEET ABOVE FLOOD PLAIN ELEVATION
WARNING SIGN KEY
A = ALL UNAUTHORIZED PERSONNEL KEEP OUT
B = DANGER UNAUTHORIZED PERSONNEL KEEP OUT
C = WARNING UNAUTHORIZED PERSONNEL KEEP OUT
WIND ROSE
WIND DIRECTION DETROIT METROPOLITAN AIRPORT
FREQUENCY OF OBSERVATION 1965 - 1974
CALM LES
ISD/ McNAMEE PORTER & SEELEY ENGINEERS ARCHITECTS
T. DORAN
P. RHODES
1" = 200'
MICHIGAN DISPOSAL INC. RELOCATION OF WASTE SOLIDIFICATION OPERATION
GENERAL
LOCATION, SIGNAGE AND TRAFFIC
G-1

ATTACHMENT 8

Acceptable Waste Types

LIST A

Waste Types That May Be Managed At
Michigan Disposal, Inc.
Pursuant to Act 64

Characteristic Waste

D001	Ignitable Waste
D002	Corrosive Waste
D004	EP Toxic for Arsenic
D005	EP Toxic for Barium
D006	EP Toxic for Cadmium
D007	EP Toxic for Chromium
D008	EP Toxic for Lead
D009	EP Toxic for Mercury
D010	EP Toxic for Selenium
D011	EP Toxic for Silver
D012	EP Toxic for Endrin
D013	EP Toxic for Lindane
D014	EP Toxic for Methoxychlor
D015	EP Toxic for Toxaphene
D016	EP Toxic for 2,4-D
D017	EP Toxic for 2,4,5-TP Silvex
001D	EP Toxic for Copper
003D	EP Toxic for Zinc

Waste From Non-Specific Sources

F001	Spent halogenated degreasing solvents.
F002	Spent halogenated toxic solvents.
F003	Spent nonhalogenated ignitable solvents.
F005	Spent nonhalogenated ignitable and toxic solvents.
F006	Wastewater treatment sludges from electroplating operations.
F007	Spent cyanide plating solutions from electroplating operations.
F008	Plating bath sludges from electroplating operations where cyanides are used.
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.
F010	Quenching bath residues from oil baths from metal heat-treating operations where cyanides are used in the process.
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat-treating operations.

F012 Quenching wastewater treatment sludges from metal heat-treating operations where cyanides are used in the process.

F019 Wastewater treatment sludges from the chemical conversion coating of aluminum.

Waste From Specific Sources

K001 Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.

K002 Wastewater treatment sludge from the production of chrome yellow and orange pigments.

K003 Wastewater treatment sludge from the production of molybdate orange pigments.

K004 Wastewater treatment sludge from the production of zinc yellow pigments.

K006 Wastewater treatment sludge from the production of chrome oxide green pigments, anhydrous and hydrated forms.

K008 Oven residue from the production of chrome oxide green pigments.

K009 Distillation bottoms from the production of acetaldehyde from ethylene.

K010 Distillation side cuts from the production of acetaldehyde from ethylene.

K011 Bottom stream from the wastewater stripper in the production of acrylonitrile.

K020 Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.

K021 Aqueous spent antimony catalyst waste from fluoromethanes production.

K02B Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.

K029 Waste from the product steam stripper in the production of 1,1,1-trichloroethane.

K031 By-product salts generated in the production of MSMA and cacodylic acid.

K046	Wastewater treatment sludges from the manufacturing, formulation, and loading of lead based initiating compounds.
K048	Dissolved air floatation (DAF) float from the petroleum refining industry.
K049	Slop oil emulsion solids from the petroleum refining industry.
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry.
K051	API separator sludge from the petroleum refining industry.
K052	Tank bottoms (leaded) from the petroleum refining industry.
K060	Ammonia still lime sludge from coking operations.
K061	Emission control dust or sludge from the primary production of steel in electric furnaces.
K062	Spent pickle liquor from steel finishing operations.
K069	Emission control dust or sludge from secondary lead smelting.
K071	Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.
K073	Chlorinated hydrocarbon wastes from the purification step of the diaphragm cell process using graphite anodes in chlorine production.
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.
K085	Distillation or fractionation column bottoms from the production of chlorobenzenes.
K086	Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.

K106 Wastewater treatment sludge from the mercury cell process in chlorine production.

Spill Residues of Commercial Chemical Products

U017	Benzal Chloride
U019	Benzene
U031	1-Butanol
U032	Chromic acid, calcium salt
U037	Chlorobenzene
U044	Chloroform
U051	Creosote
U052	Cresols, Cresylic Acid
U056	Cyclohexane
U057	Cyclohexanone
U061	DDT
U070	o-Dichlorobenzene
U071	m-Dichlorobenzene
U072	p-Dichlorobenzene
U076	Ethane, 1,1-Dichloro
U077	Ethane, 1,2-Dichloro
U07B	Ethene, 1,1-Dichloro
U079	Ethene, Trans-1,2-Dichloro
U080	Methylene Chloride
U088	Diethyl Phthalate
U102	Dimethyl Phthalate
U112	Ethyl Acetate
U113	Ethyl Acrylate
U122	Methylene Oxide
U129	Hexachlorocyclohexane (Gamma Isomer)
U154	Methyl Alchohol
U159	Methyl Ethyl Ketone
U161	Methyl Isobutyl Ketone
U165	Naphthalene
U201	Resorcinol
U202	1,2-Benzisothiazilin-3-one, 1,1-Dioxide
U208	1,1,1,2-Tetrachloroethane
U209	1,1,2,2-Tetrachloroethane
U210	Tetrachloroethylene
U211	Methane, Tetrachloro
U220	Toluene
U226	Methylchloroform
U227	1,1,2-Trichloroethane
U228	Trichloroethene
U233	2,4,5-Trichlorophenoxypropionic
U239	Xylene
U244	Bis(dimethylthiocarbamoyl) disulfide
U247	Ethane, 1,1,1-trichloro-2,2-bis(p-methoxy-phenyl)

Nonhazardous Wastes

Acid Solution
Alkaline Solution
Etching Fluids
Plating Wastes
Halogenated Solvents
Nonhalogenated Solvents
Mixed Solvents
Peroxides
Papermill Wastes
Ink Residues
Paint and Pigment Residue
Pesticide Residues
Herbicide Residues
Pharmaceutical Wastes
Lacrimators, Amides, Mercaptans
Plasticizers, Resins, Monomers, Elastomers
Crankcase Oil
Cutting Oil
Coolants and Water Soluble Oil
Lubricating Oil
Other Oil
Brine
Drilling Muds (Gas and Oil Operations)
Oil Field Tank Bottoms
Mixed Oil Residue
PCB and PBB Contaminated Materials
Food Processing Wastes

Limitations on All Wastes

1. No waste shall be reactive as defined by R 299.9212(3).

2. The PCB content of all wastes shall be less than 50 ppm.

Limitations on Wastes to be Treated through Stabilization

1. The halogenated solvent content of all wastes shall be less than or equal to ten percent.

2. The nonhalogenated solvent content of all wastes shall be less than or equal to twenty percent.

3. The flash point of all wastes shall be greater than or equal to 90°F.

LIST B

Waste Types That May Be Managed at
Michigan Disposal, Inc.
Pursuant to Wayne County Health Department Air Permits

Characteristic Waste

D001	Ignitable Waste
D002	Corrosive Waste
D004	EP Toxic for Arsenic
D005	EP Toxic for Barium
D006	EP Toxic for Cadmium
D007	EP Toxic for Chromium
D008	EP Toxic for Lead
D009	EP toxic for Mercury
D010	EP Toxic for Selenium
D011	EP toxic for Silver
001D	EP Toxic for Copper
003D	EP toxic for Zinc

Waste From Non-Specific Sources

F001	Spent halogenated degreasing solvents.
F002	Spent halogenated toxic solvents.
F003	Spent nonhalogenated ignitable solvents.
F005	Spent nonhalogenated ignitable and toxic solvents.
F006	Wastewater treatment sludges from electroplating operations.
F007	Spent cyanide plating solutions from electroplating operations.
F008	Plating bath sludges from electroplating operations where cyanides are used.

Waste From Specific Sources

K048	Dissolved air floatation (DAF) float from the petroleum refining industry.
K049	Slop oil emulsion solids from the petroleum refining industry.
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry.
K051	API separator sludge from the petroleum refining industry.
K052	Tank bottoms (leaded) from the petroleum refining industry.

K061 Emission control dust or sludge from the primary production of steel in electric furnaces.

K062 Spent pickle liquor from steel finishing operations.

K086 Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.

Limitations on All Wastes

1. The volatile organic compound (VOC) content of all wastes shall be less than or equal to one percent by volume, except for 60,000 gallons per year with VOC content less than or equal to three percent by volume.

2. The flash point of all wastes shall be greater than 90°F.

3. No waste shall be reactive as defined by R 299.9212(3).

ATTACHMENT 9

Container Storage Secondary Containment Systems

2. STORAGE OF CONTAINERIZED WASTES

a. North Container Storage Area

The facilities North Container Storage Area is located directly north of the processing plant, beneath a canopy and immediately south of the north retaining wall. The North Container Storage Area is 225' long, running from the west retaining wall to the unloading stations for the tank farm, and 45' wide measured perpendicularly from the north retaining wall. The area is designed to hold a maximum of 1,500 containers or 82,500 gallons of containerized waste. The waste is stored in parallel rows running North to South 48" wide separated by 24" aisles. The rows and aisles are 42' long. The row measurements were chosen to accommodate two 55 gallon drums side by side. Containers are not double stacked.

Drums are placed into storage on pallets or directly onto the concrete with a drum grappler.

The storage area is covered, preventing precipitation from entering. Run-on is prevented by the north retaining wall, the west retaining wall and a three inch curb on the south and east side of the storage area. Run-off is prevented by the same four structures. The storage area is sloped approximately 1% to the north where a drainage trench serves as a collection point for liquids from spills or leaks in the storage area. Containers are stored away from the curbs by a distance of at least the container height. This

2. **STORAGE OF CONTAINERIZED WASTES**

a) North Container Storage Area (Continued)

prevents a punctured container from squirting over the curb. Liquids collected in the trench are removed with a vacuum truck upon detection. The container storage area and trench are inspected at least once per day.

The area containment calculations for the north storage area are presented in Tab VIII, Attachment I.

b. East Container Staging Area

The facility's East Container Staging Area is located directly east of the processing plant and immediately west of the east retaining wall. The East Container Staging Area is 92' measured east to west and 150' measured north to south. An irregular shape is created by the presence of the tank farm in the northeast corner of the East Container Staging Area. The area is designed to hold an inventory of 400 containers or 22,000 gallons of liquid waste in the staging area. Containers are not double stacked. Once containers are accepted by the facility, they are generally immediately moved to the North Container Storage Area. In the event containers are not immediately moved, the total quantity of containers in storage and staged in the East Container Staging Area and North Container Storage Area never exceeds 1500 containers or 82,500 gallons.

Run-on is prevented by the north retaining wall, east retaining wall and a three inch curb on the west side of the East Container Storage Area. Run-on from the south is prevented by the container staging area being at a higher elevation than surrounding pavement.

2. **STORAGE OF CONTAINERIZED WASTES**

b) East Container Staging Area (Continued)

Run-off is prevented by an approximately 1% slope to the east and north, combined with a drainage trench along the east wall. The containment area is designed to hold a 100 year storm, 10% of the maximum quantity of containerized liquid waste and any waste in the tank farm which may "squirt" over the tank farm containment wall. Containers are stored away from the curb and south edge a distance at least equal to the height of the container. This prevents a punctured container from "squirting" out of the containment structure. Any liquid collected in the containment structure is removed upon detection. The container staging area is inspected at least once per day.

Containment calculations are presented in Attachment II to Tab VIII.

c) Management of Liquid Collected in Container Storage Areas

As stated above, the container storage areas are inspected at least daily. Any liquid observed in the containment structure is removed upon detection. Liquid is removed by pumping to the sludge receiving tanks, waiting tank truck or by a vacuum truck. Removed liquids are managed in one of two ways; processed as a hazardous waste or delivered to an onsite wastewater pre-treatment plant jointly operated by Michigan and Wayne Disposal, Inc.

If the liquid is processed as a hazardous waste, it is characterized as the type of waste in storage at the time the liquid collected. The liquid is delivered to the appropriate sludge receiving tank and treated through Michigan Disposal's process.

2. STORAGE OF CONTAINERIZED WASTES

c) Management of Liquid Collected in Container Storage Areas (Continued)

Michigan Disposal, Inc. operates a wastewater pre-treatment plant under a Class D Industrial Wastewater Discharge Permit Number D-11201 issued by Wayne County Department of Public Works. Liquid collected in the container storage area is specifically mentioned as a source in the permit. The pre-treatment plant is designed to precipitate heavy metals and biologically treat organic contaminants prior to discharging effluent to the Wayne County Sanitary Sewer System, feeding the Wyandotte Treatment Plant. The pre-treatment plant was designed to treat hazardous waste leachate from Wayne Disposal, Inc. and can easily treat intermittent flows from Michigan Disposal's container storage areas.

Michigan Disposal and Wayne County perform regular monitoring of the effluent to demonstrate compliance with pre-treatment permit conditions.

ATTACHMENT 10

Procedures to Prevention Ignition

PRECAUTIONS TO PREVENT ACCIDENTAL IGNITION

Michigan Disposal, Inc. (MDI) does not solidify or accept for solidification, reactive or incompatible waste streams or waste streams with a flashpoint less than 90°F or with listed solvent concentrations greater than 20%. Thus, the Waste Analysis Plan plays a major role in preventing accidental ignition in waste solidification areas by preventing flammable wastes from entering storage tanks connected to the solidification system. Ignitable waste material that is accepted for solidification at or above 90°F is by its very nature a waste already diluted in a non-flammable aqueous matrix.

Michigan Disposal is an enclosed facility equipped with a sulfuric acid/sodium hypochlorite scrubber. The primary function of the scrubber is particulate, odor and emission control. The scrubber creates a negative pressure in the building as well as the in-ground sludge receiving tank by exchanging air at a rate of 22,000 CFM. This rapid air turnover prevents collection of fumes which could create an explosive situation. In addition, as the air passes through the scrubber, it is super saturated with water which, in case of fire, would snuff out flame propagation.

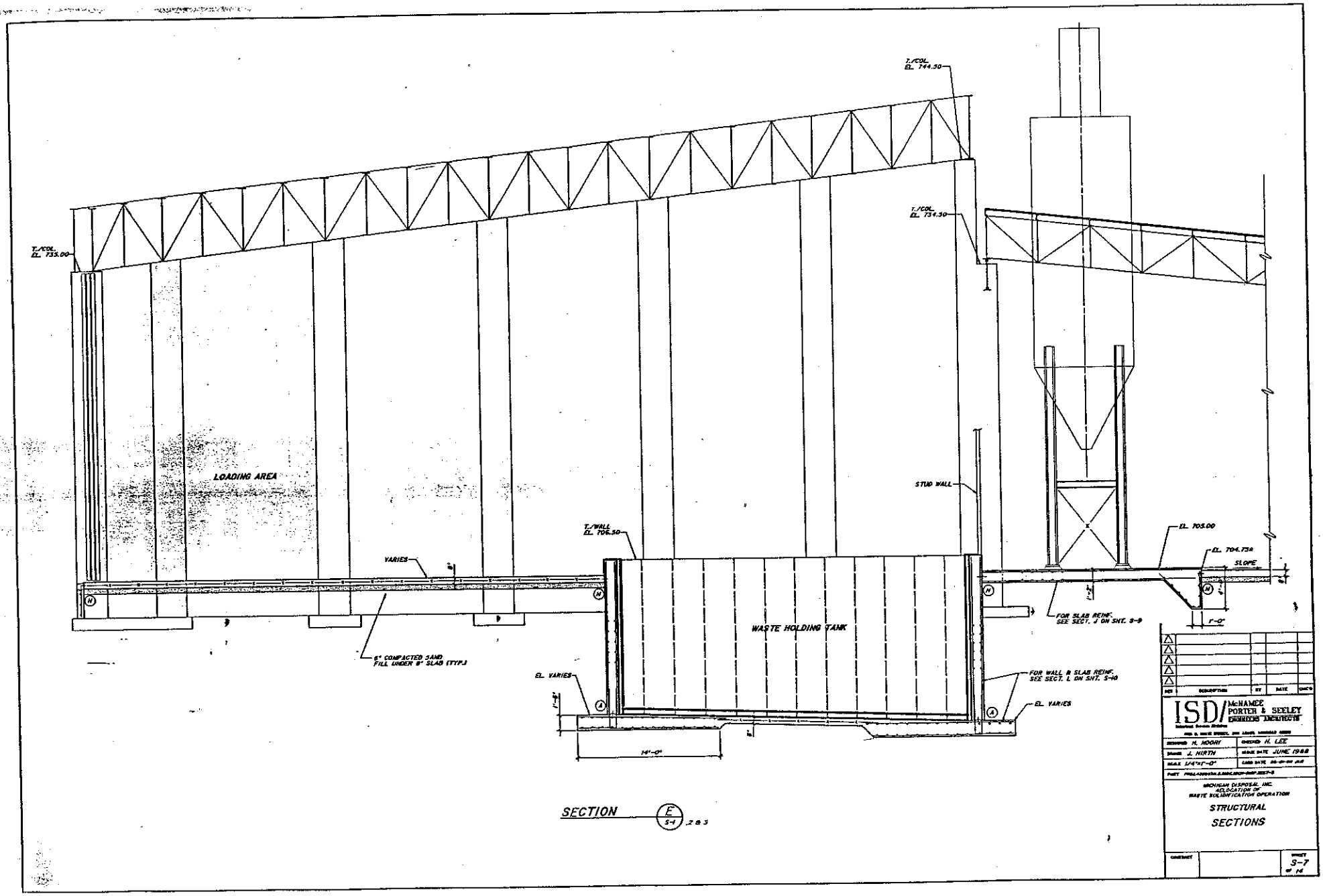
Flammable wastes may be received in six storage tanks, numbered 18 through 23. These flammable wastes are stored in above ground tanks. Tanks are located outside in a diked area. Wastes are top loaded into tank via rigid piping which runs down three-fourths the height of the tank prior to discharge. Tanks are equipped with combination pressure relief valves/flash arrestors on top and high temperature cut-off valves at the bottom. These tanks are constructed and located in compliance with NFPA Chapter 30 regulations for flammable liquids. Only properly grounded spark free pumps and motors are used to load flammable liquids, or in the vicinity of loading flammable liquids.

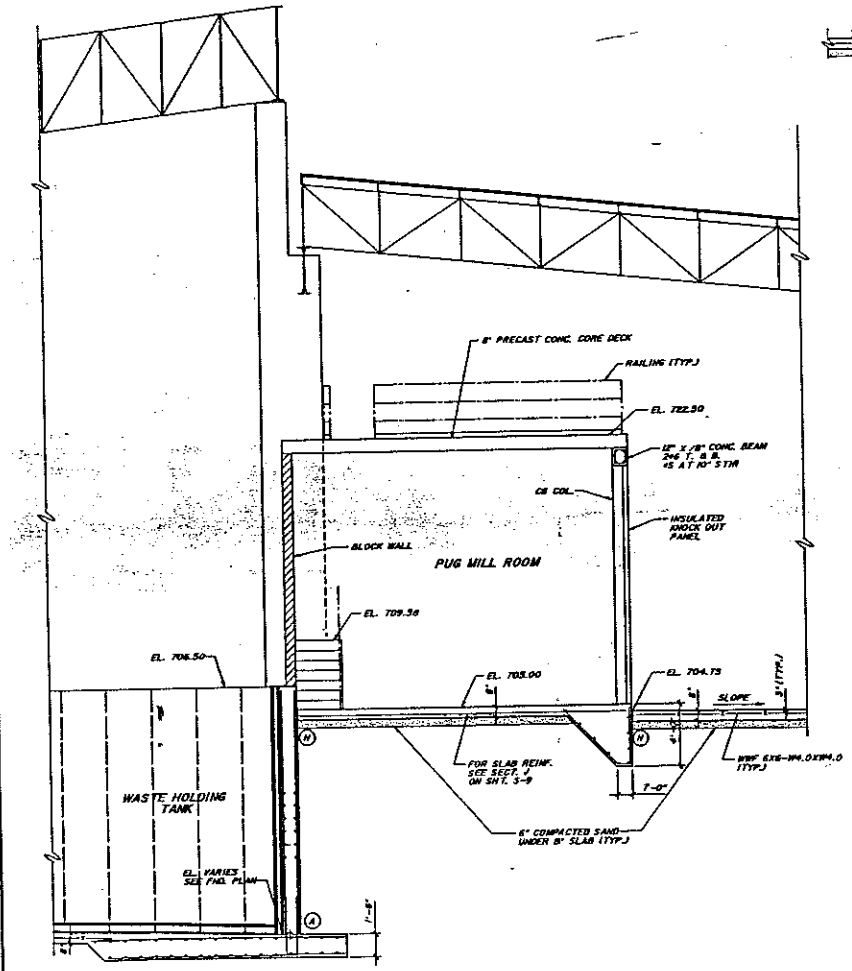
Combustible or flammable wastes received in containers will be staged and stored in the East Container Staging Area. Drums remain closed during storage.

No smoking is allowed around the unloading, storage or processing facilities. Maintenance that may cause sparks or undue heat must be scheduled in advance with the V.P. of operations and can only be performed when no ignitable materials are being treated, stored or otherwise managed in the tank farm or container storage areas.

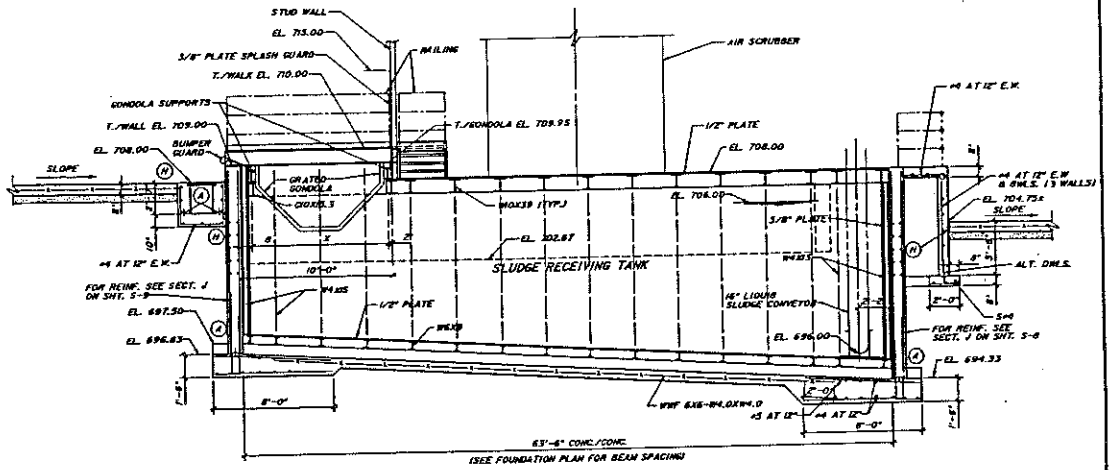
ATTACHMENT 11

Tank Plans and Specifications

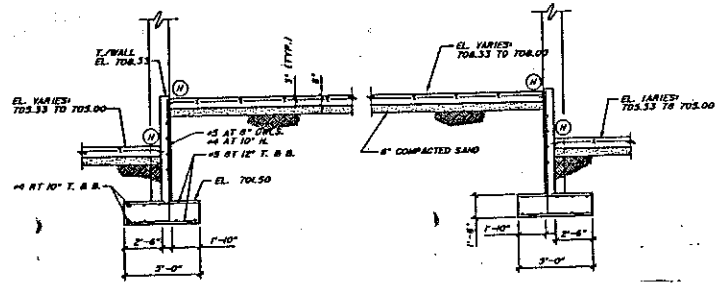

T./COL. EL. 744.50
T./COL. EL. 734.50
T./COL. EL. 735.00
LOADING AREA
STUD WALL
T./WALL EL. 706.50
VARIES
EL. 705.00
EL. 704.75±
SLOPE
WASTE HOLDING TANK
FOR SLAB REINF. SEE SECT. J ON SHT. S-9
6" COMPACTED SAND FILL UNDER 8" SLAB (TYP.)
EL. VARIES
FOR WALL & SLAB REINF. SEE SECT. L ON SHT. S-10
EL. VARIES
14'-0"
1'-0"
SECTION E S-1 2 & 3
ISD/ McNAMEE PORTER & SEELEY ENGINEERS ARCHITECTS
H. HOORI
H. LEE
J. HIRTH
JUNE 1988
1/4"=1'-0"
MICHIGAN DISPOSAL INC.
ALLOCATION OF
WASTE SOLIDIFICATION OPERATION
STRUCTURAL
SECTIONS
S-7
of 14



SECTION F (S-4) 2 & 3
SCALE: 1/4"=1'-0"



SECTION G (S-4) 2 & 3
SCALE: 1/4"=1'-0"



SECTION H (S-4) 2 & 3
SCALE: 1/4"=1'-0"

NO.	DESCRIPTION	BY	DATE	CHK'D
△				
△				
△				
△				
△				

ISD / McNAMEE PORTER & SEELEY ENGINEERS ARCHITECTS

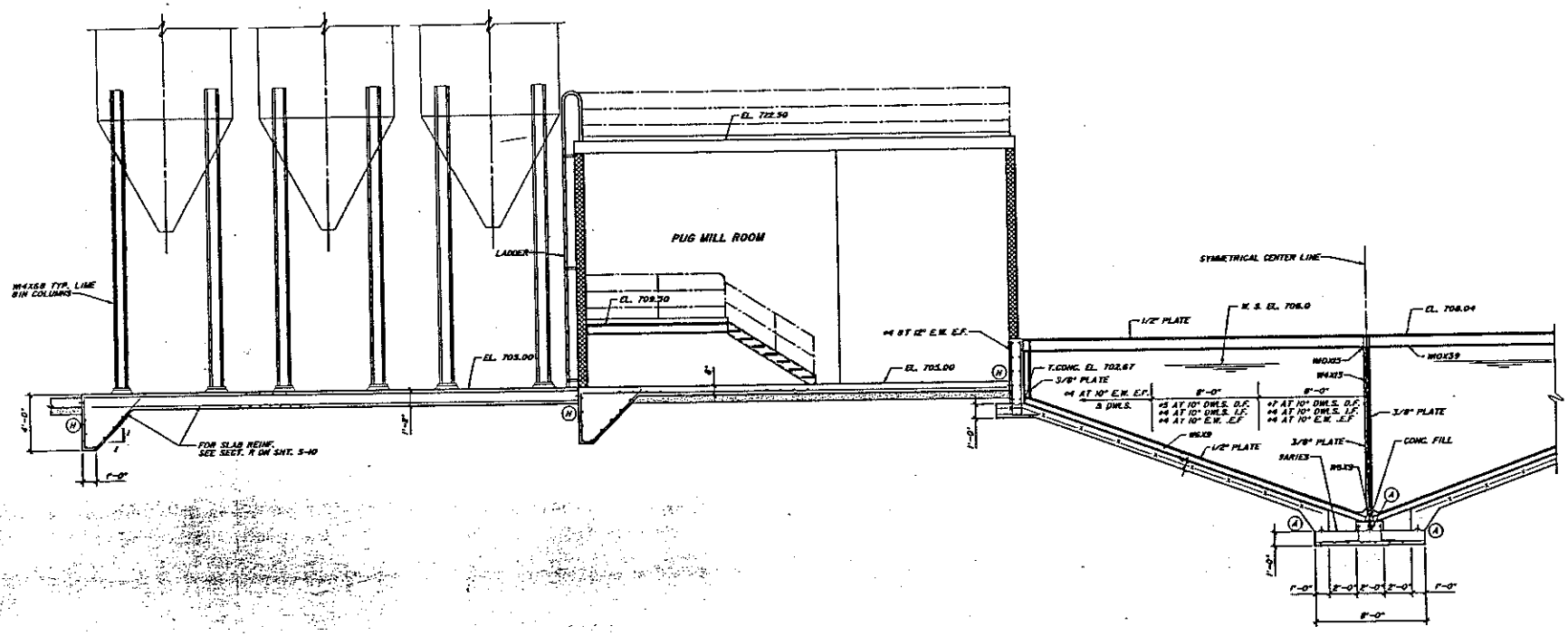
DESIGNED H. NOORI	CHECKED H. LEE
DRAWN J. HIRTH	ISSUE DATE JUNE 1988
SCALE 1/4"=1'-0"	LAST DATE 88-06-09 JJH

MICHIGAN WESTCOAL INC.
RELOCATION OF
WASTE SOLIDIFICATION OPERATION

STRUCTURAL
SECTIONS

CONTRACT

SHEET S-8 OF 14



SECTION J / S-1 — SCALE: 1/4"=1'-0"

REV	DESCRIPTION	BY	DATE	CHK'D
△				
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△				
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ISD / McNAMEE PORTER & SEELEY
ENGINEERS ARCHITECTS

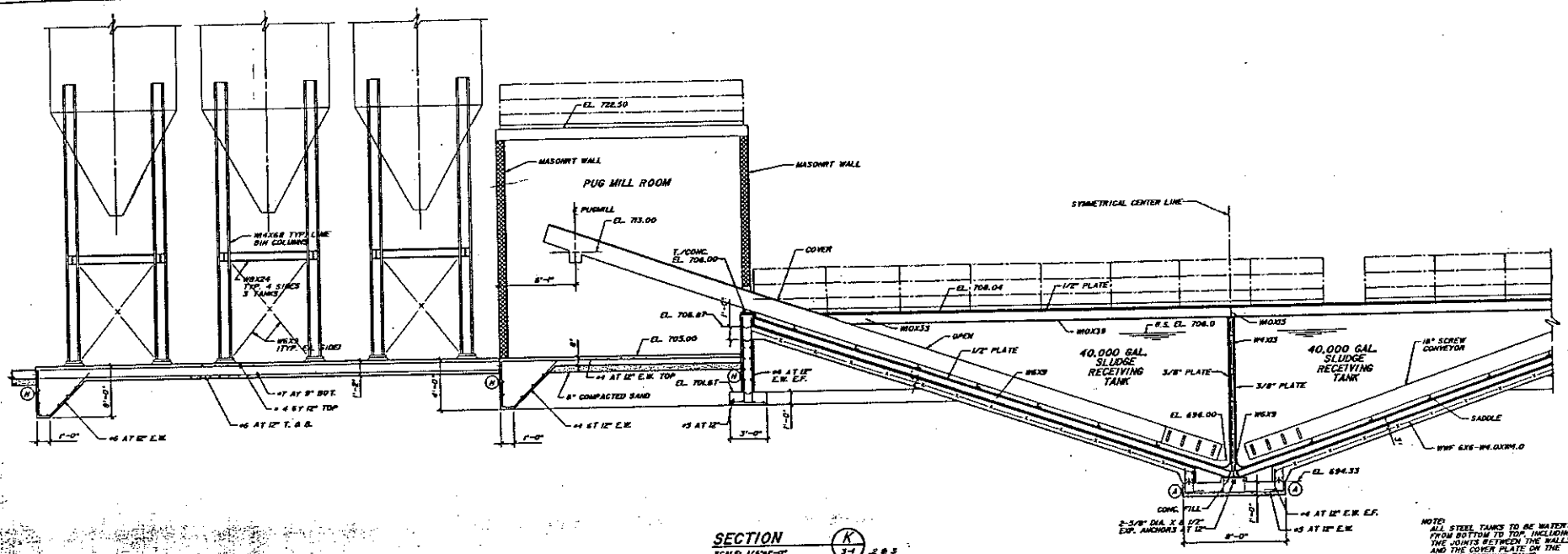
DESIGNED H. HOORI	DRAWN H. LEE
DRAWN J. HIRTH	ISSUE DATE JUNE 1989
SCALE 1/4"=1'-0"	CADD DATE

MICHIGAN DISPOSAL, INC.
RELOCATION OF
WASTE SOLIDIFICATION OPERATION

STRUCTURAL
SECTIONS

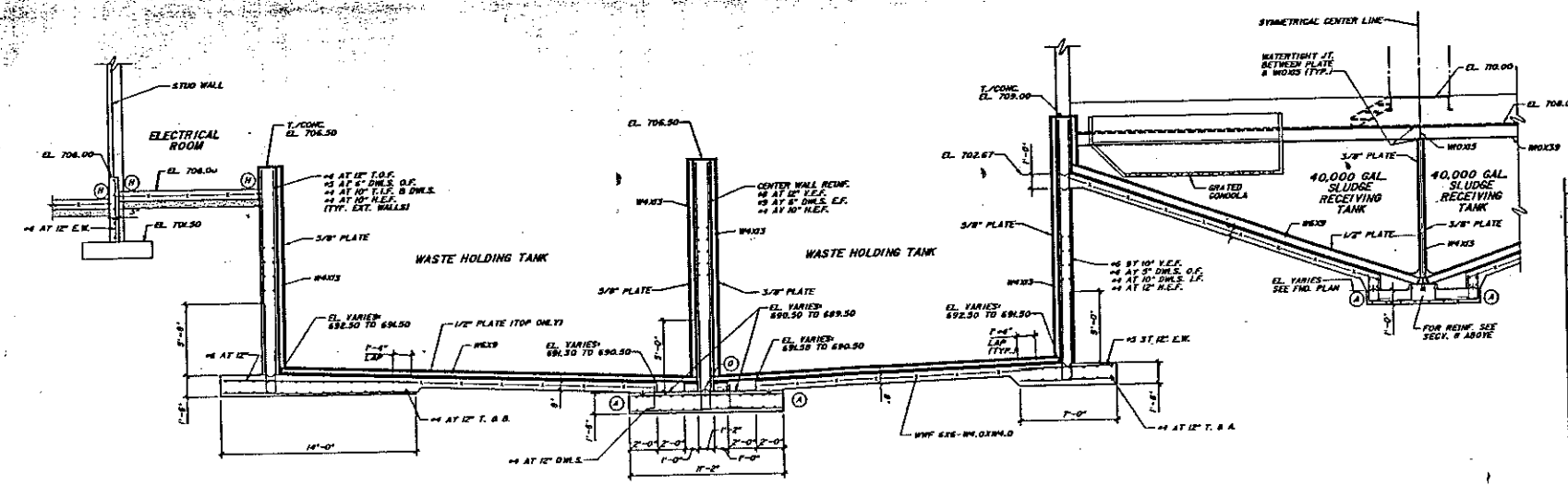
CONTRACT

SHEET S-9 OF H



NOTE:
ALL STEEL TANKS TO BE WATERTIGHT FROM BOTTOM TO TOP, INCLUDING THE JOINTS BETWEEN THE WALLS AND THE COVER PLATE ON THE SLUDGE RECEIVING TANKS.

SECTION K 3-1 .2 & 3
SCALE: 1/4"=1'-0"



SECTION L 3-1 .2 & 3
SCALE: 1/4"=1'-0"

NO.	DESCRIPTION	BY	DATE	APPR.
△				
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ISD/ McNAMEE PORTER & SEELEY ENGINEERS ARCHITECTS

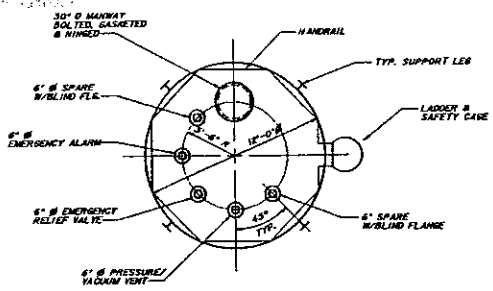
DESIGNED H. MOORI — CHECKED H. LEE
DRAWN J. HIRTH — ISSUE DATE JUNE 1988
SCALE AS NOTED — CADD DATE

MICHIGAN DISPOSAL, INC.
RELOCATION OF
WASTE SOLIDIFICATION OPERATION

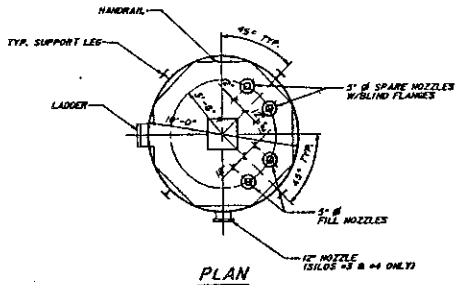
STRUCTURAL SECTIONS

CONTRACT

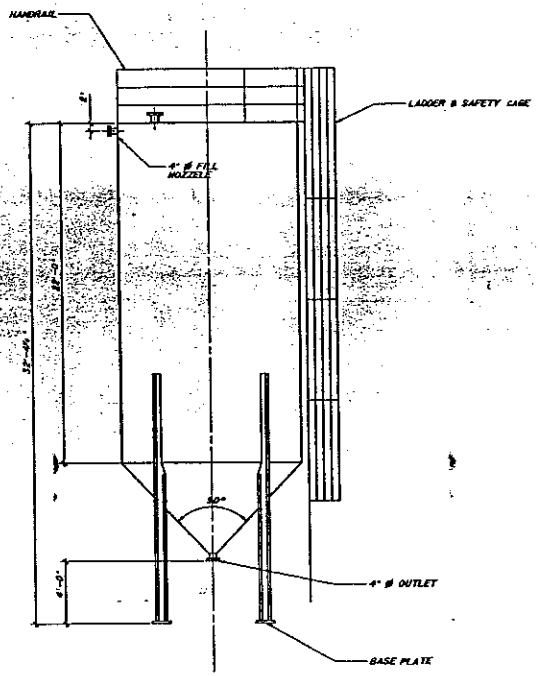
SHEET S-10 OF 14



PLAN

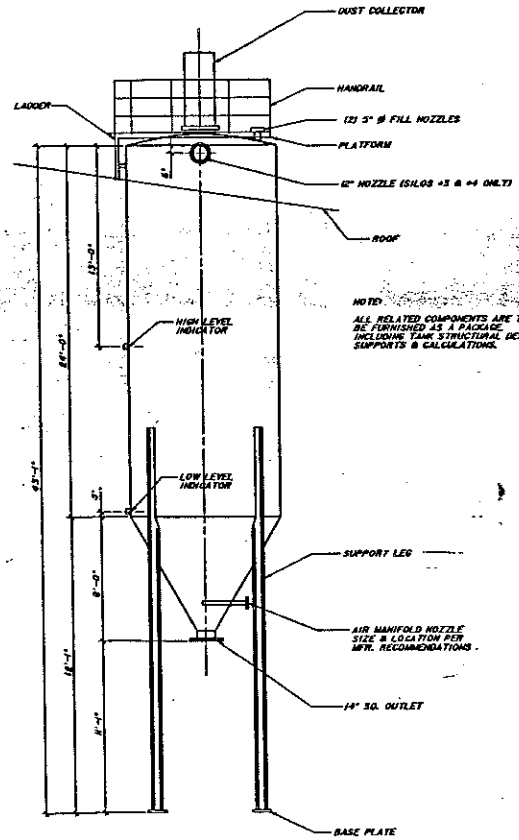


PLAN



20,000 GAL. WASTE STORAGE TANK #16 & 17

(2 REQ'D)



NOTE:
ALL RELATED COMPONENTS ARE TO BE FURNISHED AS A PACKAGE INCLUDING TANK STRUCTURAL DESIGN, SUPPORTS & CALCULATIONS.

LIME SILO

REV	DESCRIPTION	BY	DATE	CHK'D
△				
△				
△				
△				
△				

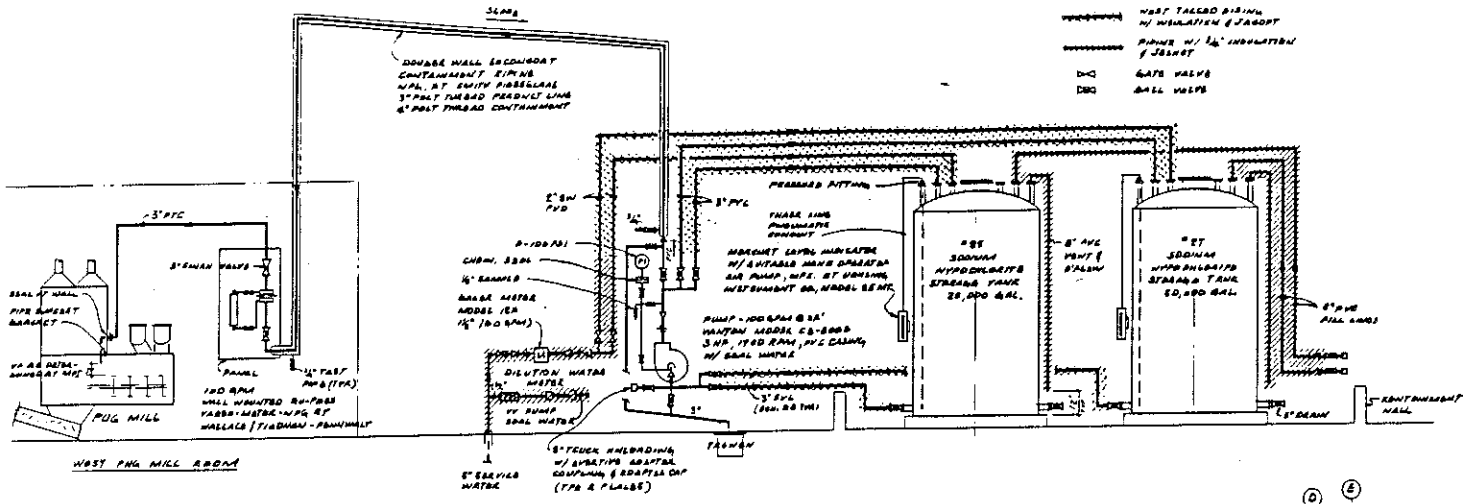
ISD/ McNAMEE PORTER & SEELEY ENGINEERS ARCHITECTS

DESIGNED R.L.LOPEZ | CHECKED
DRAWN S.N.GOTHA | ISSUE DATE JUNE 1988
SCALE 1/4" = 1'-0" | CADD DATE
PART

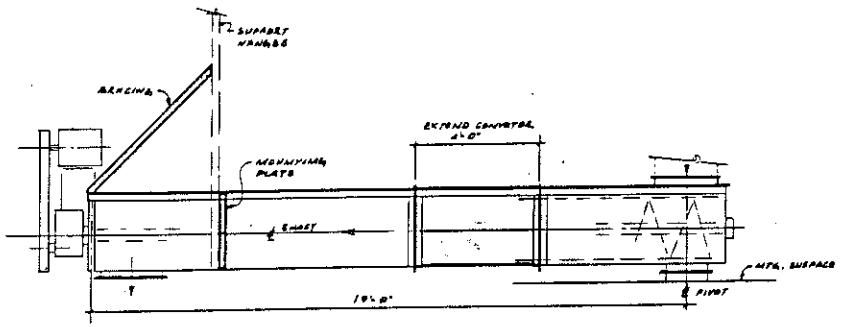
MICHIGAN DISPOSAL INC.
RELOCATION OF
WASTE SOLIDIFICATION OPERATION

MECHANICAL
TANK DETAILS

CONTRACT | SHEET M-8 of 9



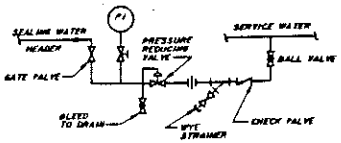
SODIUM HYPOCHLORITE SCHEMATIC



ELEVATION

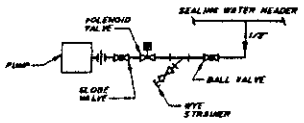
24"ϕ RADIAL SCREW CONVEYOR MODIFICATIONS

1/2" = 1'-0"



SEALING WATER PRESSURE REDUCING STATION

SYMBOL —(PRS)—



SEALING WATER CONNECTION

(TYP. 3 PUMPS) SYMBOL —(SEAL)—

TANK SPECIFICATION & Equip'D.	
TANK NO.	#25 & #27
CAPACITY (GALLONS)	20,000
ORIENTATION (HORIZ/VERT)	VERT.
DIAMETER (FT)	12'-0"
HEIGHT/LENGTH	26'-6"
SHELL THICKNESS	1/4" - 1/2"
LIQUID STORED	12% SODIUM HYPOCHLORITE
CORROSION ALLOW.	
LINING	VINYL ESTER RESIN
MATERIAL	FIBERGLASS
INSULATION	SEE GEN. NOTES
HEATING	" " "

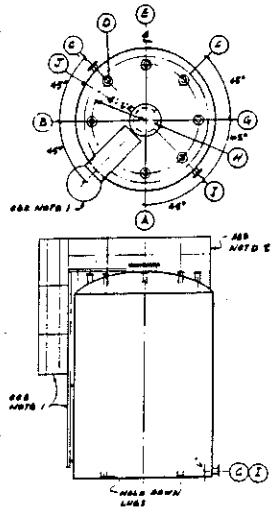
DESIGN CONDITIONS	OPER	DESIGN
PRESS. PSIG		
TEMP. °F		

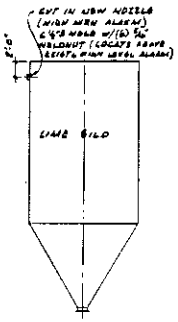
CONNECTIONS	No.	SIZE, TYPE
A GAUGE	1	3"-150# RF
B FILL	1	3"-150# RF
C SUCTION	1	3"-150# RF
D EDUCT./FILL	1	3"-150# RF
E CHANGE WATER	1	3"-150# RF
F VENT	1	8"-150# RF
G HIGH LEV. ALARM	1	3"-150# RF
H MANWAY	1	24" ϕ BOLTED
I DRAIN	1	3"-150# RF
J ACCESS/FILL HEAT	1	12" SCH. 40 PIPE (TYP. 2) 24"-150# FLANGE
K		
L		
M		
N		
O		
P		
Q		
R		
FLANGE PROJECTION		MANUFACTURER BY - PETER-CROW GRUNA CO.
COUPLINGS		DWAUL - CLOWING OR APPROVED EQUAL

NOTES

1. LADDER W/ SAFETY CAGE
2. SAFETY RAILING
3. FOR ORIENTATION SEE PLAN

SODIUM HYPOCHLORITE TANK DETAILS





HIGH HIGH LEVEL ALARM NOZZLE DETAIL

(1 EA. TANK - 6 SILOS)

GENERAL NOTES

TANKS NO. 25 & 27 - INSULATION & HEATING

FIBERGLASS TANKS SHALL BE INSULATED AND HEAT TRACED BY THE TANK MANUFACTURER PRIOR TO SHIPMENT 2 1/2" FIBERGLASS BASED TYPE EQUIPMENT INSULATION WITH A MINIMUM DENSITY OF 6 PCF SHALL BE USED. THE K VALUE SHALL BE .25 BTU LOSS AT 50°F. THE INSULATION SHALL BE INSTALLED AND PROVIDED WITH AN OUTDOOR FINISH AS RECOMMENDED BY THE INSULATION MANUFACTURER. TYPE HEAT TAPE SHALL BE RATED AT 10 WATTS PER FOOT AT 240 VOLTS. THE TAPE TAPE SHALL SHALL BE WRAPPED AROUND THE TANK WITH A PITCH OF 30°. THE TOTAL HEAT LOSS OF EACH TANK IS 4,000 WATTS.

PIPES - INSULATION & HEATING

ALL PIPES AS INDICATED SHALL BE INSULATED AND HEAT TRACED. THE INSULATION SHALL BE 1 1/2" FIBERGLASS WALL BASIN WITH A MINIMUM DENSITY OF 7 LB PCF. JACKET SHALL BE .016 INCH ALUMINUM COVER WITH MASTIC LINE, AND BAST ALUMINUM BANDS ON 12' CENTERS AND BUTT JOINTS. FITTINGS AND VALVE INSULATION SHALL BE CARTED WITH A METHOD RECOMMENDED BY THE MANUFACTURER. THE HEAT TRACING SHALL BE RATED AT 5 WATTS PER FOOT @ 240 VOLTS USING A WRAPPING PITCH OF 7° ON DEPTH 0" AND 3" PIPES. ALL RECIRCULATION LINES SHALL USE HEAT TRACING WITH A FLUOROPLYMER JACKET. HEAT CABLE SHALL BE GRAVC TO CHEMOLOC, ETC.

TANKS NO. 18 & 19

REFER TO SPEC'S AND DETAILS ON DWG. M-8 & M-9 SAME AS PANEL NO. 16 & 17 (INCLUDING CARTING)

PIPING - MATERIAL

WASTE STORAGE PIPING - SINGLE LINE, USE 800 THREAD II
" " " - DOUBLE CONTAINMENT
4" PRODUCT LINE - 800 THREAD II
6" CONTAINMENT - " " II

SODIUM HYPOCHLORITE - SINGLE LINE, USE PVC SCHEDULE 80 UNLESS OTHERWISE NOTED.
" " - DOUBLE CONTAINMENT
3" PRODUCT LINE - POLY THREAD
8" CONTAINMENT - " "

PIPE HANGERS & SUPPORTS - WASTE SYSTEM - REFER TO SPECS-M-9
- SODIUM HYPOCH. - AS RECOMMENDED BY PIPE MFR.

VALVES

BALL VALVE - (SODIUM HYPOCH.) - PVC, RAISED SHAFT, SOCKET ENDS TRUE GRAPE. "CHEMTROL TN SERIES"

PINCH VALVE - "SERIES TO W/ NYPRON SLEEVE, MFR. BY ERD VALVE

PLUG, GATE & CHECK VALVE - SEE DWG. M-9

SINGLE VALVES (SODIUM HYPOCH.) - PVC, SOCKET ENDS, TRUE GRAPE BALL SINGLE, MFR BY CHEMTROL.

REV	DESCRIPTION	BY	DATE	CHKD

ISD/McNAMEE PORTER & SEELEY

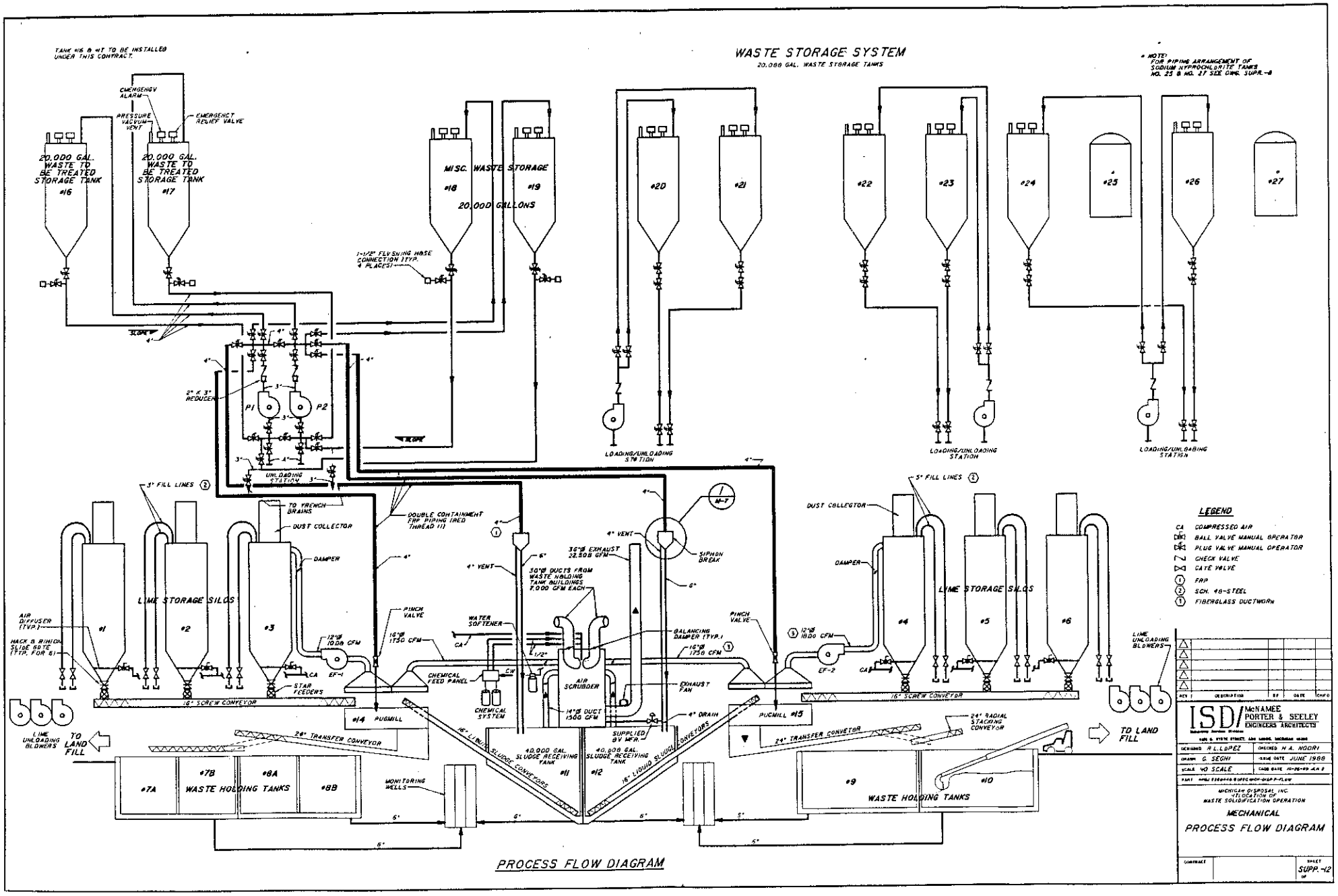
Industrial Services Division
3135 S. State Street, Ann Arbor, Michigan 48104

DESIGNED: ELL | CHECKED:
DRAWN: ALL | ISSUE DATE:
SCALE: AS NOTED

MICHIGAN DISTILLERS INC.
ALLEGAN, MI
WASTE SOLIDIFICATION OPERATION

SCHEMATIC & DETAILS

CONTRACT | SHEET SUP-8


WASTE STORAGE SYSTEM
20,000 GAL. WASTE STORAGE TANKS
TANK #16 & #17 TO BE INSTALLED UNDER THIS CONTRACT.
* NOTE: FOR PIPING ARRANGEMENT OF SODIUM HYPROCHLORITE TANKS NO. 25 & NO. 27 SEE DWG. SUPP.-8
EMERGENCY ALARM
PRESSURE VACUUM VENT
EMERGENCY RELIEF VALVE
20,000 GAL. WASTE TO BE TREATED STORAGE TANK #16
20,000 GAL. WASTE TO BE TREATED STORAGE TANK #17
MISC. WASTE STORAGE #18 #19
20,000 GALLONS
#20
#21
#22
#23
#24
#25
#26
#27
1-1/2" FLUSHING HOSE CONNECTION (TYP. 4 PLACES)
2" X 3" REDUCER
P1
P2
UNLOADING STATION
LOADING/UNLOADING STATION
LOADING/UNLOADING STATION
LOADING/UNLOADING STATION
3" FILL LINES
TO TRENCH DRAINS
DUST COLLECTOR
DAMPER
DOUBLE CONTAINMENT FRP PIPING (RED THREAD !!)
LIME STORAGE SILOS
#1
#2
#3
#4
#5
#6
AIR DIFFUSER (TYP.)
HACK & RIHDON SLIDE GATE (TYP. FOR 6)
12"Ø 1000 CFM
EF-1
EF-2
STAR FEEDERS
16" SCREW CONVEYOR
PINCH VALVE
16"Ø 1750 CFM
WATER SOFTENER
CHEMICAL FEED PANEL
CHEMICAL SYSTEM
AIR SCRUBBER
30"Ø DUCTS FROM WASTE HOLDING TANK BUILDINGS 7,000 CFM EACH
36"Ø EXHAUST 22,500 CFM
4" VENT
SIPHON BREAK
BALANCING DAMPER (TYP.)
16"Ø 1750 CFM
14"Ø DUCT 1500 CFM
EXHAUST FAN
4" DRAIN
SUPPLIED BY MFR.
PUGMILL #14
PUGMILL #15
24" TRANSFER CONVEYOR
24" RADIAL STACKING CONVEYOR
16" LIQUID SLUDGE CONVEYORS
40,000 GAL. SLUDGE RECEIVING TANK #11
40,000 GAL. SLUDGE RECEIVING TANK #12
LIME UNLOADING BLOWERS
TO LAND FILL
#7A
#7B
#8A
#8B
WASTE HOLDING TANKS
MONITORING WELLS
#9
#10
WASTE HOLDING TANKS
LEGEND
CA COMPRESSED AIR
BALL VALVE MANUAL OPERATOR
PLUG VALVE MANUAL OPERATOR
CHECK VALVE
GATE VALVE
1 FRP
2 SCH. 40-STEEL
3 FIBERGLASS DUCTWORK
ISD/McNAMEE PORTER & SEELEY ENGINEERS ARCHITECTS
DESIGNED R.L.LOPEZ
CHECKED H.A. NOORI
DRAWN G. SEGHI
ISSUE DATE JUNE 1988
SCALE NO SCALE
MICHIGAN DISPOSAL, INC.
LITIGATION OF WASTE SOLIDIFICATION OPERATION
MECHANICAL
PROCESS FLOW DIAGRAM
SHEET SUPP.-12
PROCESS FLOW DIAGRAM

GENERAL NOTES

1. THE CONTRAGTOR SHALL PRBVIDE AND INSTALL ALL MECHAHIGAL EOUIPMENT SPECIFIED SELBW. ALL OTHER MEGNANICAL EOUPMENT SNOWN ON FNESE DRAWINGS SNALL BE PRBVIDEB BY THE OWNER AND INSTALLED BT TNIS C6HTRACTBR.

2. THE GONVHACTOR SKALL BE RESPBHSIBLE TB PROVIDE THE MATEPIAL. FABRIGATIOH, EREGT AND DESIGN ALL PIPE HANGERS. SUPPORTS AND SUPPLEMENTARY STEEL AS KEOUIREO FOR A PERMANENT INSTALLATIBN OF THE PIPE SVSTENS INCLUDEO IN THIS CONTRAGT.

3. PIPING ANA EBUIPMENT SNALL BE SURPBRTED IN A THOROUBNLV SUBSTANTIAL AND WORKMANLY MANNER. NANGERS AND SUPPBRTS SNALL OE OESIGHED SB AS TB MEET ALL STATIC AND BPEPATIONAL CONDITIONS TB WHICH THE PIRING AND EBUIPMENF MAV BE SUBJECTED.

4. AUXILIART SUPPBRTING STEEL SNALL BE DESIGNED ON THE BASIS OF THE ALLOWABLE STRESSES AS PER A.I.S.C. STEEL HANDBBBK. ALL STEEL WORK SHALL HAVE ONE CORT BF PRIMER AND ONE FINISN GOAT OF PAINT.

5. A SUFFICIENT NUMBER OF UNIONS SNALL BE PROVIDED ANB INSTALLED AT EACH PIECE OF EOUIPMEPT TO FACILITATE REMOVAL OK EBUIPMENT WITHOUT HAVING TB CUZ PIPE.

6. PIPE SIZES SHOULB BE THE SAME SIZE BR LARGER THAN THE OPENING BH THE EOUIRMENV THET ARE CONNEGTED TO.

7. NINIMUM CLEARANGE BETWEEN PIPES INGLUDING INSULATION SHALL BE 3".

8. WATER STSFEM

BAGKFLOW PREVENTER - CLAVTON MBDEL RP-2 (3/4")

EMERGENCV SHBWER - WESTERN MODEL 9102 (FBR NEATEB AREAS)
MESTERN MODEL SIB6 (FBR UNHEPTEB AREAS)
WITN MODEL 629 SNBWER NEAD.

WATER SOFTENER - PEEPLESS WAZER SOFTENER MODEL 20MX6

VARO HVDRANT - JBSKM 71701-1/2-6
GURB STOPS, 125 LB. FBR AWWA C6BB

PIPING - ALL 6URIEO PIPING (NDP), HIGH OENSITY POLVETHVLENE ASTM DI2A6, PE 3406 OR 34B0 ORISCOPIPE. HIPAK. DUPONT
EXPOSED PIPING 2-1/2" AND LARGER, GALVANIZED STEEL PIPE SCHEDULE 40 ASTM A120
EXPBSEO PIPING 2" AND SMALLER, GOPPER TUBING. TVPE L NARB-DRPWN

VALVES - BALL VALVES-JENKINS 5OOT
CNECK VALVES-JENKINS J-92
GATE VALVES-JENKINS J-G2U (1/4" THRU 2")
J-651-A (2-1/2" AND LARGER)
GLOBE VALVES-JENKINS J-106A WITH NO. 312 6ISC.
125 LB. BRONZE BOOV
HOSE BIBBS (3/4")-WITH GARDEN HBSE TRPEAD AND VAGUUM BREAKER.
125 LB. NONFREEZE
SILL COCK (3/4")- TVRE WALL HVDRANT. 6RRSS GASING, YANDALPROBF WITN HANDLE AND VACUUM BREPKER.

9. AIR SVSTEM

AIR COMPRESSOR - SULLAIR SERIES 12 OREN STTLE 5BHN 460/3/60 1270 RPM WITH AIR COBLEB HEAT EKCHANGER

REGEIVEP - THE RECEIVER SHALL BE 288 GAL. IN SIZE. IT SHALL BE ASME PRESSURE RATEB AT 200 PSIG WORKING PRESSURE. THE FOLLOWING ACCESSORIES SHALL BE MOURTEO ON EAGH RECEIVER.
1. 200 PSIG PRESSURE GAUGE (A-1/2-INCH BIAL)
2. ASNE SAFETY RELIEF VALVE
3. ORAIN CONNECTION WITH VALVE
4. INLET AND OUTLET GONNECTIONS
5. TRAP (AUTOMATIC)
6. THREE ADJUSTABLE PRESSURE SWITCHES FBR CBMPRESSOR CONTROL AND LOW PRESSURE ALARM. SWITGNES SHALL RE 120 VOLT 2-TWO PBLE AND 1-ONE POLE. SBUANE D, ALLEN BRADLEV, OR EBUAL IN NEMA 4 ENCLOSURE.

AIR DRVER - SULLAIR RAR REGENERAZIVE DRVER MBDEL-SO

PRE-FILZER - SULLAIR AF PURETECH FILTER MODEL PF-25B

AFTER-FILTER - SULLAIR PH PURELESCER FILTER MODEL PHC-BE

TRNPS - ANNKISON, TRIP-L-TRAP

AIR SET ASSEMBLV - THE AIR SET ASSEMBLV SHALL GONSISZ OF TWO 2-WAV 6RS55 6ALL VALVES WITN 3/8-INCH PORTS, 1/4 TURN ACTIBN ANB DIRECTIONAL HANDLE AND ONE GBMBINATION PRESSURE REGULATOP AND FILTEP ASSEMBLT AS SPECIFIED BELOW.

PRESSURE REGULATOR &
FILTER ASSEMBLV - GARDNER DENVER 65NG405BO
WILKERSON C20-B3-00B

PIPING - GALVANIZEB STEEL. SCH. 4R, ASTM A120

VALVES - BALL VALVES-JENKINS 900T
CHECK VALVES-JENKINS 12P2

INSTRUMENTATIBN &
GBNTROLS - PIPING-GALVANIZED STEEL. SCN. 40 ASTM A12B
VALVES: BALL VALVES-WHITNEY "6B" SERIES (SHUT BFF)
NEEDLE VALVES-WHITNET VEE STEM (THROTTLING SERIES) WITH .172 ORIFICE FOR 1/4" AND .250 BRIFICE FOR 3/8"
(USE 1/4" BALL VALVE FBR GAUGE COCKS)

PRESSURE 6AUGES - TRERIGE OR ASHCROFT

10. LIBUIB PETROLEUM KAS (LPG) SYSTEM

GENERAL - SHUTBFF VALVES AND URIBNS AND BIRT POCKETS SNALL BE INSTALLEO AT THE CBNNECTIBN TO EAGH POINT BF USE. THE SYSTEM SRALL BE PURGEO AND TESTEB WITH NITROKEN AT 7B PSIG. THE INSTALLATION SHALL CBNFORM TO LBGAL FIKE MARSKALL'S REQUIREMENTS.

PRESSURE REGULATBR - A GAS PRESSURE RECULATBR SNALL BE PRBVIDEO AHEAD OF ANY GAS CBNSUMING EOUIPMENT THAT IS REOUIREB TO BPERATE BN LESS THAN LINE PRESSURE. THE REGULATOR SHALL BE THE DIAANRAGM TYPE. THE PEGULATOR SHALL BE SUITAGLE FBR UP TB 18 PSI INLEF PRESSURE AND SHALL NAVE S REOUCEO RANGE OF 7 TO 12 INGHES W.C. THE PEGULATBR SNALL BE CAPABLE BF HANDLING THE FLBW NOTEB BN THE DRAWINGS. REGULATBP SNALL BE KISHER TYPE S-100, HBNEVWELL, TPERIGE, BR EOUAL.

PIRING - ALL BURIED PIPING (NDP) NIGH DENSITY POLTETHYLENE ASTM D1246, PE 3406 OR 34RA ORISCORIPE. NIPAK, DUPONT EKPBSEO PIRING-GAR6BN STEEL PIPE. SCHEDULE 4B ASTN 120 SEAMLESS OR ELEG. WELDED

VALVES - SHUT-OFF VALVES-1" AND LPRGER LUBRIGATED PLUG VALVE. 125LB. WITH WRENCN
RBCHWELL NORDSTROM FIG. 142 (1-2")
FIG. 143 (3")
LESS THAN 1"
LUBRIGATEO PLUG VALVE, 200 LB. WITH WRENCH
ROCKWELL NGPDSZORM FIG. 114

11. AIR DISTRIBUTION

DUGTWORK
GENERAL. THE CBNTRACTOP SHALL FURNISH DUCTWORK AND ALL NECESSART ACCESSBRIES. AS SHOWN ON THE BRAWINGS AND AS SPECIFIED HEREIN, FBR A COMPLETE AND ACCEPTABLE INSFALLATIBN. AIR DUCTS SHALL BE ERECTEO ANB INSTALLED IN ACCBRDANCE WITH NFRA STANDARD 9BA B #. WITH THE SMACHA "DUCT MANUAL FBR LOW VELOCITY SVSTEMS", AND WITH THE ASRRAE GUIDES VOLUME "EBNIPMENT". ALL ESTENSIVE AIR DUCT SVSTEMS SHALL BE BALANCED BV AN INDEPENDENF AIP BALANCE AND TESTING AGENCT.

ALL SHEET METAL PLENUMS SHALL BE FABRICATEB BF 18 GAUGE GALVANIZED METAL WITN DOURLE SEAM LOCHS. BRACE PLENUMS WITN 1 1/2 INCH X 1 1/2 INCH ANGLE FRAMING. ALL SECTIONS OF REGTHNGULAR DUCTWORK SHALL BE MADE AIR TIGRT. ALL AECTANGULAR DUGTWORK SECTIBNS 3-INCNES MIDE AND BVER SHALL BE STIFFENED BF PANELING OR CROSS 6REAKING BEFBRE FABRICATION.

DUCT SYSTEM HANGERS. ALL SHEET METAL DUCZWORK SHALL BE SUPPORTEB BR 4-FBBT CENVERS BV MEANS OF GALVANIZEB SNEET METAL HANGER STRAPS OR STEEL RODS WITH ANGLE TRAPEZE. THE BBTTOM CORNERS OF ZNE DUCT SNALL BE PROZECTED BV ANGLES TO PREVENT BEING GUT BT THE STRAPS. NANGERS FOR PBUND DUCT SHALL BE THE SLING BR SADDLE TYPE. ALL NANGERS SNALL PRBVIDE A MEAHS OF VEPTICAL ADJUSTMENT AFTER ERECZIBA. ALL DUGTWORK SNALL BE FARRICATED AND INSTALLED SB AS TO ENTIRELY ELIMINAZE ANY VIBRATION BR DUCT NOISE, USING FABRIG SLEEVES AF FANS, ETC., AS DESGRIBED BELOW. ALL CORRBSIVE AREA DUCTWORK SNALL BE ADEOUATELT SUPPORTED BV MEANS OF A PVC CBATEB HANGER, STRAPS BR STEEL ROOS.

PVC GOBTED DUGT - ALL DUCTWORK SHALL BE PVS TYPE 4X4-4MIL, AS MFR. BT FOREMOST MFR. CO. SOUTHFIELD, MI. ALL FASTENERS SHALL BE STAINLESS STEEL AND ALL EOGES SNALL RE SEALEB WITH PVS DUCT SEALER AND TAPE. INSTALLATION SHALL BE AS PER MFRS. RECOMMENOATINS USING ALL CORROSION RESISTANT MATERISLS.

INSULATIBN - 3 LA. DENSITY, 1-1/2" THIGKNESS KIBERGLASS WITH ALL SERVIGE AACKEP, ARMSTRBNG ARMOLOK/ACGBTHERM.

12. CBNVETBRS

RADIAL STACKING CBNVETDR - 26" DIAMETER 16'-B" LONG PUG MILL BISCHARGE CBMPONENTS INCLUDING 1/2" THICK SECZIONAL FLIGHT GONVEVOR SCREW. 1/4" THICK ANGLE FLANGE U TROUGH, 3 7/16" 6IAMETER HARDENEB STEEL COUPLING AND HARD IRBN BEARING HANGERS, BALL 6EARIND FRBUGH END WITH LIP SEAL 12 GAUGE COVERS WITN SPRING CLAMPS. NECESSARV ASSEMBLV BBLTS AND LOCK NUTS INGLUDING 407019 LINK-BELZ SCREW CONVEVBR DRIVE WITH DRIVE SHAFT AND ADAPTOR AND 4B HP RELIANCE TEFC 250/460 VOLT MOTOR GOMPLETE WITH SLIBING MOTOR BASE AND FBUR GRBBVE 5V SECTIBN V BELT DRIVE CAPABLE BF DELIVERING 408 TBNS PER HOUR BF SLUDGE MIKEB WITH LIME AT APPROKIMATELV 100-150 POUNDS AER CUBIG FBOT. PEDESTAL SWIVEL AT INLET END BF CONVEVOR.

ELECTRIC 1-TON TROLLET - ALL TROLLEVS SNALL NAVE WHEELS WITN BALL BR ROLLER BEARINGS ANB SHALL BE SIZED TO FIT THE MONORAIL BEAM SECTIBM BN WHICH THET ARE TO BE INSTALLED AS SHOWN BN THE DRAWINGS. TRBLLEV SPEEB SHALL BE 3B FEET PER MINUTE.

SUGGESTED MANUFACTURERS. EBUIPMENZ SHALL BE THE PRODUCT OF BNE OF THE FOLLBWING MANUFACTURERS, OR EDUAL:
ACCO INDUSTRIES, INC.
CHRISNOLM-MOOPE
DRESSER INDUSTRIES
NARHISCHFEGER RBN
R6BBINS AND MYERS

TRANSFER CONVEYBR - 24" BISMETER 24'-0" LONG PUG MILL DISCNARBE GOMPONENTS INGLUDING 1/2" THICK SEGTIONAL FLIGHT CONVEVOR SCKEW. 1/4" THICK ANGLE FLANGE U TROUGH. 3 7/16" OIAMETER NARDENED STEEL COURLING AND HARB IRON BEARING HANGERS. BALL BEARING TRBUGH ENB WITH LIP SEAL 12 GAUGE GBVERS WITH SPRING ELAMPS. NEGESSARV ASEMBLV BBLTS AND LBCK NUTS INCLUDING 407019 LINK-6ELT SCREW CBNVE7BR DRIVE WITH DRIVE SHAFT AND ADARTBR AND 40 HP RELIANGE TEFC 25B/46B VOLT MOZOR GOMPLETE WITH SLIDING MOTBR BASE AND FOUR GRBBVE 5V SECTION V BELT DRIVE CARABLE OF DELIYERING 400 TONS PER HBUR OF SLUDGE MIXED WITN LIME AT APPROKIMATELY 10B-15B POUNDS PER GUBIG FBOT.

LIME CBPVEYBR - 16" 6IAMETER 42'-B" LONG HORIZBNTAL LIME DELIVEP7 CBNVEVOR COMPONENTS INCLUDING 16" DIAMETER SEGPIBNAL FLIGHT SCREWS 3/8" THICK FLIGHTING 16" DIAMETER 1/4" THICN ANGLE FLANGE U TROUGH, 3" DIAMETER HARDENEB STEEL GOUPLINGS AND NARD IKBN SEARING HANGERS. BALL SEARING TROUGH END WITH LIP SEAL, 12 GAUGE SHRBUD COVERS. SUPPORT FEET, NECESSARV ASSEMBLV BBLTS AND LOCK NUZS AND 25 HP DRIVE INCLUDING RELIANCE TEFC 25B/460 VOLT MOTOR 45B24 LINK-6ELT SHAFT MOUNT SGREW CONVEYBR DRIVE INGLUDING 3" DIAMETER SHAFT KIT AND ABAPTBP KIT. WOOGS ELECTRIC REMOTE CONTROLLED MOTOR SASE AND WOODS MCS VARIABLE SPEED PULLEV AND COMPANIBN SNEAVE GAPABLE OF PRBVIDING A CONVEVOR SPEEB OF 77 RPM MAK. 3B RPM MINIMUM TO PROVIDE A CHPAGITV OF 2B0 TBHS PEP HOUR OF LIME AT 60 POUNDS PER CUBIG FOOT.

LIOUIO SLUDGE C6NVEYOR - 16" DIAMETEA 94'-8" LONG CBNVEVBR. LOBSE CBMPONENTS INCLUDE 16" BIAMETER 1/2" TRICK SECTIBNAL FLIGHT SGREWS. 1/4" THICK ANGLE FLANGE U TROUGH 3" DIAMETEP NARDENEB STEEL EOUPLINGS AND HARB IRBH NANGER BEARINGS. SPECIAL HARB IROH SEARING TROUGH ENB FOR SUBMERGEB END OF CBNVEVOR. 12 GAUGE SNPOUD COVERS. SUPPORT FEET AND NEGESSARV ASSEMBLF BBLTS AND LOCK NUTS INCLUDING 40 HP LINK-BELT 4070 SNAFZ MOUNT SGREW C6HVEVBR DRIVE INCLUBING 3" SNAFT KIT ANB ADAPTOR KIT. WOODS ELECTRIC REMBTE EONTROLLED MOTOR BASE WITH T.S. WOODS MCS VARIABLE SPEED DRIVE PROVIBING A CONVEVOR SPEEB OF 17 RPM MAX 3B RPM MINIMUM CAPABLE OF DELIVEPING 20B TONS PER NBUR OF RAW SLUDGE AZ 188 POUNDS BER GUBIC FBBT.

13. SCRUBBER DUCTWORK

FIBERGLASS REINFBRCE9 ROUND DUCT - ALL MATERIALS SHALL CONFBRM PD THE SPECIFICATIONS OK SBGIETT BF PLASTIG INOUSTRIES. LATEST EBITION. FIGERKLASS REINFBRGED DUCTWORK SNALL BE VIPVLESTER AS MANUFAGTURED BT A.O. SMITH, FI9ERCAST, CEILCBTE, OR EBUAL.

FIBERGLASS DUCT FITTINGS AND SPECIALS SHALL BE 6F THE SAME MATERIALS AS THE DUGS. FITTIHG CBNNECTIONS SHALL BE SOCKET TVBE OR FLANGED.

JOINTS SHALL 6E PLAIN END BUTT WRAPPEO OR FLANGEB AS SHBWN BR NOTEB BN THE DRAWINGS AND APPROVEB B7 THE ENGINEER. FLANGE JOINTS KS REOUIREB SNALL BE ALL PLASTIG AND SHALL NAVE THE BIMENSIONS OF ASNI B16.1 EVGEPT FBR THICKNESS. EXPANSIBN ABIRT SHALL BE KURNISHED AS REBUIRED.

THE FIGERGLASS DUCT SNALL GONFBRM TO ALL BUILBING GODES AS IS REBUIRED FOR CLASS I RATEB OUCTWORK. THE DUCT SHALL NAVE A MINIMUM 5% FLAME RETARBANT ADDEB TO THE RESIN. THE DUCT SNALL BE MANUFACTURED IN ACCBPDANCE WITH NBS PS15-69 AND SHALL MEET ASTM 84 AND NOT NAVE FLAME SPREAD GREATER THAN 25.

THE DUCT SHALL BE DESIGNEB FOR 12-INCHES OF VACUUM AT 19B DEGREES F TEMPERATURE.

GBRRBSIOH RESISTAHF DAMPERS - DAMPERS SNALL BE FURHISNEO AND INSTALLEO WHERE SNOWH BN THE DRAWINGS. DAMPERS SNALL BE OF THE BUTTERFLY TYPE GBNSISTING OF GIPGULAR BLADE, MOUNTEB TB A SHAFT WITHIN A FLANGED FRAME.

PLUGMILL HOODS - HOODS ARE TB BE FABRICATED OUT OF 16 6AUGE SHEET METAL. ALL WALL PANELS ARE TB BE MADE REMBVADLE. ACCESS OPENING TB NAVE 2 NINGEB SAFETV GATES WITN LIFT OUT HINGE PINS AND LBGKINC LATCH.

14. LIBUID WASTE SVSTEM

PIPE (FRP) - GLASS FIBER REINFBRCEB FILAMENT WOUND PIRE WITH MATCHING TAPERED BELL ANB SPIGBT. PIPE SHALL SE IN GOMPLIANCE WITH ASTM SPECIFICATION D2996-71 AND CLASSIFIED 6V ITS DESIGNATION CODE AZ 74 DEGREES F. RTRP-11AR-5111, 5112, RTRP-11A0-5112, 3113, 3114. WHEPE USEB FOP PETRBLEUM PRODUCTS, PIPE SRALL BE U/L APPROVED.

FLANGES - FLANGES SNALL BE FLAT FAGES AND DRILLED ACCORDING TB ANSI B16.5. 150 LB. BOLT HBLE CIRCLE.

FITTINGS - FITTINGS SHALL 6E COMPRESSION MBLDED USING AN EPOKY MOLBING GOMPOUND AND SHALL BE REINFORGED WITH A MINIMUM OF 6B% CHORREB GLASS FIBER. IN-LINE FITTINGS ARE FILAMERT WOUND.

GASKETS - GASKETS SNOULD BE 1/8-INGN THIGK, 6B-70 DURBMETER FULL FACE TYPE SUITABLE FOR THE SERVIGE.

ADHESIVES - AONESIVE AND GURING AGENTS SHALL BE VINVLESTER, AS REGOMMENDED BT THE MANUFSGTURER.

CHEC6 VALVES - PVC SWING CHECK VALVES. CHECK VALVES SHALL BE DESIGNEB FBR 15B PSI WORKING PRESSURE. ALL SWING GHECK VALVES SNALL BE BF A SBLIB THERMBPLASTIC GONSTRUCTION NAVING NO METAL TB MEDIA GBNTACT. VALVES MUST INCOKPORATE A SINGLE DISG DESIGN SUITABLE FOR EITHER HORIZONTAL BR VERTICAL INSTALLATIONS AS MANUFACTUREB BY ASAHI/AMERICA.

PLUG VALVE - PLUG VALVES SNALL BE NONLUBRIGATED, ECCENTRIG TYPE WITH RESILIENT FACED PLUGS AS CALLED FOR IN THE VALVE SCHEDULE. ENB CONNECTIBNS SNALL BE FLANGEB FBR ALL VALVES. PBRT AREAS SHALL BE EBUAL TB AT LEAST 6B PERGENT OK THE NOMINBL SIZE PIPE AREA. VALVE BOBIES SNALL BE SUITABLV MARKED TO INOICATE WHETHER THE VALVE IS OPEN BR CLBSED.

THE SEATING SURFACE OF THE RBTATING ELEMENT SHALL BE NITRILE BUTABIENE (RTCAR), OR BTHER MATERIAL RECOMMENDEO BV THE MANUFACTURER FOR CNEMIGAL SERVICE. BEARINGS AT THE TOP AND BBTTBM SUPPBRVING THE ROTAPING ELEMENT SHALL BE SELF-LUBRICAVING, C6KROSIBN-RESISTANF TVPE, SUITABLE FOR CHEMICAL SERVICE. THE VALVE SNALL BE OF THE BBLTEB BBNNET DESIGN. PACKING SHALL BE VISIBLE FOR INSPECTION WITHBUT BISMANTLING VALVE OR REMBVING OPERATBR. THE PACKING SHALL BE ADJUSTABLE AND REPLACEABLE WITHBUT DISASSEMBLING OF THE VALVE. MATERIAL OF CONSTRUGTIBN SHALL 6E AS NBTED BN THE PLANS.

ALL BLUG VALVES SHALL OE OF ADEOUATE DESIGN ZO BPERATE WITH A PRESSURE OF 50 PSI BN BOTH SIDES 6R ON EITHEA SIDE OF THE VALVE WITHBUT LEAKAGE.

VALVES SHALL BE THE PRBDUCZ BF ONE OF THE FOLLOWING MANUFAGTURERS, OR EDUAL: DEZURIK OR PRATT.

PIRE HANGERS - SNALL BE MADE OF A CORROSION RESISTANT MATERIAL OR 6E CBATED WITN EPOKV PHENOLIG COATING AS MANUFAGTUREB BT LIBERVV PLASVICS, PLASITE AS MANUFAGTURED BV WISGBNSIN PROTECTIVE COATING GORP.

15. UNLBADING PUMPS (P-1 AND P-2)

SINGLE STAGE SOLIBS NANDLING, NON-GLOG GENTRIFUGAL PUMP WITH SEMIOPEN RADIAL VANE. ALL PARTS IN CONTACT WITH THE PUMPED FLUIB GBNSTRUCTED OF GLASS REINFORCEB VINYLESTER. PUMP RATEB FOR 150 GPM AT 36 FT. TDH, 115B RPM PRBVIDED WITH A 1B NP, 46B V., 3 PNASE MOTOR. FVBRBC 3DBB SERIES NO. 4 X 6 X 11.

16. LIME SILO EOUIPMENT - (ALTERNAFE NO. 2)

1BB TON (550 BARREL) SILO GONSTRUGTED BK 1/4-INCH STEEL PLATE 10-FOOT BIAMETER. SAFETV PRESSURE-RELIEF VALVE MOUNTED ON TOR WITH WEIGNTEB CBVER, 2- 5-INCN DIAMETER FILL LINES WITN CAMLOCK CBUPLINGS AND TWO G-INCN GATE VALVES WITH 6 A 5-INCH REDUCERS (GATE VALVE JENKINS J-651-A). OUTSIDE LADDER AND EKPANDED METAL SERVICE PLATFBRN WITN NANDRAIL AND LANBING TO LADDER. INSPECTION HATCH ON TOP OF SILB WITH INSIDE LADDER. 14-INCH RACK AND PINIOH SLIDE GATE. AIR MANIFOLB IN CONE WITN VALVE, FITTINGS AND GONTROLS 3 GFM EAGH SILO. 14-INCN ROTARY AIRLBCK TEEDER, WITH CBNTROLS. MANUFAGTURED BV MEYEP AND SONS INC. INSTALLED BV ELEGTRICAL CBNTRAGTOR SV-380 FILTER VENT (36B SB. FT. CLBTH) WITH TIMER SWITCH CBNTRBL AND RUBBER-CBATED S/O GABLE NIREB FRBM VENT TB J-BOX ON POWER PANEL. SILO'S #5 AND #4 TO HAVE 12-INCN BIAMETER FLANGEB DUGT CONNECTION NEAR TOP OF SILO. 1" AIR LINE FRBM SCRUBBEP ROOM TO AIR MANIFOLDS.

17. FOR MOTOR SPECIFICATIBNS, SEE GENERAL EOUIPMENT STIPULATIBNS.

18. BLOWEP PAGKAGES
EACN ALOWER PACKAGE SHALL CONSISV OF A SUTKRBILT SERIES 4500 ROTARV POSITIVE BLOWER, SIZE 612, 8" CONNECTIONS. DUTV PBINT: 125B. INLET CFM AT 12.0 PSI. MOTBR SHALL BE 10B HP, 46BV, 3 PHASE, 6B HZ WITH A 1.15 SEAVIGE FACTOR AND A TEFC ENGLBSURE. REFER TB SPECIFICATION SEGTION I, GENERAL EBUIPMENT STIPULATIONG FOR MOTOR SPECIFICATIONS. BLOWER SNALL BE V-BELT DRIVEN. PRBVIDE WITH SAFETY GUARDS.

IN ADDITIBN, EACH BLBWER PAGKAGE SHALL INCLUDE A BURGESS MANNING TVPE 6PF INLET FILTER, MODEL 2B, C6MPLETE WITH FILTER ELEMENTS AND WEATHER HBBD. INLET FILTER SNALL BE PRIMEB AND FINISN PAINTED INSIDE AND OUTSIDE WITH RUST INHIRITIVE PAINT.

EAGH 6LBWER PACKAGE SHALL INCLUDE A KUNKLE, 3" SIZE, SAFETV RELIEF VALVE AND A MANUAL UNLOAAING BUZTERFL7 VALVE, 5" SIZE, CAST OR DUCTILE IRON BBOT AND DISC, STAINLESS STEEL SNAFT, WITH VITON SEAT AND LEVER BPERATBR.

EACH BLBNER PACKAGE SKALL BE FURNISHEO FACTBRV INSTALLEB ON A STUGTURAL STEEL PLATFBRM WITH THE BASE OF THE MOTBR ANB BLBWER 3 FEET ABOVE THE BBTTBM BF THE PLATFORM. THE INLET FILTER SNALL BE SUPPBPTEB FRBM THE PLATFORM AND PIPED TB THE BLBWER INLET, WITH REDUCER. THE SAFETV RELIEF AND UNLOADING VALVES SHALL BE PIPED ONTO A 3" BIAMETER BISGNARGE PIPE CONNECTEB TB THE BLOWER WIZH A REDUCER. MOUNT THE SAFETV RELIEF AND UNLOADING VALVE SB THEV ARE EASILT ACCESSIBLE. ENTIRE BLBWER PACKAGE AND PIPEWORK, ETC. SNALL BE PRIMEB AND FINISH PAINFEB FOR BUTDOOR INSTALLTION.

FILTER ELEMENTS SHALL 6E SINGLE STAGE, MINIMUM BF 2 INCHES THICK AND OF THE DISPOSAL DRV-TVPE. FILTERS SHALL 6E SIZEO FOR 3BB FEET PER MINUTE AIR FLOW RATE AND SHALL RETAIN 98% OF ALL PARTICLES 15 MICRONS BR LARGER. THE PRESSURE DRBP THRBUGH THE CLEAN MEDIA SHALL NOT EXCEED 0.25 INCNES OF WATER.

THE VELBCIFT BF THE AIR PASSING THROUGH THE WEATHER HOOD SNALL TB EXCEEB 500 FEET PER MINUTE.

19. WASTE STORAGE TANKS #16 AND #17
1. TANK NOZZLE ORIENTATION AND BUANTITT SNALL BE VERIFIEB AT TIME OF SHOP DRAWING SUBMITTAL.
2. TANK NOZZLES SHALL HAVE A 6" PROJECTION UNLESS NOTED OTNERWISE. ALL SIDE AND BOFTBM NOZZLES ON 1ST AND 2ND STAGE TANKS SHALL BE REINFORGED.
3. TANK TO BE C6MPLETELY DESIGNED BY TANK MANUFAGTURER AND STRUCTURAL CALGULATIBNS TO BE SUBMITTEB TB ENGINEER. WIND LBAD 2B PSF, EARTNBUAKE ZBNE I, ALLOWABLE SBIL SEARING GAPACITY 3000 PSF.
4. ALL STEEL TANK WELDMENTS FOR TANK NOZZLES, ANCHOR LUGS, ETC. SNALL SE GONTINUOUS WELD.
5. ALL NOZZLES SHALL NAVE 150 LB. FLANGES UNLESS NBTED BTHERWISE.
6. ALL TANKS SHALL BE FURNISHEB WITH LIFTING LUGS UNLESS OTHERWISE NOTEB.

TANKS TO BE SNBP FABRICATED CBMPLETE AS SHOWN INCLUDING SUPPBRTS. COMPLETE ALL WELDING BEFBRE LINING. ALL WETTED SURFACES TB BE LINEB THRBUGH ALL BPENINGS, BVER FLANGES, BLIND FLANGES AND INSIDE FACE OF THE MANHBLE CBVER WITH BAKEB PHENOLIC LINING, PHASITE CAT. NO. 45B0 VINYL ESTER 40 MIL THIGKNESS MANUFACTUREB BV WISCONSIN PROTECTIVE CBATING GBRP., P.B. BOX 216, GREEN BAV, WI. PHASITE TECHNIGAL BULLETINS SNOULD 6E CLOSELY FOLLOWED FOR ALL APPLICATIONS. ALL WELDS AND SNARP GORNERS FOR ALL WETTEO SURFACES TO BE GRBUND SUITABLE FBR BAKED PHENOLIC LINING.

ALL WELDS NOT SNOWN TO BE 1BB% PENETRATION.

TANK MATERIAL TB BE 1/4" STEEL MINIMUM.

WELDEB JOINT EFFICIENCY - 0.P0 AS PEP ASTM CBDE FOP UNFIRED PRESSURE VESSELS, SEGTIOR VIII, DIVISION 1.

TANK EXTERIORS AND ALL METAL GOMPONENTS SNALL 6E PRIME PAINTEB BY THE TANK MANUFACTURER, PEP PROJECT SPECIFICATIBNS.

REV	DESCRIPTION	BY	DATE	CHK'D
△				
△				
△				
△				
△				

ISD/ McNAMEE PORTER & SEELEY ENGINEERS ARCHITECTS

DESIGNED R.L.LOPEZ	CHECKED N.HBORI
DRAWN P.O.RHODES	ISSUE DATE JUNE 1988
SCALE NONE	CADD DATE

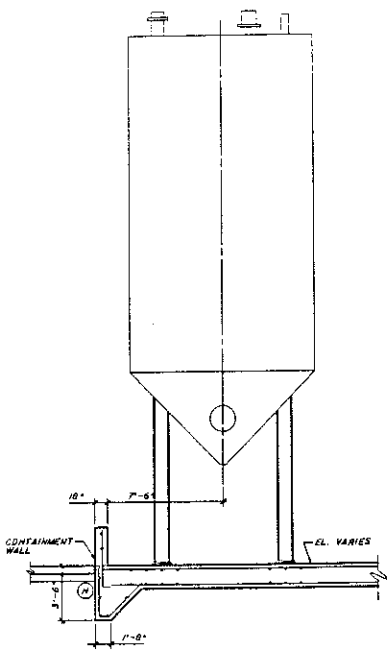
MICHIGAN DISPOSAL INC.
RELOCATION OF
WASTE SOLIDIFICATION OPERATION

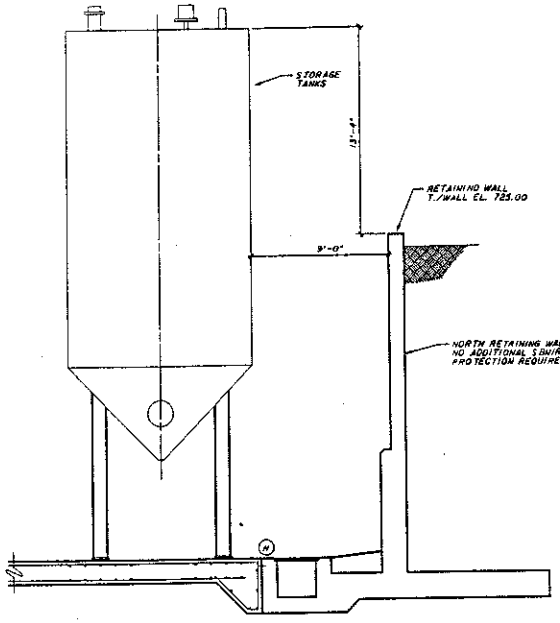
MECHANICAL

SPECIFICATIONS

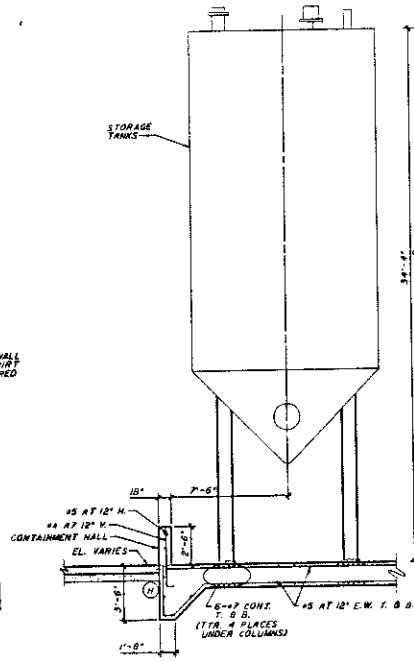
CONTRACT

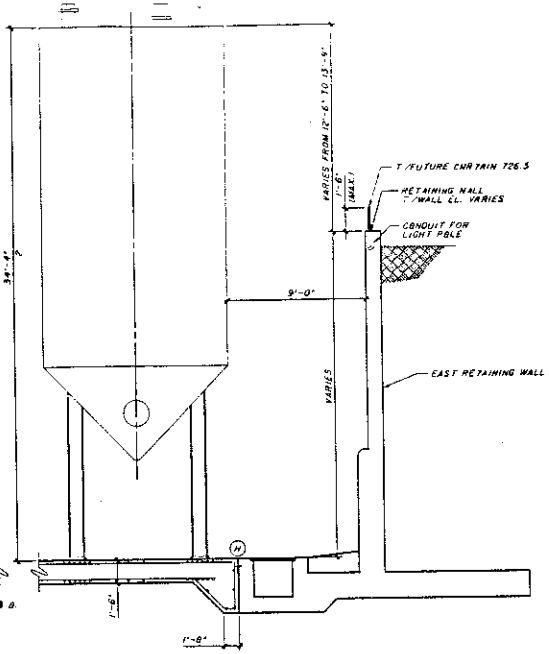
SHEET SUPP.-13





SECTION M / S-1
SCALE: 1/4" = 1'-0"





SECTION N / S-1
SCALE: 1/4" = 1'-0"

NOTE:
FOUNDATION FOR ALL STORAGE TANKS
TO BE INCLUDED UNDER THIS CONTRACT.

REV #	DESCRIPTION	BY	DATE	CHK'D
△				
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ISD / McNAMEE PORTER & SEELEY
CONSULTING ENGINEERS ARCHITECTS
615 N. WEST STREET, ANN ARBOR, MICHIGAN 48106

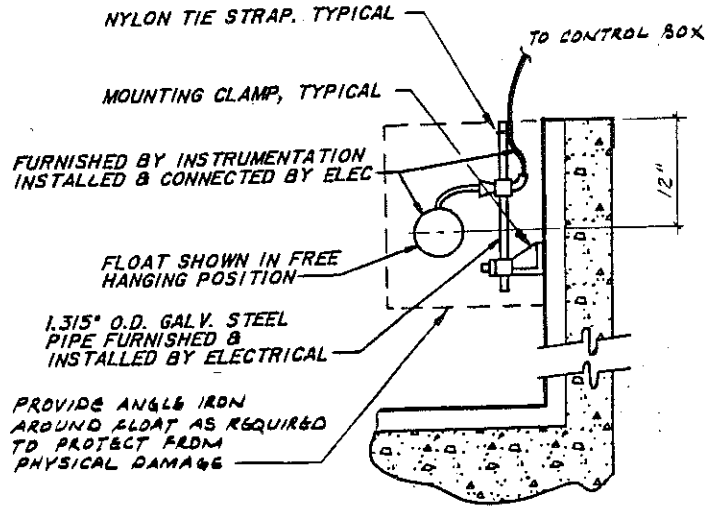
DESIGNED H. NOORI	CHECKED H. LEE
DRAWN J. HIRTH	ISSUE DATE JUNE 1988
SCALE AS NOTED	CADD DATE 10-24-89 JOB #
PLOT PROJ:LIBOHIS SHEET:MOH-0030 SECT:6	

MICHIGAN DISPOSAL INC.
HOLOCATION OF
WASTE SOLIDIFICATION OPERATION

STRUCTURAL
SECTIONS

CONTRACT

SHEET SUPP.-15
OF



CORD TYPE-SINGLE FLOAT SWITCH

NO SCALE

NOTE: ANGLE IRON ONLY REQUIRED FOR FLOATS IN WASTE HOLDING TANKS, NOT REQUIRED FOR FLOATS IN SLUDGE RECEIVING TANKS.

3235 SOUTH STATE ST. SUITE 202 ANN ARBOR, MI. 48108 [redacted]	MICHIGAN DISPOSAL INC. RELOCATION OF WASTE SOLIDIFICATION OPER.		CONTRACT
SCALE NONE	DATE 10-10-89	FLOAT SWITCH	SHEET SUP-16
DRAWN RLL	CHECKED		OF

Tank #1 - Steel Cylindrical Vertical Tank

Dimensions:	10' x 40' cone bottom
Shell Thickness:	1/4" steel
Liner:	None
Venting:	Stevens Sv-380 dust collector or the equivalent.
Overfilling:	High level Bin-Dicator alarm or equivalent at three-fourth capacity level. Automatic feed cut-off at full capacity.
Use:	Hazardous waste dust storage.

Tank #2 - Steel Cylindrical Vertical Tank

Dimensions:	10' x 40' cone bottom
Shell Thickness:	1/4" steel
Liner:	None
Venting:	Stevens SV-380 dust collector or the equivalent.
Overfilling:	High level Bin-Dicator alarm or equivalent at three-fourth capacity level. Automatic fee cut-off at full capacity.
Use:	Hazardous waste dust storage

Tank #3 - Steel Cylindrical Vertical Tank

Dimension:	10' x 40' cone bottom
Shell Thickness:	1/4" steel
Liner:	None
Venting:	Stevens SV-380 dust collector or the equivalent.
Overfilling:	High level Bin-Dicator alarm or equivalent at three-fourth capacity level. Automatic feed cut-off at full capacity.
Use:	Hazardous waste dust storage.

Tank #7 - Steel Rectangular Tank

Dimensions:	30′ x 35′ x 15′
Capacity:	560 cubic yards (6" freeboard). Two compartments; 280 cubic yards each.
Shell Thickness:	3/8" to 1/4" steel
Liner:	None. the tank is designed as a steel tank within a concrete containment structure. The outer concrete serves as secondary containment for the inner shell.
Venting:	Tank is enclosed in a building ventilated by the Quad Environmental Air Scrubber. Negative pressure is maintained within the building by the air scrubber.
Overfilling Control:	All loading operations are manually inspected by MDI personnel. A float switch triggers an audible alarm at the 6" freeboard level, indicating all loading must stop.
Use:	Tank is used to receive treated wastes from Tank 14 and untreated wastes directly as shipments.

Tank #8 - Steel Rectangular Tank

Dimensions:	35′ x 25′ x 15′
Capacity:	470 cubic yards (6" freeboard). Two compartments; 235 cubic yards each.
Shell Thickness:	3/8" to 1/4" steel
Liner:	None. The tank is designed as a steel tank within a concrete containment structure. The outer concrete serves as secondary containment for the inner shell.
Venting:	Tank is enclosed in a building ventilated by the Quad Environmental Air Scrubber. Negative pressure is maintained within the building by the air scrubber.
Overfilling Control:	All loading operations are manually inspected by MDI personnel. A float switch triggers an audible alarm at the 6" freeboard level indicating all loading must stop.
Use:	Tank is used to receive treated wastes from Tank 14 and untreated wastes directly as shipments.

Tank #9 - Steel Rectangular Tank

Dimensions:	35′ x 25′ x 15′
Capacity:	470 cubic yards (6" freeboard)
Shell Thickness:	3/8" to 1/4" steel
Liner:	None. The tank is designed as a steel tank within a concrete containment structure. The outer concrete serves as secondary containment for the inner shell.
Venting:	Tank is enclosed in a building ventilated by the Quad Environmental air Scrubber. Negative pressure is maintained within the building by the air scrubber.
Overfilling Control:	All loading operations are manually inspected by MDI personnel. A float switch triggers an audible alarm at the 6" freeboard level indicating all loading must stop.
Use:	Tank is used to receive treated wastes from Tank 14 and untreated wastes directly as shipments.

Tank #10 - Steel Rectangular Tank

Dimensions:	30' x 35' x 15'
Capacity:	565 cubic yards (6" freeboard)
Shell Thickness:	3/8" to 1/4" steel
Liner:	None. The tank is designed as a steel tank within a concrete containment structure. The outer concrete serves as secondary containment for the inner shell.
Venting:	Tank is enclosed in a building ventilated by the Quad Environmental Air Scrubber. Negative pressure is maintained within the building by the air scrubber.
Overfilling Control:	All loading operations are manually inspected by MDI personnel. A float switch triggers an audible alarm at the 6" freeboard level, indicating all loading must stop.
Use:	Tank is used to receive treated wastes from Tank 14 and untreated wastes directly as shipments.

Tank #11 - Rectangular Steel Tank

Dimensions:	See engineering plans; drawings S-8, S-9 S-10; Structural Sections.
Capacity:	40,000 gallons
Shell Thickness:	3/8" to 1/4" thick steel. The tank is designed as a steel tank within a concrete containment structure. The concrete serves as secondary containment for the inner shell.
Liner:	None. Double walled tank construction.
Venting:	Connected to QUAD Environmental Air Scrubber, negative pressure maintained in tank.
Overfilling Control:	ALL loading operations are manually inspected by MDI personnel. A float switch triggers an audible alarm at the 6" freeboard level, indicating all loading must stop.
Use:	Liquid and sludge storage, process feed tank

Tank #12 - Rectangular Steel Tank

Dimensions:	See engineering plans; drawings S-8, S-9 and S-10; Structural Sections.
Capacity:	40,000 gallons
Shell Thickness:	3/8" to 1/4" thick steel. The tank is designed as a steel tank within a concrete containment structure. The outer concrete serves as secondary containment for the inner shell.
Liner:	None. double walled tank construction
Venting:	Connected to QUAD Environmental Air Scrubber, negative pressure maintained in tank.
Overfilling Control:	All off loading operations are manually inspected by MDI personnel. A float switch triggers an audible alarm at the 6" freeboard level, indicating all loading must stop.
Use:	Liquid and sludge storage; process feed tank

Tank #14 - Pugmill Mixer

Dimensions:	4.5' W x 10' L x 3'0 deep
Capacity:	1/2 cubic yard agitating capacity
Shell:	3/16" to 5/16" thick steel
Liner:	Abrasion liners in mixing chamber; 3/16" steel
Venting:	QUAD Environmental air Scrubber, negative Pressure: Vacuum draft vented to bag house or proximate dust storage tank.
Overfilling Control:	Manual - visual inspection during processing. A flow through mixing device that is continuously gravity fed and unloaded, during processing.
Use:	Processing of dusts, liquids and sludges

Tank #15 - Pugmill Mixer

Dimensions:	4.5' W x 10' L x 3'0
Capacity:	1/2 cubic yard agitating capacity
Shell:	3/16" to 5/16" thick steel
Liner:	Abrasion liners in mixing chamber 3/16" steel
Venting:	QUAD Environmental Air Scrubber, negative. Pressure: Vacuum draft vented to bag house or proximate dust storage tank.
Overfilling Control:	Manual - visual inspection during processing. A flow through mixing device that is continuously qravity fed and unloaded, during processing.
Use:	Processing of dusts, liquids and sludges

Tank #16 - Steel Cylindrical Vertical Tank

Dimensions:	20' x 12' with 6' 45 degrees cone bottom
Capacity:	20,000 gallons
Shell Thickness:	1/4" steel
Liner:	Plasite 4300, by Wisconsin Protective Coating. See Attachment III to this section.
Venting:	Emergency relief vent, pressure-vacuum vent
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Liquid Waste Storage, waste to be stabilized.

Tank #17 - Steel Cylinder Vertical Tank

Dimensions:	20′ x 12′ with 6′ 45 degree cone bottom
Capacity:	20,000 gallons
Shell Thickness:	1/4" steel
Liner:	Plasite 4300 by Wisconsin Protective Coating. See Attachment III to this section.
Venting:	Emergency relief vent, pressure-vacuum vent, indicator alarm, equipped with weight-lite liquid level indicator.
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Liquid Waste Storage, waste to be stabilized.

Tank #18 - Steel Cylinder Vertical Tank

Dimensions:	20′ x 12′ with 6′ 45 degree cone bottom
Capacity:	20,000 gallons
Shell Thickness:	1/4" steel
Liner:	Plasite 4300 by Wisconsin Protective Coating. See Attachment III to this section.
Venting:	Emergency relief vent, pressure-vacuum vent indicator alarm, equipped with weight-lite liquid level indicator.
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Liquid Waste Storage, waste to be stabilized.

Tank #19 - Steel Cylinder Vertical Tank

Dimensions:	20' x 12' with 6' 45 degree cone bottom
Capacity:	20,000 gallons
Shell Thickness:	1/4" thick steel
Liner:	Plasite 4300 by Wisconsin Protective Coatings. See Attachment III to this section.
Venting:	Emergency relief vent, pressure-vacuum vent
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite level indicator.
Use:	Liquid Waste Storage. Waste to be stabilized.

Tank #20 - Steel Cylindrical Vertical Tank

Dimensions:	20' x 10' with 6' 45 degree cone bottom
Capacity:	15,000 gallons
Shell Thickness:	1/4" thick steel
Liner:	Plasite 4300, by Wisconsin Protective Coatings. See Attachment III to this section.
Venting:	Emergency relief vent. Pressure vacuum vent
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Liquid Waste Storage. Not connected to the stabilization system.

Tank #21 - Steel Cylindrical Vertical Tank

Dimensions:	20' x 10' with 6' 45 degree cone bottom
Capacity:	15,000 gallons
Shell Thickness:	1/4" thick steel
Liner:	Plasite 4300, by Wisconsin Protective Coatings. See Attachment III to this section.
Venting:	Emergency relief vent. Pressure vacuum vent
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Liquid Waste Storage. Not connected to the stabilization system.

Tank #22 - Vertical Steel Tank

Dimensions:	10'0 x 25' L, storage cone bottom
Capacity:	15,000 gallons
Shell:	1/4" thick steel
Liner:	Plasite 4300, by Wisconsin Protective Coatings. See Attachment III to this section.
Venting:	Emergency relief vent, vacuum/pressure vent indicator alarm, equipped with weight-lite liquid level indicator.
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Liquid Waste Storage. Not connected to the stabilization system.

Tank #23 - Vertical Steel Tank

Dimensions:	10'0 x 15' L, storage cone bottom
Capacity:	15,000 gallons
Shell:	1/4" thick steel
Liner:	Plasite 4300, by Wisconsin, etc...
Venting:	Emergency relief vent, vacuum/pressure vent indicator alarm, equipped with weight-lite liquid level indicator.
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Liquid Waste Storage. Not connected to the stabilization system.

Tank #24 - Vertical Steel Tank

Dimensions:	10'0 x 25' L, cone bottom
Capacity:	15,000 gallons
Shell:	1/4" thick steel
Liner:	Plasite 4300, by Wisconsin Protective Coatings. See Attachment III to this section.
Venting:	Emergency relief vent, vacuum/pressure vent indicator alarm, equipped with weight-lite liquid level indicator.
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Liquid Waste Storage. Not connected to the stabilization system.

Tank #25 - Vertical Fiberglass Tank

Dimensions:	12'0 x 25' L,
Shell:	Capacity 20,000 gallons. Fiberglass, Insulated and heat-traced.
Liner:	Vinyl ester resin
Venting:	Emergency relief vent, vacuum/pressure vent indicator alarm, equipped with weight-lite liquid level indicator.
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Storage of sodium hypochlorite, directly feeds Tank 14. Prior to the introduction of hazardous wastes, tank 25 is rinsed and emptied. All wastes are evaluated for tank liner compatibility and waste-waste compatibility prior to acceptance.

Tank #26 - Vertical Steel Tank; proposed as future development

Dimensions:	10' x 25'
Capacity:	15,000 gallons
Shell:	1/4" thick steel
Liner:	Plasite 4300, by Wisconsin Protective Coatings. See Attachment III to this section.
Venting:	Emergency relief vent, vacuum/pressure vent indicator alarm, equipped with weight-lite liquid level indicator.
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Liquid Waste Storage. Not connected to the stabilization system.

Tank #27 - Vertical Fiberglass Tank

Dimensions:	12' x 25' L, flat bottom
Capacity:	20,000 gallons
Shell:	Fiberglass, Insulated and heat traced
Liner:	Vinyl ester resin
Venting:	Emergency relief vent, vacuum/pressure vent indicator alarm, equipped with weight-lite liquid level indicator.
Overfilling Control:	Waste feed cut-off and high level indicator alarm, equipped with weight-lite liquid level indicator.
Use:	Storage of sodium hypochlorite, directly feeds Tank 14. Tank 27 is rinsed and emptied prior to holding hazardous waste. Wastes are evaluated as described in tank #25 above.

Our experience and test results have demonstrated that no appreciable deterioration of the storage tanks occurs due to MDI's operation. We expect this to continue effectively giving the tanks an unlimited lifespan. With annual testing, we will be able to detect any deterioration that may develop and respond accordingly.

ATTACHMENT 12

Treatment Procedures

METHOD OF TREATMENT
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~~Attachment I, Organic Waste Stabilization Demonstration~~

1) **STABILIZATION REACTION**

Michigan Disposal, Inc. (MDI) utilizes a waste stabilization technique commonly referred to as pozzolanic solidification. This technique relies on materials rich in stabilization and solidification agents to provide a solid stabilized mass when mixed with wastes in an aqueous medium. The most commonly utilized materials in MDI's process are soluble silicates, lime, cement kiln dust, fly ash and, in part, electric arc furnace dust. All compounds contain either soluble silicates, 10-30% calcium oxide or a combination of the two and effectively stabilize waste in a slightly exothermic reaction.

The materials utilized in MDI's process follow a reaction sequence very similar to that of concrete. Upon mixture of the stabilization agents and waste, a hydrated calcium silicate gel is formed. The mix ratio favoring formation of this gel is determined in the laboratory but is adjusted somewhat subjectively in practice, by observing and modifying the proper waste to stabilization agent mixture as treatment takes place. When a product mix similar to wet concrete is established the waste will stabilize in 5 - 10 hours and be ready for testing and landfill disposal. The gel like mixture hardens as silicate crystals grow in the alkaline matrix of waste and stabilization agents. The silicate crystals grow from individual particles in the matrix, including the waste itself. In the pozzolanic process the presence of fine grained inert solid particles and an exceptionally alkaline medium may prevent the formation of a monolithic concrete like solid, instead forming a material with an earth like consistency. By reducing the volume of calcium oxide in favor of additional silicate containing materials a monolithic solid may be easily created. Retention times of twelve hours or more are very common prior to disposal of treated wastes. As with concrete, the reaction continues for several days, gradually strengthening the stabilized product and continually reducing the concentration of leachable metals, and other hazardous constituents.

MDI also utilizes a modified version of the stabilization process in order to attain treatment levels mandated by recently enacted land disposal prohibitions. The treatments are recognized as the best demonstrated and available technology (BDAT) for

1) **STABILIZATION REACTION** (Continued)

many inorganic and a few organically contaminated waste streams. In each case, waste treatment is confirmed through post treatment analysis of the residue, thereby demonstrating and documenting the effectiveness of the process.

With respect to the treatment of organically contaminated wastes, according to a guidance document published by the EPA, Guide to the Disposal of Chemically Stabilized and Solidified Waste, while the pozzolanic process is very effective in stabilizing inorganic wastes, only 20% organic constituents can be effectively stabilized. With respect to this observation MDI has performed several bench scale tests to demonstrate up to 20% "listed" organic constituents can be stabilized. The results are detailed in Appendix I pages 2-13. It was also demonstrated that the organic material is not simply volatilized, pages 14-28 show the results of a weight loss study as the product solidifies.

The treatment is affected through the mixing of the stabilization agents, modifiers and waste products, resulting in an homogeneous gel like mass. Physically this is accomplished in two ways, pugmill treatment and in-tank stabilization.

2) **PUGMILL TREATMENT**

The pugmill mixer is the primary treatment vessel in MDI's process. Liquid, sludge and slurried wastes are pumped from the waste storage tanks (tank farm) or conveyed from the sludge feed tanks to the pugmill. Stabilization agents are conveyed from storage silos adjacent to the pugmill and fed into the pugmill at the same point as the liquid waste(s). After mixing in the pugmill the waste is discharged to a stacking conveyor for distribution to the waste holding tanks. The waste is then sampled and analyzed to demonstrate and document effective treatment.

2) **PUGMILL TREATMENT**

a) Treatment in the West Pugmill; Tank 14

The west pugmill is used for the treatment of wastes identified in 40 CFR Part 261 Subpart D and identified in the Part A Application and the Waste Analysis Plans D007 and D012-D017 wastes may also be treated in this tank if treatability testing demonstrates an ineffective treatment of a particular waste stream.

Prior to treatment in the west pugmill, Michigan Disposal's laboratory conducts a treatability study on each waste. The study is conducted to insure standard operating procedures will result in a successfully stabilized product and identify any special treatment requirements for the waste prior to waste acceptance. Standard treatment involves mixing waste to stabilization agent in a 1:1 ratio by volume. This is established by setting the feed rates on the rotary vane feeders on the base of the silos 1, 2 or 3 equal to the liquid feed rate on the screw conveyor or pump coming from tank 11, 16, 17, 18, 19, 25 or 27.

After treatment in the pugmill mixer, treatment residues are discharged through a staking conveyor to tank number 7 or 8. The treated waste is sampled according to the requirements of SW-846 and analyzed to insure compliance with land disposal restructions prior to shipping for final disposal. Analysis consists of a TCLP extraction followed by metal and organic analysis for the constituents of concern. Final analysis varies based on the type of waste being treated.

b) Treatment in the East Pugmill, Tank 15

The east pugmill is used for the treatment of hazardous wastes described in 40 CFR Part 261 Subpart C and identified in the Part A application and Waste Analysis Plan, including K062 wastes.

If soluble metal concentrations (EP Toxicity Results) are less than specified in (5); Treatability Testing, no pretreatment analysis is conducted. If soluble metal concentrations are greater than this level treatability test is conducted to insure the waste can be successfully

3) **IN TANK STABILIZATION** (Continued)

the process is confirmed through post treatment analysis of the residue.

As with pugmill treatment, in tank stabilization is separated into characteristic and listed waste treatment. Tanks 7 and 8, just as the west pugmill (Tank 14) receive listed hazardous waste types identified in 40 CFR Part 261 Subpart D and identified as an acceptable waste type in the Part A Application and Waste Analysis Plan. Also treated in tanks 7 and 8 are waste types D007, hexavalent chrome only and D012-D017.

Tanks 9 and 10 receive wastes described in 40 CFR Part 261 Subpart C and identified in the Part A Application and the Waste Analysis Plan, including K062 wastes.

In an effort to introduce all wastes to the pugmill, by 1991 MDI may install a hopper and conveyor to screen incoming wastes and convey solids to the pugmill mixer. Once this change is made solid wastes will be received in the waste holding tanks for temporary storage, an excavator will then lift the solid wastes and deposit them onto a 3" screen over a small hopper feeding a belt conveyor for delivery to the pugmill mixer. Stabilization agents will be added and materials discharged to the conveyor for distribution in the adjacent waste holding tanks. Post treatment analysis will follow stabilization as described below.

In either case described above, wastes that pose a dusting problem when tipped into the waste holding tanks are not accepted. Wastes containing free liquids are accepted into the sludge feed tanks, not the waste holding tanks.

4) **POST TREATMENT ANALYSIS**

All listed hazardous wastes being accepted by MDI are subject to the land disposal restrictions found in 40 CFR Part 268 Subparts A, B, C and D. The treatment requirements for these wastes are spelled out in Part 268 Subpart D. All analysis are performed on TCLP extractions according to the analytical methods specified in 268.40(a). Prior to shipping any wastes for final disposal it is confirmed through sampling and analysis, that the waste meets the specified treatment standards. Waste is sampled with a random

4) **POST TREATMENT ANALYSIS** (Continued)

three dimensional matrix according to the requirements of Chapter Nine, SW 846. Sampled waste is directed to the laboratory for TCLP extraction followed by analysis for the appropriate constituents. A log of post treatment analysis results maintained on site at MDI and is provided to the final disposal facility along with the required certifications and notifications.

The treatment of characteristically hazardous wastes, types D001, D002, D004, D005, D006, D007, D008, D009, D010, D011 001D and 003D and listed hazardous waste type K062 result in a product which is not characteristically hazardous and may be managed as a non-hazardous waste. Post- Treatment Analysis is used to confirm succesful treatment prior to disposing of the waste. Waste is sampled with a random three dimensional matrix according to the sampling requirements of Chapter Nine, SW-846. Sampled waste is directed to the laboratory for EP Toxicity Extraction followed by analysis of metals listed as D004 through D011 including 001D and 003D. Additional testing includes pH, flash point of the treatment residue and the paint filter test. The analysis is kept on file on site at MDI and provided to the disposal facility with each shipment of waste sent for disposal.

5) **TREATABILITY TESTING**

MDI conducts treatability testing to insure the waste stabilization reaction will effectively treat a waste stream to required levels prior to acceptance of the waste. The procedure involved in a treatability test is described below. Not all waste types require a treatability test. The need for a treatability test is described below in (5) Treatment Performance by Waste Type. A decision chart is detailed on the following page to help the Chemists and Technicians determine if a treatability test is required.

Treatability Study
Decision Chart

WASTE	TREATABILITY	POST TREATABILITY TESTING ANALYSIS
D001	NO	N/A
D002	NO	N/A
D004-6 < 10,000 ppm metal*	NO	N/A
D004-6 > 10,000 ppm metal*	YES	EPTox
D007 < 100,000 ppm trivalent chrome*	NO	N/A
D007 > 100,000 ppm trivalent chrome*	YES	EPTox
D007 < 10,000 ppm hexavalent chrome*	NO	N/A
D007 > 10,000 ppm hexavalent chrome*	YES	EPTox
D008 < 50,000 ppm lead*	NO	N/A
D008 > 50,000 ppm lead*	YES	EPTox
D009 < 100 ppm mercury*	NO	N/A
D009 > 100 ppm mercury*	YES	EPTox
D010 < 200 ppm selenium*	NO	N/A
D010 > 200 ppm selenium*	YES	EPTox
D011 < 500 ppm silver*	NO	N/A
D011 > 500 ppm silver*	YES	EPTox
001D, 003D < 100,000 ppm copper, zinc*	NO	N/A
001D, 003D > 100,000 ppm copper, zinc*	YES	EPTox
D012-D017	YES	EPTox

Treatability Study (Continued)

Listed Wastes

F Series Wastes	YES**	TCLP***
K Series Wastes	YES	TCLP***
U Series Wastes	YES	TCLP***

* Results of EP Toxicity Extraction and Analysis:

** Not necessary if pretreatment soluble metal concentrations are below those of concern for D series wastes.

*** TCLP extraction and subsequent analysis for pertinent constituents identified in 40 CFR 268 Subparts A, B, C, D are performed to insure treatment is effective and provides a residue in compliance with land disposal restrictions.

The treatability test is simply mixing waste and stabilization agents in a 1:1 by volume. Measured volumes of the waste of between 100 and 500 ml are mixed with an equal volume of stabilization agent. Mixing takes place in a large beaker with a food mixer set on low speed for 45 seconds. Mixing is designed to emulate retention time in the pugmill mixer and mixing time per unit of waste in the waste holding tanks. After mixing, the waste is allowed to stabilize for 5-10 hours. A sample of the waste is taken for EP Toxicity or TCLP extraction followed by analysis for the constituents of concern. A treatability report is then prepared, showing before and after concentrations for constituents of concern. The report is placed into the waste streams hard copy technical approval file prior to acceptance of the waste.

To successfully treat certain waste streams, a modification of the standard process is required. Modified treatments are first verified in the laboratory then implemented at the plant once the waste is received. Modified treatments are considered confidential information and have been provided to MDNR under separate cover. It is important to note that all treatments are verified through actual post treatment analysis of treatment residue, prior to disposal of the waste.

6) **WASTE SPECIFIC TREATMENT DISCUSSION**

As discussed above, stabilization is a very effective treatment for a broad range of inorganically contaminated wastes and a few organically contaminated wastes. A brief discussion of how each waste type or group of waste types is treated is presented below. Following the presentation is a series of examples, actual records from MDI's files, exhibiting the effectiveness of the stabilization process.

Discussion

a) Non-Hazardous - No Discussion

b) D001

These characteristic wastes are divided into two categories:

i) Characteristic of ignitability (MDI waste analysis plan, > 90, < 140oF.

ii) Oxidizing potential.

The MDI process which uses soluble silicates carriers such as cement kiln dust is capable of handling category (i) via the intermixing with the ignitable compounds and via absorption/adsorption to reduce the vapor density through a remarkable reduction in the exposed surface area. It will also serve as a moderator using the hydrated kiln dust, wetted prior to mixing with the D001 wastes, giving rise to molecule segregation and in many cases, the partial dissolution of some organics in the aqueous phase (which acts as the pozzolanic initiator).

The MDI process is also capable of handling and eliminating the characteristic of "oxidizers" i.e., their ability to gain electron via exothermic reaction.

6) **WASTE SPECIFIC TREATMENT DISCUSSION**

b) D001 (Cont.)

The basis for this capability arises from the fact that the soluble silicates and alkali metal oxides such as sodium, calcium and magnesium hydroxides have a characteristic of being mild reducing agents, i.e., the ability to lose electrons via their negative oxidation - reduction potential (-mv). This is a characteristic well established in an alkali pH medium i.e., pH > 8.5 units.

c) D002

The characteristic of corrosivity, either acidic (pH < 7) or basic (pH > 7) is easily handled by the MDI process.

Acidic materials are neutralized with the plentiful alkali oxide contents of the stabilizing media (sodium, calcium and magnesium oxides). These media act as a pH regulator to fall within 8.5--11.5 units.

The final products resulting from the treatment of D002 (Acidic & Basic) is normally a residue buffered to pH values ranging from 8.5-11.5 units.

In this reaction, all free hydrogen ions (H+) are converted to water by the excess (OH-) hydroxyl ions. The final pH is controlled by the buffering capacity and the presence of small concentrations (slight excess) of hydroxyl ions (10^{-6} M to 10^{-3} M).

d) D004-D011, 001D, 003D and Nickel Wastes

Wastes exhibiting one or more of the above EP-toxic characteristic with respect to heavy metals are handled by the MDI process utilizing three process advantages.

i) pH adjustment via buffering, as discussed in (6)(c) D002. Most heavy metals are precipitated as their respective hydroxides Me(OH)x, carbonates or oxides in alkali pH ranges (8.5-11.5 units).

ii) The Pozzolanic interaction of the available silicate thus forcing the heavy metals into the Crystal lattice which will reduce the

6) **WASTE SPECIFIC TREATMENT DISCUSSION**

d) D004-D011, 001D, 003D and Nickel Wastes (Cont.)

leaching characteristics by orders of magnitude. This takes place via the interaction of the strong positive charges of the metal species with those already negatively charged (via the alkaline pH) of the silicate carrying media.

iii) The third process capability is the use of known waste components in tackling compatible species in reducing the solubility of the resulting mixes. Example the use of a high Ferric metal content waste to handle Arsenic wastes followed by the pozzolanic aggregation of the coprecipitates Fe+3 and As+3, As+5 into the silicate matrix.

Metals in concentrations discussed in (5) Treatability Testing above are routinely stabilized into a non-hazardous residue.

e) D012-D017

The components of the above characteristic wastes (D012-D017) have been shown to decrease by up to one order of magnitude using the MDI standard fixation process.

This treatment involves the encapsulation within the silicate matrix and thus reducing the leaching of the components of the codes D012-D017.

Due to the very low volume of wastes covered by the above codes, all received wastes (D012-D017) will be treated and disposed of as hazardous wastes.

Modified treatment procedures might be introduced to achieve effective treatment and attain non-hazardous levels.

Details of modified treatments are confidential and will be covered under a separate letter to MDNR.

6) **WASTE SPECIFIC TREATMENT DISCUSSION**

f) F001, F002, F003, F005

Listed wastes covered by the above codes were subjected to land disposal restriction issued in 40 CFR, 268 A, B, C and D.

Despite the fact that the BDAT standards were based on incineration and carbon adsorption, stabilization is believed to achieve some of the issued BDAT standards via changing the physical state and reducing the concentration of the soluble organic constituents.

The extreme variations in results obtained from the standard stabilization process due to molecular size, change and the affinity to water, require assessment of wastes as individual cases. This is achieved by conducting treatability studies and generally require process modifications. Modifications are considered confidential business information and have been provided to MDNR under a separate cover.

6) **WASTE SPECIFIC TREATMENT DISCUSSION**

g) F006, F007, F008, F009, F011, F012, F019
(Electroplating Wastes)

The above listed wastes are subject to land disposal restriction found in 40 CFR Part 268 Subpart A, B, C and D.

The above wastes are listed due to their (a) total and reactive cyanide contents, (b) soluble heavy metal concentrations of Cadmium, Chromium, Nickel, Lead and Silver.

Wastes having reactive cyanide levels > 250 ppm are not accepted at the MDI plant.

Metal concentrations up to 20,000 ppm (using EP Toxicity Extraction) can be effectively treated (stabilized) using the MDI standard process. Metals treatments are discussed in section (d) (D004-11, 001D, 003D and Nickel). In spite of the above knowledge, a treatability study is conducted on every stream to insure effective treatment and compliance with the BDAT/TCLP standards.

In order to effectively treat some F006-F019 wastes, a modified treatment process may be utilized. The modified process is considered confidential and has been furnished to MDNR under separate cover.

h) F010

This listed waste is similar to the F006-F019 listed wastes due to its cyanide and heavy metals content and is subject to the land disposals restrictions issued in 40 CFR Part 268 Subpart A, B, C and D. F010 wastes having in excess of 1.9 ppm reactive Cyanides are not accepted for treatment. This code is either separately treated or with other wastes complying with a total cyanide concentrations limit of 1.9 ppm to insure compliance with land disposal restrictions.

A separate treatability study will be conducted on this code to insure process effectiveness prior to waste acceptance.

6) **WASTE SPECIFIC TREATMENT DISCUSSION**

h) F010 (Continued)

In order to effectively treat some F010 wastes, a modified treatment process may be utilized. The modified process is considered confidential and is being provided to MDNR under separate cover.

i) K-Series Wastes, Other than K062

K Series wastes are subject to the land disposal restrictions found in 40 CFR Part 268 Subparts A, B, C and D. K Series wastes are listed due to the presence of; (a) reactive compounds such as cyanide or sulfide, (b) soluble heavy metals identified in 5(d) D004-11, 001D, 003D and Ni above and (c) hazardous organic constitutents. MDI's Waste Analysis Plan ensures reactive compounds such as cyanide and sulfide are not accepted for treatment. Prior to acceptance of any K Series waste a treatability study is conducted to insure the waste can be effectively treated. As discussed above, in 5(d), MDI's standard treatment process effectively treats soluble, heavy metals found in K Series wastes.

In order to effectively treat some K Series wastes, a modified treatment process may be utilized. The modified treatment is considered confidential and has been provided to MDNR under separate cover.

j) K062

K062 is listed as a hazardous waste due to the characteristic of corrosivity and the presence of soluble heavy metals. MDI's standard treatment process effectively treats these hazardous characteristics as described in 5(c) and 5(d) above. K062 is subject to the land disposal restrictions found in 40 CFR Part 268 Subparts A, B, C and D. However, K062 is also subject to an exemption found in 40 CFR Part 261 Subpart A Section 261.3(c)(2)(ii). As required by the exemption, when treating K062 wastes MDI utilizes lime as a neutralization/stabilization agent.

6) **WASTE SPECIFIC TREATMENT DISCUSSION**

j) K062 (Continued)

When concentrations of heavy metals fall within the demonstration discussed in 5(d) a treatability study is not required. Concentrations exceeding; these levels require a treatability study to insure effective treatment of the waste.

In order to effectively treat some K062 wastes a modified treatment process may be utilized. The modified process is considered confidential and has been provided to MDNR under separate cover.

k) U Series Wastes

As stated in the Part A Application and Waste Analysis Plan, MDI does not accept U series wastes in pure concentrated form. They are only accepted as a contaminant in an otherwise inert carrier such as soil or water or as a contaminant in another waste.

U series wastes are listed due to the hazardous nature of each compound. U series wastes are or will be subject to the land disposal restrictions found in 40 CFR Part 268 Subparts A, B, C, and D. Standard treatment through MDI's stabilization process will easily render liquid wastes solid due to the solidification reaction. If treatment is necessary to comply with a land disposal restriction regarding the concentration of a U series contaminant, a modified treatment process may be used by MDI. The modified process is considered confidential and has been provided to MDNR under separate cover.

9) **MIXING, BLENDING AND COMINGLING OF WASTES**

As part of the storage process, it is inevitable that various individual waste streams are mixed, blended and/or comingled. The blending operations are conducted by plant personnel under the direction and careful supervision of MDI's technical department or laboratory.

a) Authorization to Mix or Blend

Prior to approving a waste stream for acceptance a series of compatability tests are conducted, insuring the waste is acceptable and compatible with MDI's tank systems and other accepted waste streams. Upon receipt of an approved waste, the laboratory designates the receiving storage tank. A sample of the waste is then tested for compatability with other wastes in storage according to the procedures presented in the Waste Analysis Plan, Tab II-C. The laboratory then completes an acceptance authorization form, designating the storage tank and releases the truck to the plant.

b) Plant Operations

Once received, the waste is directed to the plant for unloading into a storage tank. An authorization slip prepared by the laboratory, indicating the storage tank to be used, is presented to the tank farm operator with copies of a receipt and the signed manifest for comparison, prior to unloading. After confirming the wastes identity, the operator connects the tanker to the designated tank and unloads the truck.

Waste already present in the tank may be thoroughly mixed by recirculating or physically mixing the contents. Tank to tank mixing may also be conducted, but only at the direction of the laboratory after the compatibility checks described above have been completed.

10) **DISPOSAL OF TREATMENT RESIDUE**

After the post treatment analysis is completed the data is reviewed to confirm successful treatment of the waste. If the waste was not successfully treated, treatment is repeated as described above in In Tank Stabilization.

a) Disposal of Non-Hazardous Treatment Residue

EP Toxicity, pH, flash point and paint filter test results are reviewed to insure successful treatment has occurred. Once deemed successful, the waste and copies of the analytical results are transported to a non-hazardous solid waste disposal facility for final disposal.

Currently, the waste is transported to Wayne Disposal, Inc. for disposal in a non-hazardous landfill. MDI's waste stream approval file at Wayne Disposal contains the analytical results discussed above.

b) Disposal of Hazardous Waste Treatment Residue

After analysis is completed the results are reviewed to confirm successful treatment relative to the requirements found in 40 CFR Part 268 Subparts A, B, C, and D. Once treatment is deemed successful, the analytical results, notifications and certifications are prepared for delivery with the waste to a properly licensed hazardous waste landfill disposal facility.

Currently, the waste is transported to Wayne Disposal, Inc. (WDI) on site and all analysis, notifications and certifications are transferred to the Wayne Disposal, Inc. files on site.

ATTACHMENT 13

Tank Spill and Overflow Prevention

PREVENTATIVE PROCEDURES

(i) Prevention of hazards in unloading operations are accomplished by careful handling of each waste stream in the bulk, tank and drum handling areas.

The unloading area for bulk liquids is provided with an off loading ramp that positions trucks directly in line with the sludge box receiving riser. This above ground riser is provided with splash and wind protection sides. The box contains a grate to prevent any material from entering the sludge box that cannot be handled by the screw conveyors.

The bulk tanker receiving area (pump or unloading area) is provided with dikes around the tanks and all loading pumps are in a self-contained area. The receiving lines are equipped with quick disconnects and back flow valves to prevent spillage either from lines, pumps or tanks.

e) Waste Storage Tanks

(i) Waste to be Treated; Tanks 16, 17, 18, 19, 25, 27

Tanks 16, 17, 18, 19, 25, 27 are located in the tank farm in the north east corner of the East Container Staging Area. These tanks are filled by one of two pumps located in the unloading station along the north retaining wall between the North Container Storage Area and East Container Staging Area. The valving, filling and discharge options available for Tanks 16, 17, 18 and 19 are described schematically on engineering plan M-1, Process Flow Diagram. The valving, filling and discharge options available for Tanks 25 and 27 are described schematically on Engineering Plan Sup-8, Schematic and Details.

A typical filling procedure takes place as follows:

1) Tank to be filled is selected by the laboratory.

2) Tank level and log sheet are checked to insure there is sufficient room to hold the load.

3) Pump to be used is selected.

4) Valving between the pump and tank is properly aligned.

5) The tanker truck is connected to the pump.

4. DESCRIPTION OF TANK SYSTEMS AND OPERATION

e) Waste Storage Tanks

i) Waste to be Treated; Tanks 16, 17, 18, 19, 25, 27 (Continued)

6) The open valve line between the pump and tank is physically retraced. All valves tied off the main feed line are checked and placed in the closed position.

7) The truck valve is opened and the pump started, delivering waste to the chosen tank.

8) After the truck is emptied, the pump is shut down.

9) The suction valve adjacent to the pump is closed.

10) The truck valve is closed and flexible connection removed between the pump and truck.

11) A 1.5" clean water flush line is attached to the suction end of the pump.

12) The suction valve is opened and the pump started to flush out the line.

13) Tank numbers are stenciled on each tank. The term "fill" or "discharge", tank numbers and direction arrows are stenciled on all fill and discharge lines dedicated to an individual tank. Stencils are placed in a position easily seen by the operator.

The contents of the storage tanks can be transferred to one of the pugmills sludge receiving tanks (#11, 12, 14 or 15) following an identical sequence. For the transfer sequence, the tanker trucks discharge line is simply replaced with the rigid plumbing between the tanks discharge line and the selected pump.

4. DESCRIPTION OF TANK SYSTEMS AND OPERATION

e) Waste Storage Tanks

ii) Waste to be Stored; Tanks 20, 21, 22, 23, 24, 26

These tanks will be constructed within 3 years after the operating license is issued. They are not present at the facility at this time.

Two additional pumps, P-3 and P-4 will be placed in the unloading area and dedicated to filling and discharging from tanks 20, 21, 22, 23, 24 and 26. Tanks and lines will be labeled as discussed above in 4(e) (i) Waste to be Treated. Tanks will be filled and emptied as discussed above in Tab IX 4(e)(i) Waste to be Treated.

OVERFLOW PREVENTION

Tank #1 - Steel Cylindrical Vertical Tank

Overfilling Control: High level Bin-Dicator alarm or equivalent at three-fourth capacity level. Automatic feed cut-off at full capacity.

Tank #2 - Steel Cylindrical Vertical Tank

Overfilling Control: High level Bin-Dicator alarm or equivalent at three-fourth capacity level. Automatic feed cut-off at full capacity.

Tank #3 - Steel Cylindrical Vertical Tank

Overfilling Control: High level Bin-Dicator alarm or equivalent at three-fourth capacity level. Automatic feed cut-off at full capacity.

Tank #7 - Steel Rectangular Tank

Overfilling Control: All loading operations are constantly monitored by MDI personnel. A float switch triggers an audible alarm at the 6-inch freeboard level, indicating all loading must stop.

Tank #8 - Steel Rectangular Tank

Overfilling Control: All loading operations are constantly monitored by MDI personnel. A float switch triggers an audible alarm at the 6-inch freeboard level, indicating all loading must stop.

Tank #9 - Steel Rectangular Tank

Overfilling Control: All loading operations are constantly monitored by MDI personnel. A float switch triggers an audible alarm at the 6-inch freeboard level, indicating all loading must stop.

Tank #10 - Steel Rectangular Tank

Overfilling Control: All loading operations are constantly monitored by MDI personnel. A float switch triggers an audible alarm at the 6-inch freeboard level, indicating all loading must stop.

Tank #11 - Steel Rectangular Tank

Overfilling Control: All loading operations are constantly monitored by MDI personnel. A float switch triggers an audible alarm at the 6-inch freeboard level, indicating all loading must stop.

Tank #12 - Steel Rectangular Tank

Overfilling Control: All loading operations are constantly monitored by MDI personnel. A float switch triggers an audible alarm at the 6-inch freeboard level, indicating all loading must stop.

Tank #14 - Pug Mill Mixer

Overfilling Control: The pug mill mixer is constantly monitored during processing. The unit is a flow-through mixing device that is continuously gravity fed and unloaded during processing.

Tank #15 - Pug Mill Mixer

Overfilling Control: The pug mill mixer is constantly monitored during processing. The unit is a flow-through mixing device that is continuously gravity fed and unloaded during processing.

Tank #16 - Steel Cylindrical Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #17 - Steel Cylindrical Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #18 - Steel Cylindrical Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #19 - Steel Cylindrical Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #20 - Steel Cylindrical Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #21 - Steel Cylindrical Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #22 - Steel Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #23 - Steel Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #24 - Steel Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #25 - Fiberglass Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #26 - Steel Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

Tank #27 - Fiberglass Vertical Tank

Overfilling Control: High level alarm, equipped with weight-lite liquid level indicator, and automatic waste feed cut-off system.

ATTACHMENT 14

Tank Secondary Containment Systems

4. DESCRIPTION OF TANK SYSTEMS AND OPERATION

b) Sludge Receiving (Feed) Tanks; Tanks 11 and 12

Each tank is built completely within a concrete containment structure. The base of the concrete containment slopes toward the north and center of the tank to a low point at the northeast corner of Tank 11 and northwest corner of Tank 12. At the low point of each tank a monitoring well is located to detect any liquid leaking out of the primary containment. Every 24 hours a measuring stick is dropped into the monitoring well to detect any accumulated liquids. If detected, a submersible 2" diameter pump is lowered into the well and the liquid, if any, evacuated to waiting containers. Collected liquid is considered to be a combination of the waste types stored in the tank at that time. If liquid is detected, the tank is emptied and surveyed for the leak, the leak is repaired, the repair is hydrostatically tested by refilling the tank with water, then the tank is placed back into service. Engineering plan M-7, Schedules and Details, shows the detail for a secondary containment monitoring well.

c) Pugmills; Tanks 14 and 15

In the event of a spill, each pugmill room contains a floor drain, connected to the north trench drain located along the north retaining wall.

d) Waste Holding Tanks; Tanks 7, 8, 9 and 10

Tanks 7, 8, 9 and 10 are rectangular steel tanks constructed completely within a rectangular concrete tank. The outer concrete tank acts as secondary containment. The tanks and secondary containment slope to the north and center of each tank. A monitoring well is located at the low point of each secondary containment unit. The well is designed and detected liquid is managed as described above in 4(b) Sludge Receiving Tanks, Tanks 11 and 12.

4. DESCRIPTION OF TANK SYSTEMS AND OPERATION

e) Waste Storage Tanks

(i) Waste to be Treated; Tanks 16, 17, 18, 19, 25, 27

Secondary containment is provided within the containment wall surrounding the waste storage tanks. "Squirt" protection provided by adjacent tank, the retaining wall and the shorter containment wall is adequate for tanks 16, 17, 18, 19, 25 and 27. See Attachment II to this section.

If no spill has occurred, liquid waste collected in the secondary containment is considered potentially contaminated rainwater and transferred to a wastewater pre-treatment plant jointly operated by Wayne Disposal, Inc. and Michigan Disposal, Inc. for treatment prior to discharge to the Wayne County Sewer System. The wastewater pre-treatment plant is operated under a Class D Industrial Wastewater Discharge Permit Number D-11201 issued by Wayne County Department of Public Works.

If a spill has occurred into the secondary containment the accumulated liquid is considered a hazardous waste with a waste type identical to waste types present in the leaking tank.

Liquid accumulated in the secondary containment structure is removed upon detection. The structure is inspected at least once a day. Liquid is pumped out to a waiting tanker truck or vacuumed out with a vacuum truck. Waste is then transported to Tank 11, 12 or the waste water pre-treatment plant.

ii) Waste to be Stored; Tanks 20, 21, 22, 23, 24, 26

Liquid accumulated in the secondary containment will be managed in the wastewater pre-treatment plant, as described above in 4(e)(i) if no spill or leak has occurred. If a spill or leak from tanks 20, 21, 22, 23, 24 or 26 has occurred, the waste liquid accumulated in the secondary containment will be managed as hazardous waste, waste type identical to waste types in the leaking tank.

REQUEST FOR VARIANCE FROM SECONDARY CONTAINMENT REQUIREMENTS

Silos 1, 2 and 3 are designed for and limited to storage of granular or dusty materials, typically containing less than 5% moisture. Materials placed into the silos are only inorganically contaminated dusts including hazardous wastes such as K061, electric arc furnace dust. Other products used in the stabilization process are also stored in the silos including, cement kiln flue dust, lime kiln flue dust, powdered silicates and fly ash.

Silos 1, 2 and 3 are elevated approximately 10' above their concrete footings and the concrete floor of the plant. A canopy covers the silos and prevents precipitation from falling on the concrete plant floor. The concrete floor has been constructed with PVC waterstops in all joints and is exceptionally strong, able to withstand pressures in excess of 4,000 psi. The silos and all ancillary systems are formally inspected each day the plant is operated. In addition, constant activity around the silos provides for continuous visual inspection of the area. Any detected leak or spill would be reported immediately, allowing for rapid correction of the problem, always in less than 24 hours. The tanks are also tested once a year to determine shell thickness, providing the opportunity for preventative maintenance if deterioration of tank integrity is detected.

If a leak or spill of the solid material were to occur, it would fall down onto the concrete plant floor. In the worst case, the leak would be detected 24 hours later (through immediate detection is much more likely) the spilled material vacuumed up and the silo taken out of service for repair. Spilled materials would not migrate away from the area due to their solid nature and a lack of precipitation. The silos are central to the plant preventing any spilled materials from migrating off the paved area to threaten surface or groundwater supplies. In addition to being over 100 feetfrom the south edge of concrete paving, the concrete is sloped south to north, directing any liquids toward the north retaining wall. Dispersion of spilled material is further prevented by the waste holding building to the south, the pugmill room to the east and retaining walls to the west and north.

The addition of a secondary containment curb would not add to protection already provided by the existing concrete floor, structures and canopy. As such, MDI requests that a variance be granted according to the provisions of 40 CFR 264.193(g).

ATTACHMENT 15

Groundwater Monitoring Plan

270.14 (c)(5)

Groundwater Sampling and Analysis Plan
Michigan Disposal, Inc. Waste Processing Facility
MID 000724831
August 1988

I. Introduction

40 CFR, Part 264.97 requires the owner or operator of a hazardous waste facility to develop and follow a consistent program of groundwater sampling and analysis procedures. The program must include procedures and techniques for:

1) sample collection;
2) sample preservation and shipment;
3) analytical procedures; and
4) chain of custody control.

This document has been developed to direct the efforts of our groundwater monitoring personnel and thereby meet the requirement of the rule referenced above.

The groundwater monitoring system for the Michigan Disposal Waste Processing Facility (MDI) consists of a subset of wells utilized for the hazardous waste management area of the Wayne Disposal Site #2 Landfill (WDI). While the same sampling events will be utilized by both facilities, MDI will receive separate laboratory reports, develop separate background data, conduct separate statistical assessments of results and submit separate reports of these activities to regulatory agencies from those analyses and reports conducted by Wayne Disposal for its landfill operations.

The MDI groundwater monitoring system consists of upgradient Wells 18 and 19 and downgradient Wells 21, 23 and 36, along with a proposed new well, #41. Well 41 is to be located mid-way between Wells 21 and 23. Well locations are shown on Attachment A. Analyses of samples from the MDI wells are conducted by Environmental Control Technology Corporation (Encotec) of Ann Arbor, Michigan. Analytical arrangements and sample bottle preparation can be ordered in advance by calling Encotec at 761-1389. Request all analyses when calling for bottles so the laboratory personnel can properly prepare the containers.

If Michigan Disposal, Inc. decides to contract analysis of groundwater samples to another laboratory, the change will be made only after at least two concurrent sampling/analysis events show adequate correlation of analysis results of the existing and proposed contract laboratories.

For recordkeeping, two items are required. A small notebook is maintained on-site into which all pertinent monitoring well data is entered. These items include but are not limited to name of sampler, date, time, sampling point, depth to standing water in the well, calculations for determining the volume of water to be purged from the well prior to sampling, results of any field or lab tests conducted after sampling and any other observations of the sample character or sampling environment. Also required for recordkeeping are blank copies of the chain of custody record from Encotec. A sample copy of this sheet is included herein as Attachment B. This sheet must be filled out fully.

II. STANDING WATER LEVELS

The sampling schedule is arranged such that the MDI wells are sampled the month immediately following that in which Wells 1A through 17 are sampled. To obtain the best picture of static water levels for the site, 1) the levels must be obtained for all 43 wells (with the proposed additional well) before any water is removed for purging or sampling, and 2) the levels must be obtained for all 43 wells in as short a time as possible on the same day, due to barometric pressure effects. This means that static water levels for the MDI wells are determined at least 30 days in advance of their sampling. This is the only case where purging and sampling does not immediately follow the water level observations.

The depth to standing water within the well casing is measured from the top of casing (TOC). The top of the well casing is exposed by removing the white plastic Well WizardTM well heads. The TOC elevations shall be surveyed at least once each year to verify accuracy. Removal of the well head is necessary for determination of the standing water level. The depth to water is measured using a electric water level indicator. Attachment C describes the operating procedures for the Slope Indicator Company, Model 51453 water level indicator, which is used for this purpose.

When using the water level indicator, make certain that the probe and submersed portion of the cable are cleaned with distilled water and a clean rag, followed by a distilled water rinse. This prevents cross contamination between wells. Lower the probe into the casing slowly while watching for the light. Carefully determine the water level by raising and lowering the probe at

the water surface, and monitoring the light and buzzer. (Measure the distance from the point on the cable at TOC to the nearest marking on the cable within the well casing to the nearest 0.01 foot.) The depth to standing water is the sum of the measurement just made and the marking on the cable. Record this depth in the field notebook. Do not use a tape graduated in inches; you must use a tape graduated in hundredths of feet.

III. WELL PURGING

Before purging a well, it is necessary to determine the quantity of water contained within the well casing. This is done by subtracting the depth to standing water from the depth to the well screen. The depth to the well screen for each existing well is listed on Attachment D. The depth to the well screen should be confirmed semi-annually by lowering the water level indicator probe to the very bottom of the well casing for a determination of the clear depth of the well (make sure that the indicator cable is cleaned between each well). The difference between screen depth and water level depth is the height of water standing within the well. Multiply this height of water by 0.17 gallons per foot (for 2 inch diameter well casing). Multiply that product by 3, the number of standing volumes to be purged, which is the minimum recommended by Michigan DNR. The resultant product is the total quantity to be purged from the well, in gallons. Once again,

Amt. purged (in gallons) = (Ht. of standing water) x 0.17 x 3

Record these calculations in the field notebook.

Once 3 standing well volumes have been removed, measure and record the pH and specific conductance of the water coming from the well. Continue to record these values at a rate of once every 10 minutes. After three values of pH and specific conductance have been obtained in this manner, compare the highest and lowest values. If the difference between the highest and lowest pH value is 0.07 SU or less, then the well is considered stabilized with respect to pH. If the difference between the highest and lowest specific conductance values is 18 umhos/cm or less, then well stabilization with respect to this parameter is considered complete. If the difference between the highest and lowest values for either parameter exceeds this criteria, pump the well another 10 minutes and recheck both parameters. Perform the comparison again, using only the last three monitored values of pH and specific conductance. Once the criteria are satisfied for any 3 consecutive monitored values of both pH and specific conductance, then consider the well fully stabilized and proceed with sampling. Measure and record well water temperature at this time as well. Record in the field

notebook all the data obtained to establish well stabilization. In the cases where an individual well cannot be purged to stabilization in a manner described above because the well becomes fully dewatered, then sample the well after completely dewatering (evacuating) the well 4 times. For each sampling event, the second, third and fourth well evacuations should be performed within 3 days of the previous well evacuation.

Sampling should be accomplished as soon after the fourth well evacuation as possible, depending upon the rate at which the water level in the well recovers. Measure and record pH, specific conductance and temperature in the field at the time the sample is obtained from such a well. Fully record in the field notebook all instances of well evacuation.

At WDI/MDI, the "Well Wizard"TM system of dedicated pumps is employed. This means that each well has a submersible pump within it, generally located at the well screen. The control unit and cylinders of compressed nitrogen are the other components that complete this system. Because sampling immediately follows the purging step in nearly all cases, the sampling box is always included during well purging. The sample box is discussed in greater detail in the Sample Collection portion of this document.

Prior to a sampling round for the MDI wells, replace the sampling box discharge tube. To set up the Well WizardTM system for operation, connect the nitrogen cylinder hose to the supply port on the controller unit. Connect one end of the coiled tubing within the controller unit to the Drive Air Out port on the unit, and the other end to the smaller of the two ports on the well head assembly. Connect the water sample line from the larger of the two well head ports to the back of the sampling box. Make certain that the valve on the rear of the box directs flow out of the box and through the discharge tube, until well purging is completed.

To initiate purging, begin the flow of nitrogen from the cylinder. Measure the quantity of water purged from the well using the graduated 3 gallon bucket kept with this equipment. Note that all purged water should be discharged on the ground away from the well. Do not allow the purged water to re-enter the well or the well protective casing nor should you allow ponding of the water around the well. Further background on Well WizardTM operation can be gained by referring to Attachment E. Report any problems with equipment function to Mark Young at the Engineering Office at 697-8900.

IV. SAMPLE COLLECTION

Upon completion of the well purging step, or return to a well which has been evacuated four times for purging, you are ready to take samples. Make sure each sample bottle for a given monitoring well has a label (affixed by the analytical laboratory personnel) which contains our facility name, the monitoring well number, the date and the sampler's initials. If a preservative has been included by the laboratory, such a note should appear on the label.

In the past sampling programs, it has been shown that airborne artifacts from disposal operations and engine exhaust can affect the number of detected constituents and their concentrations within groundwater samples. For this reason, a controlled-atmosphere sampling box was fabricated. Nitrogen is used as the sampling atmosphere, thereby minimizing the probability of impacts to sample quality by airborne artifacts. All samples taken from MDI wells shall be taken within the sampling box.

In preparation for sampling, connect the nitrogen cylinder to the sampling box and purge the box atmosphere with nitrogen for 20 to 30 minutes. Make certain that all sample bottles to be used at a given location are placed within the box with caps off prior to purging the box atmosphere. Further, a new tube connecting the wellhead to the sampling box must be used for the collection of samples from each location. When all is ready, turn the valve on the rear of the sampling box, diverting the flow of water from the discharge tube to the sampling tube within the box.

Fill each sample bottle to the very top and allow minimal headspace (air bubbles when capped and tipped). No headspace is permitted in the small glass volatile organic vials. This may require several attempts but it can and must be done. Fill these volatile organic vials first. Make certain not to touch the inside of bottle necks or caps with your hands. Record the number and type of samples taken and the time of sampling on the chain of custody record and in the field notebook.

Trip blanks shall be used every day and shall remain unopened throughout the sampling day. Field blanks shall also be submitted as well. These are all available from the laboratory and consist of VOC vials. There will be one field blank per well. It will be opened in the nitrogen sampling box and will remain open while that well is being sampled. Both kinds of blanks should be handled and shipped exactly as the well samples are. The blanks shall be preserved in the laboratory exactly as samples for Table 3a. Only a limited number of the blanks will be analyzed on a random basis for Table 3a parameters. However, if a positive result for any Table 3a parameter is noted in a given well, the matching trip and field blanks will immediately

be analyzed for the offending parameter(s). A complete replicate sample shall be obtained from one well, chosen randomly, during each sampling round and will be analyzed for the same parameters as the sample it replicates.

V. SAMPLE PRESERVATION AND SHIPMENT

When the sample collection step is completed, open the sampling box, transfer all sample bottles to a cooler packed with ice, and transport them immediately to our on-site laboratory. Transfer the samples from the cooler to the refrigerator.

At this point, you are ready to prepare for the next set of samples by replacing the tubing for the sampling box, purging the sampling box with nitrogen and by completing sample bottle labels and chain of custody records.

At the close of the sampling day, place all collected samples and blanks in coolers, pack them with ice and transport them to the appropriate laboratory. Be sure to take along all chain of custody records. The handling of these forms is covered in the Chain of Custody Control portion of this document. Refer to Attachment F for a tabulation of sample preservation procedures for Encotec.

VI. ANALYTICAL PROCEDURES

The parameters to be tested for as part of this monitoring program are shown in Attachment G.

Analytical procedures to be used by Encotec for the various monitoring parameters are tabulated in Attachment H.

Field measurements of specific conductance, pH and temperature will be performed using the equipment and procedures described in Attachment I.

VII. CHAIN OF CUSTODY CONTROL

Chain of Custody refers to the record of individuals and external conditions of sample handling through the time of laboratory analysis. The chain of custody record included as Attachment B is the principal document of this record. These sheets must be fully filled in with sampling information as well as the persons involved and shipment conditions during transport to the analytical laboratory. These sheets must accompany the samples to the laboratory.

When the samples are surrendered at the laboratory, each chain of custody record must be signed by the person transporting the samples as well as a representative of the receiving laboratory. The lab will make a copy of each sheet for us and keep the originals. Two copies must be made upon return to the site: one for the operating log notebook and one for the Engineering Office files. Upon completion of a full round of sampling, transmit depth to standing water information, field monitoring data and all chain of custody records to Mark Young at the Engineering Office.

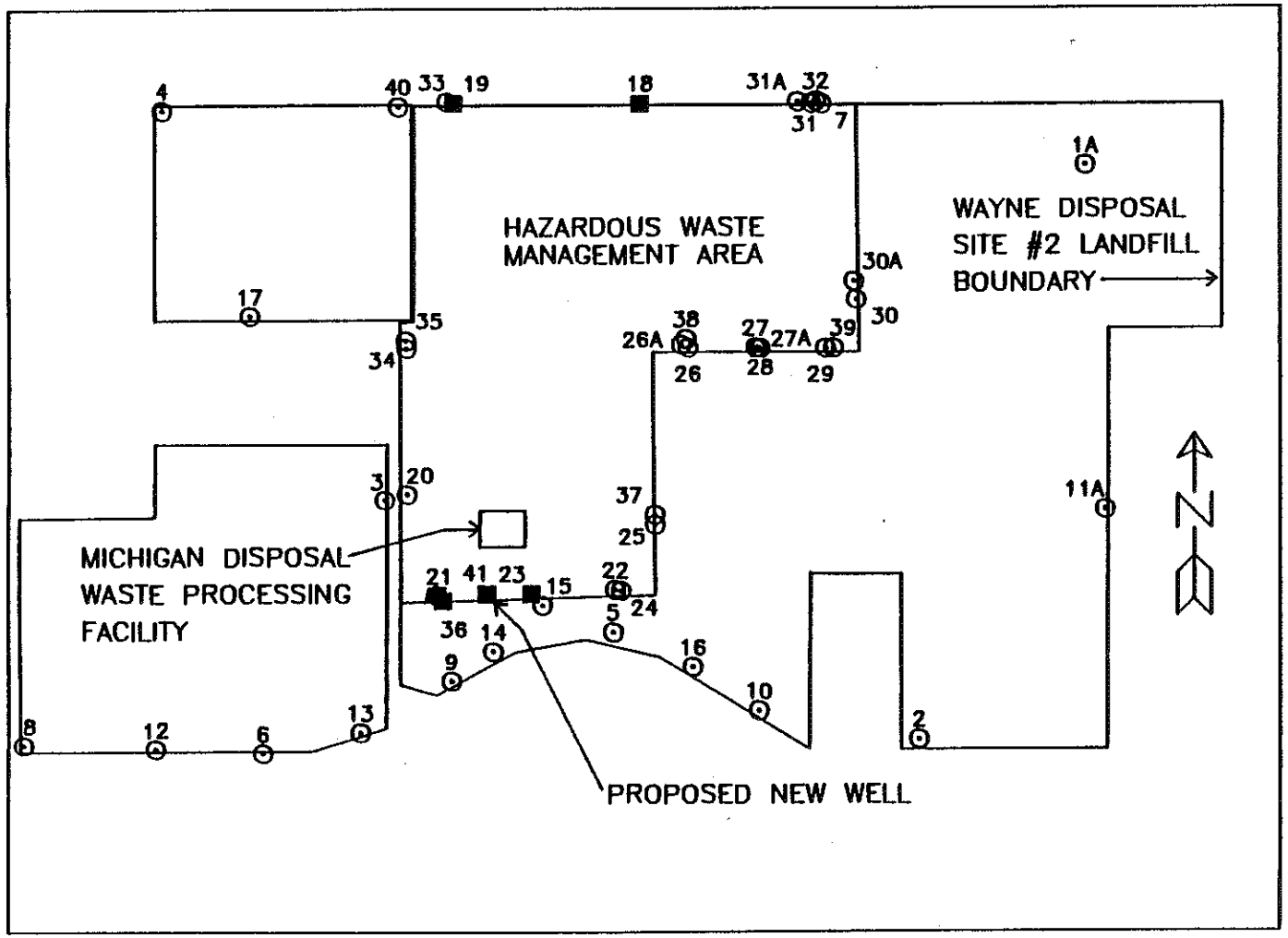
VIII. WELL MAINTENANCE

The well casings, protective covers, and Well WizardTM pump heads should be inspected for damage at the time of each well sampling. Any damage should be noted in the field notebook and reported to Mark Young at the Engineering Office. Also note any surface erosion, standing water at the well or evidence of a damaged grout seal around the well.

In the event any damage requiring well repair becomes necessary, a Damage Incident Report will be prepared by the Engineering Department. A copy of this report will be placed in the site Operating Log, the Engineering Department Groundwater Monitoring Operating Log and the Engineering Department Incident File. A proposed method of well repair will be prepared and submitted to the MDNR Waste Management Division for approval. Repair efforts will be undertaken after approval by the MDNR is received. The MDNR Waste Management Division shall then be notified at least 24 hours prior to initiating the repair efforts. Following completion of the well repairs, as-built documentation of the repair efforts will be prepared. A copy of this will be placed in the site Operating Log, the Engineering Department Groundwater Monitoring Operating Log, and the Engineering Department Incident File. A copy will also be sent to the MDNR Waste Management Division.

MICHIGAN DISPOSAL, INC.

FIGURE 1: GROUNDWATER MONITORING WELL LOCATIONS



LEGEND

- ⊙ WAYNE DISPOSAL WELLS
- ■ MICHIGAN DISPOSAL WELLS

SCALE: 1 INCH=510 FEET

MDNR/WMD 1989

ENCOTEC

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
SAMPLERS (Signature)	

STA. NO.	DATE	TIME	Comp.	Grab	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE														REMARKS INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE

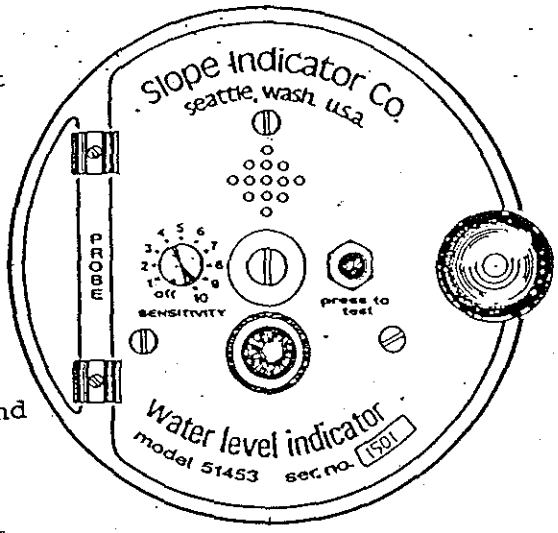
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signatu	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)

Attachment C

operating instructions

model 51453 WATER LEVEL INDICATOR

The sensitivity knob on the reel panel is used to select the desired sensitivity setting on a scale from 1 thru 10. Setting (1) is the lowest sensitivity for very saline and/or contaminated water and setting (10) is the highest sensitivity for very pure or fresh water.



To determine proper setting, turn sensitivity knob to full setting (10) position and lower probe until it contacts water. Raise probe out of water and turn sensitivity knob to a lower setting until the light and buzzer turn off. Repeat and adjust sensitivity knob so that the light and buzzer turn off promptly when withdrawing the probe from the water. Do not turn the sensitivity knob lower than necessary or accuracy will be reduced.

Water level is measured at point where light first turns on.

Make certain the sensitivity setting is in the off position when measurements are not being taken. This will conserve battery life. To test the Water Level Indicator, turn the sensitivity switch on and press the "press to test" button.

The Model 51453 Water Level Indicator operates on 3 each (AA) Batteries.

To replace batteries:

1). Remove 3 peripheral screws and the center screw on the controls panel side.

2). Lift cover panel and replace 3 each AA batteries. Note polarity on batteries for series hook-up.

3). Replace cover.

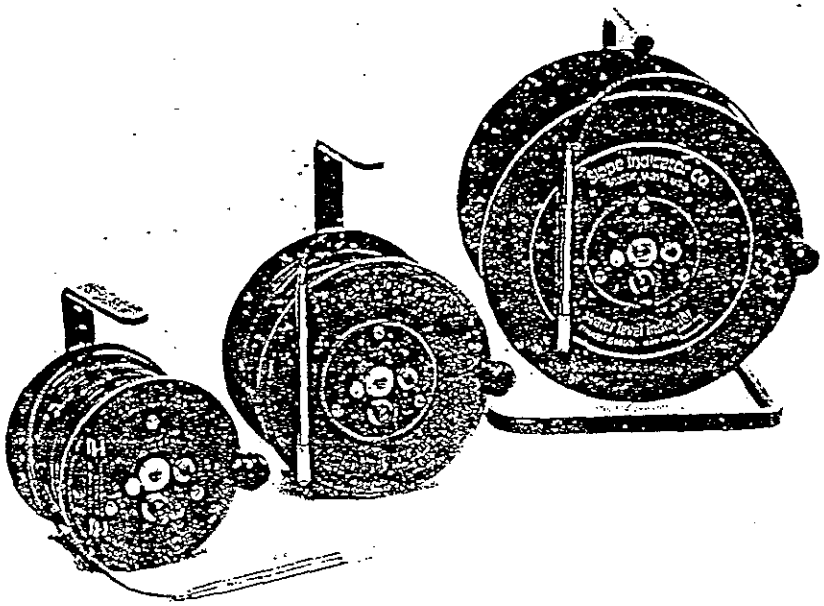
Cable may be removed from reel to facilitate battery replacement.

SINCO Slope Indicator Company
3668 Albion Place No., P.O. Box C-30316, Seattle, WA. 98103 U.S.A.
TWX: 910-444-2205 (SINCO SEA) cable: SINCO SEA phone: (206) 633-3073

SINCO 70001265-0684 Printed in USA

model 51453 Water Level Indicator

Slope Indicator's Water Level Indicator is a self-contained transistorized instrument for determining ground-water level in boreholes and wells to 1000-ft. depths.



Model 51453 Water Level Indicators

The system consists of a reel with control panel, cable and sensor. A two conductor cable connects the control panel to the sensor. An insulating gap in the ⅜" diameter stainless steel sensor acts as a switch. The circuit is completed upon making contact with water which serves as an electrolyte. This low level signal is amplified and fed into an indicator light and audible buzzer, thus signalling when water has been contacted. The circuit has a test switch to insure proper operation prior to making depth readings. A sensitivity control has also been incorporated so adjustments can be made to compensate for very saline or contaminated water to prevent premature indication of water contact.

Permanent cable markings are hot-stamped at 1-foot or 1-meter increments to facilitate depth control. Copperweld (copper plated steel) conductors minimize stretch of cable for more accurate depth measurements.

SINCO Slope Indicator Company
3668 Albion Place North, Seattle, Washington 98103 U.S.A.
TWX: 910-444-2205 (SINCO SEA) cable: SINCO SEA phone: (206) 633-3073

DEPTH TO TIP OF WELL SCREENS
MICHIGAN DISPOSAL, INC. WASTE PROCESSING FACILITY

Well Number	Depth to Tip of Screen (Feet)
18	114
19	120
21	104
23	131
36	130
41 (Proposed)	120 (Approximately)

Well Installation

The new well will be installed under the full-time supervision of an hydrogeologic consultant under contract to Michigan Disposal, Inc. It will installed to the depth shown above using a combination of hollowstem augers rotary-wash drilling techniques. Prior to any drilling and between each wel installation, all drill stem tools and samplers will be appropriately decontaminated.

During drilling, soil samples will be obtained at appropriate intervals using standard split-spoon procedures. Rock coring using a 2-inch diameter, core barrel will be undertaken once bedrock is reached for the installation well 41.

The monitoring well will be installed using 2-inch inside diameter stainless steel and galvanized flush-coupled riser pipe with slotted stainless steel screen. A minimum of 10 feet of stainless steel casing will extend from the screen top in each well assembly. The remainder of the well will be galvanized steel pipe which will be connected to the stainless steel portion with a Teflon bushing. Two sizes of well screen may be utilized in well construction; a No. 10 (0.01") slot at a length of 3.5 feet, or No. 7 (0.007") slot at a length of 5 feet.

Sand filters will be placed around the well screen, a bentonite seal wi be placed over the sand filter, and non-shrinking cement grout will be used fill the remainder of the borehole annulus to the ground surface.

At all monitoring well locations, a protective casing with a locking co will be installed over the well to protect that portion of the pipe projecti above the ground surface. "Well Wizard" bladder displacement-type pumps wil installed in each of the monitoring wells upon completion of well developmen

Following completion of the new well installation, a report will be prepared describing the well construction efforts and the completed well details. This report will be transmitted to the Waste Management Division o the Michigan Department of Natural Resources.

WELL WIZARD®
Dedicated Monitoring System

DESCRIPTION OF OPERATION

The Well Wizard is the only complete dedicated system for groundwater monitoring. Permanent installation of the sampling device is the key to controlling the introduction of contamination to the well.

The Well Wizard system consists of dedicated downwell pumps, tubing, well cap assemblies, and one portable controller.

The Well Wizard employs the use of a positive displacement bladder pump. Water enters the bladder via a bottom check valve. When the bladder is full, compressed air is delivered to the space between the body of the pump and the bladder, squeezing the bladder. This action closes the bottom check valve and forces the water in the bladder through the upper check valve and into the attached water discharge tubing. There is no air-water contact. After the bladder is fully evacuated, the pressure inside the pump is released back through the air line to the surface. This action causes the upper check valve to close and the bottom check valve to open, refilling the bladder. Continuous operation of this pump relies upon alternating the compression/release cycle.

The small number of moving parts, the ability of this design to handle solids and the ability to withstand dry pumping make it very reliable and practical for permanent installation.

Additional advantages of the positive displacement bladder pump are no loss of volatile organics due to air stripping and no change in sample temperature as often occurs when using electric pumps.

The pump is offered in five models. One is constructed entirely of PVC, another entirely of Teflon*. Other models are constructed of Stainless Steel with PVC assembly and a Teflon bladder, Stainless Steel with Teflon assembly and Teflon bladder, and there is a rigid PVC pump with a Teflon bladder. There is a Well Wizard pump available for virtually any groundwater sampling application.

Q.E.D. environmental systems inc. 6095 Jackson Road • P.O. Box 3726
Ann Arbor, Michigan 48106 • (313) 995-2547

The pumping device is suspended inside the well by the lines that conduct the water and compressed air. These lines are available in polypropylene, polyethylene, Teflon*, or Teflon* lined polyethylene.

The air and water lines terminate at the top of the well casing in a snugly fitting cap assembly. The cap has a lockable top to prevent tampering. Inside the cap assembly is a panel with a fitting for the water discharge tubing and a quick connect air fitting for the compressed air supply.

The pressure-release cycling of compressed air that is required to drive the pumping device is managed at the surface by a portable cycle controller. The cycle controller has several features that add to the versatility of the system.

The controller is light and compact. Its design permits the use of virtually any compressed air source. A full range of compressors, both 12 VDC and gasoline-operated, is available or the system can be driven with compressed air cylinders.

In keeping with the dedicated approach, a dedicated static water level indicator can be included with the system. The probe portion of the static water level indicator remains in the well with the pump and is actuated through a fitting in the cap assembly.

Another available option is the Purge Mizer. The Purge Mizer is an inflatable Viton bladder which is suspended above the well screen by a polyethylene-coated, stainless steel cable. Prior to purging the well, the Purge Mizer is inflated using an air line from the well cap panel. The inflated Purge Mizer isolates the sampling pump from the stagnant water in the well, reducing the volume of water which must be purged. The water discharge tubing and air delivery tubing actually pass through the body of the Purge Mizer.

QED's objective continues to be to provide a high quality, low cost approach to groundwater sampling techniques. We believe that the Well Wizard system meets this objective by eliminating several potential sources of sample contamination, adhering to very strict material standards, providing an efficient and simple design which reduces the time and effort required for the collection of high integrity groundwater samples.

*Teflon is a Registered Trademark of E. I. DuPont Company

HANDLING REQUIREMENTS FOR INORGANIC PARAMETERS

PARAMETER	CODE	PRESERVATION	HOLDING TIME	BOTTLE TYPE	VOLUME(mL)
TOTAL PHENOLICS	PHN	1,2	24 HRS.	GLASS	1 LITER
SULFATE	SO4	2,6	7 DAYS	PLASTIC	1 LITER *
TOTAL ALKALINITY	ALK	2,6	24 HRS.	PLASTIC	1 LITER *
FLUORIDE	F -	2,6	7 DAYS	PLASTIC	1 LITER *
CHLORIDE	CL -	2,6	7 DAYS	PLASTIC	1 LITER *
NO3+NO2-N	NPN	2,3,6	24 HRS.	PLASTIC	0.5 LITERS
ARSENIC	AS	4,6	6 MOS.	PLASTIC	1 LITER **
BARIUM	BA	4,6	6 MOS.	PLASTIC	1 LITER **
CADMIUM	CD	4,6	6 MOS.	PLASTIC	1 LITER **
CALCIUM	CA	4,6	6 MOS.	PLASTIC	1 LITER **
CHROMIUM	CR	4,6	6 MOS.	PLASTIC	1 LITER **
HEX. CHROMIUM	CR6	2,6	24 HRS.	PLASTIC	0.25 LITER
IRON	FE	4,6	6 MOS.	PLASTIC	1 LITER **
LEAD	PB	4,6	6 MOS.	PLASTIC	1 LITER **
MAGNESIUM	MG	4,6	6 MOS.	PLASTIC	1 LITER **
MANGANESE	MN	4,6	6 MOS.	PLASTIC	1 LITER **
MERCURY	HG	4,6	6 MOS.	PLASTIC	1 LITER **
SELENIUM	SE	4,6	6 MOS.	PLASTIC	1 LITER **
SILVER	AG	4,6	6 MOS.	PLASTIC	1 LITER **
SODIUM	NA	4,6	6 MOS.	PLASTIC	1 LITER **
ZINC	ZN	4,6	6 MOS.	PLASTIC	1 LITER **
CYANIDE	TCN	2,5,6	14 DAYS	PLASTIC	1 LITER
COPPER	CU	4,6	6 MOS.	PLASTIC	1 LITER **
pH	PH	2,6	7 DAYS	PLASTIC	0.5 LITERS
BICARBONATE	BAL	2,6	7 DAYS	PLASTIC	0.5 LITERS
CARBONATE	CAL	2,6	ASAP	PLASTIC	0.25 LITER
TOC	TOC	1,2	28 DAYS	GLASS	0.04L-VIAL
SPEC. CONDUCT.	CON	2,6	24 HRS.	PLASTIC	0.25 LITER

1) pH < 2 WITH CONCENTRATED SULFURIC ACID
2) STORE AT 4 DEGREES CENTIGRADE
3) 0.3% SULFURIC ACID
4) 1% NITRIC ACID
5) pH > 12 WITH SODIUM HYDROXIDE, 0.6 GRAMS ASCORBIC ACID
6) FILTERED IN THE LAB USING 0.45 MICRON MEMBRANE FILTERS ON THE DAY OF SAMPLE COLLECTION

* NOTE: ONE LITER FOR ALL THESE PARAMETERS STORED SIMILARLY
** NOTE: ONE LITER FOR ALL THESE PARAMETERS STORED SIMILARLY

Attachment F

NCOTEC

Handling, Preservation

Parameter	Preservation	Holding Time	Bottle Type	Vol
All Volatile Organics	Cool to 4°C No Headspace	14 Days	40 ml Vial Teflonseptum TOP	2-40 ml Vials
Lindane*	Cool 4°C Extract within 7 days	30 Days After Extraction	Amber Glass	2 liter
Endrin*				
Methoxychlor*				
Toxaphene*				
2,4 D*				
Silvex*				

*Pesticide/Herbicides collected in two 1 liter amber glass for all parameters.

TABLE 3

GROUNDWATER MONITORING PARAMETERS

3a. Primary Monitoring Parameters

Benzene	Methylene Chloride
1,2-Dichlorobenzene	Toluene
1,1-Dichloroethane	1,1,1-Trichloroethane
1,2-Dichloroethane	Trichloroethylene
1,2-Dichloroethylene	Vinyl Chloride
Ethylbenzene	Xylene

3b. Secondary Monitoring Parameters

* Alkalinity as $CaCO_3$	Cyanide
Arsenic	* Iron
Barium	Lead
* Bicarbonate	* Magnesium
Cadmium	Manganese
* Calcium	Mercury
* Carbonate	Selenium
* Chloride	Silver
Chromium (total)	* Sodium
Chromium (hexavalent)	* Sulfate
Copper	Zinc

*major ions (for Sign Test evaluation)

3c. Tertiary Monitoring Parameters

2,4-D	Phenols
Endrin	Silvex
Fluoride	Specific Conductivity
Nitrate	Total Organic Carbon
pH	Methoxychlor
	Toxaphene

Monitoring Frequency:

- Quarterly during background period for 3a, 3b and 3c
- Semiannually after background period for 3a and 3b
- If individual constituent in 3a confirmed to be statistically significant, follow procedures C7 and C8

Attachment G

7/88

Attachment H

INORGANIC ANALYSES

METHOD DETECTION LIMITS FOR INORGANIC PARAMETERS

PARAMETER	CODE	MDL (MG/L)	EPA REF
TOTAL PHENOLICS	PHN	0.05	420.1
SULFATE	SO4	1	375.4
TOTAL ALKALINITY	ALK	20	310.1
FLUORIDE	F -	0.1	340.2
CHLORIDE	CL -	0.1	325.2
NO3+NO2-N	NPN	0.05	353.2
ARSENIC	AS	0.002	7060
BARIUM	BA	0.05	6010
CADMIUM	CD	0.02	6010
CALCIUM	CA	0.05	6010
CHROMIUM	CR	0.02	6010
HEX. CHROMIUM	CR6	0.01	7196
IRON	FE	0.05	6010
LEAD	PB	0.05	7420
MAGNESIUM	MG	0.05	6010
MANGANESE	MN	0.02	6010
MERCURY**	HG	0.0002	7470
SELENIUM	SE	0.002	7740
SILVER	AG	0.01	7760
SODIUM	NA	0.05	7770
ZINC	ZN	0.02	6010
CYANIDE	TCN	0.01	9010
COPPER	CU	0.02	6010
pH	PH	N/A	9040
BICARBONATE	BAL	10.O	*403I
CARBONATE	CAL	10.O	*403I
TOC	TOC	1.O	9060
SPEC. CONDUCT.	CON	100.O	9050

* NOTE: STANDARD METHODS, 16th EDITION
** Use method 7471 for solid, sludge samples.

QUALITY CONTROL REQUIREMENTS FOR INORGANIC PARAMETERS

PARAMETER	CODE	CAL. CHECK % RECOVERY	MATRIX SPIKE % RECOVERY	MATRIX DUPLICATE % RECOVERY
TOTAL PHENOLICS	PHN	90-110	85-115	80-120
SULFATE	SO4	90-110	85-115	80-120
TOTAL ALKALINITY	ALK	90-110	85-115	80-120
FLUORIDE	F -	90-110	85-115	80-120
CHLORIDE	CL -	90-110	85-115	80-120
NO3+NO2-N	NPN	85-115	85-115	80-120
ARSENIC	AS	90-110	75-125	80-120
BARIUM	BA	90-110	75-125	80-120
CADMIUM	CD	90-110	75-125	80-120
CALCIUM	CA	90-110	75-125	80-120
CHROMIUM	CR	90-110	75-125	80-120
HEX. CHROMIUM	CR6	90-110	75-125	80-120
IRON	FE	90-110	75-125	80-120
LEAD	PB	90-110	75-125	80-120
MAGNESIUM	MG	90-110	75-125	80-120
MANGANESE	MN	90-110	75-125	80-120
MERCURY	HG	90-110	75-125	80-120
SELENIUM	SE	90-110	75-125	80-120
SILVER	AG	90-110	75-125	80-120
SODIUM	NA	90-110	75-125	80-120
ZINC	ZN	90-110	75-125	80-120
CYANIDE	TCN	85-115	80-120	80-120
COPPER	DU	90-110	75-125	80-120
BICARBONATE	BAL	85-115	N/A	80-120
CARBONATE	CAL	85-115	N/A	80-120
pH	PH	N/A	N/A	N/A
TOC	TOC	90-110	80-120	80-120
SPEC. CONDUCT.	CON	90-110	N/A	80-120

FREQUENCY REQUIREMENTS FOR QUALITY CONTROL

ARAMETER	CODE	CONT. CALIB. % FREQUENCY	MATRIX SPIKE % FREQUENCY	MATRIX DUPL. % FREQUENCY	BLANKS % FREQ.
TOTAL PHENOLICS	PHN	10	10	10	10
SULFATE	SO4	10	10	10	10
TOTAL ALKALINITY	ALK	N/A	N/A	10	N/A
FLUORIDE	F -	10	10	10	10
CHLORIDE	CL -	10	10	10	10
NO3+NO2-N	NPN	10	10	10	10
ARSENIC	AS	10	5	5	10
BARIUM	BA	10	5	5	10
CADMIUM	CD	10	5	5	10
CALCIUM	CA	10	5	5	10
CHROMIUM	CR	10	5	5	10
HEX. CHROMIUM	CR6	10	10	10	10
IRON	FE	10	5	5	10
LEAD	PB	10	5	5	10
MAGNESIUM	MG	10	5	5	10
MANGANESE	MN	10	5	5	10
MERCURY	HG	10	5	5	10
SELENIUM	SE	10	5	5	10
SILVER	AG	10	5	5	10
SODIUM	NA	10	5	5	10
ZINC	ZN	10	5	5	10
CYANIDE	TCN	10	10	10	10
COPPER	CU	10	5	5	10
BICARBONATE	BAL	10	N/A	10	N/A
CARBONATE	CAL	10	N/A	10	N/A
pH	PH	10	N/A	10	N/A
TOC	TOC	10	10	10	10
SPEC. CONDUCT.	CON	10	N/A	10	N/A

Attachment H

ORGANIC ANALYSES

Attachment H

METHOD DETECTION LIMITS - ORGANIC ANALYSES

PARAMETER	METHOD USEPA	DETECT. LIMIT (mg/l)
1,1-Dichloroethane	601/8010	0.001
1,2-Dichloroethane	601/8010	0.001
1,2-Dichloroethene	601/8010	0.001
1,1,1-Trichloroethane	601/8010	0.001
Trichloroethylene	601/8010	0.001
Vinyl Chloride	601/8010	0.002
Methylene Chloride	601/8010	0.001
1,2-Dichlorobenzene	601/8010	0.001
Benzene	602/8020	0.001
Toluene	602/8020	0.001
Ethylbenzene	602/8020	0.001
Total Xylenes	602/8020	0.003
Lindane	8080	0.00005
Endrin	8080	0.00005
Methoxychlor	8080	0.0001
Toxaphene	8080	0.0002
2,4 D	8150	0.001
Silvex	8150	0.001

Quality Control Procedures

Volatile Organics

Methods

601, 602

I. Lab Blank

One per set of samples or a minimum of one in ten samples (for extraction procedure, blank extracted with samples).

II. Spikes

One per analytical run or a minimum of one per twenty samples.

III. Duplicates

One per analytical run or a minimum of one per ten samples.

IV. Calibration

Volatiles

A three point calibration is made daily for all volatile compounds - see method (601, 602) list.

VI. Continuing Calibration

A mid-range standard is run every 10 samples to verify calibration. Results must be ± 15% of initial calibration or recalibration is required if any compounds are found in the samples run in the previous ten.

QUALITY CONTROL PROTOCOL

There are certain QA/QC requirements necessary to ensure that the best possible analysis is performed. If an analysis involves a calibration of an instrument, check samples should be used initially and throughout the run to ensure accuracy of calibration. These check samples are called initial/continuing calibration verifications. Usually the EPA is the source for these samples. They are analysed in the same manner as other samples and their values obtained compared to their true value. Blanks should be analysed with every set of samples in order to show that no significant contamination is present. These should also be run at the indicated frequency (see chart) to measure background shifts throughout the run. Matrix duplicates are analysed in order to measure precision of the matrix and the analysis. These should be run at their indicated frequencies or per matrix type, whichever is more frequent. Matrix spikes should be analysed to indicate matrix recovery problems. They should be analysed at their indicated frequencies or per matrix type also.

These quality control types should be reviewed in order to determine the validity of analysis. Certain rejection criteria must be established. Calibration verification recoveries must meet specified limits or the analyses will be terminated, the problem resolved, and the samples re-analyzed. Matrix spikes are used to indicate sample matrix effects on analyte recovery and do not necessarily terminate an analysis. If recoveries are outside of window for any sample, it will be investigated to determine if it is due to preparation or analysis before acceptance of the data. Matrix duplicates are used to indicate precision of preparation and analysis, and also do not necessarily terminate analysis. Again, results outside of window will be investigated to determine if it is due laboratory error prior to acceptance of data.

FIELD MONITORING - SPECIFIC CONDUCTANCE

Attachment I

Revision 1
8/22/88

INSTRUCTION MANUAL
DIGITAL CONDUCTANCE, TEMPERATURE AND pH TESTER, CATALOG No. 301353

Parameters:

Conductance 4 ranges
0 to 20 μ/cm
0 to 200 μ/cm
0 to 2,000 μ/cm
0 to 20,000 μ/cm
Integral sample cup

Accessible internal calibration potentiometer
Standard solution available:
500 ml. Bottle of .01 Molar Potassium Chloride 1413 micromhos @ 77° F.

pH 0 to 14 range
Slope and zero adjustments on face of unit
External electrode (purchased separately)
Buffer solution kit available, includes:
Buffer solutions, 4, 7 and 10 pH
Bottle of (distilled) water for rinse

Temperature 0 to 160°F
Integral sample cup

Accuracy Conductivity ± 2% Full scale at 77°F
Temperature ± 2°F
pH ± .01 pH units at 77°F

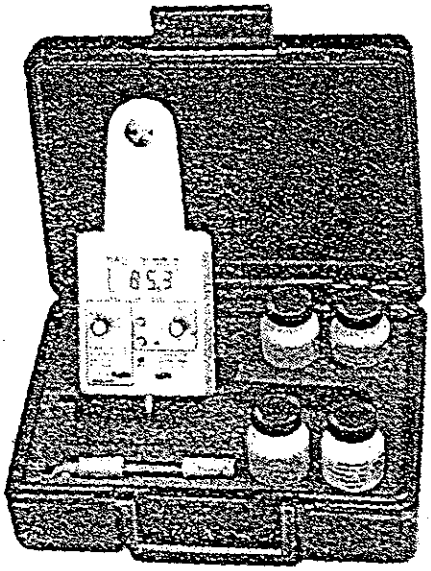
Attachment I

Tester with case, P/N 301353
(includes battery, P/N 905531)

pH electrode with BNC connector, P/N 102927

Standard Conductance Solution 1413 micromhos, P/N 905770

Buffer Solution Kit
(includes buffer solutions 4, 7 and 10 pH; also bottle of (distilled) water for rinse, P/N 102953)



HI831-1-2

CAMBRIDGE SCIENTIFIC INDUSTRIES
Moose Lodge Road Cambridge, Maryland 21613

Attachment I

Operating Instructions:

1. Rinse the inside of sample cup with liquid to be measured. (This is especially important if samples with a wide range of conductivity or pH are to be measured.)
2. Fill sample cup. (see Figure 1).

   CAUTION: THE MAIN BODY IS NOT WATER-PROOF (Do not subject unit to splashing water).

   CAUTION: UNIT DESIGNED FOR AQUEOUS SOLUTIONS ONLY!

3. Fill sample cup at least 2/3 full. If the sample is hot boiler water, allow to cool to 160°F, or below.

4. Slide the right hand function switch to "TEMP" and push the "READ" button. If temperature reading is not stable, empty & refill cup several times to bring cup and sample to the same temperature.

5. Read the temperature on the digital display panel and adjust both temperature compensation knobs accordingly.

6. If the approximate conductance is known, slide the left hand range selector switch to the proper range.

   Example: If you expect the sample to be around 2000 micromhos, slide the left hand selector switch to x1000.

7. Slide the right hand function switch to "COND" and push the "READ" button.

8. Multiply the digital display reading by the factor indicated by the position of the left hand range switch to determine conductance.

   Example: A display reading of 1.00 with the left hand range selector switch indicating x1000 is:

   1.00 x 1000 or 1000 μ/cm

   Note: If a single "1" appears on the left hand side of the digital display, the sample conductance is higher than the selected range. Slide the left hand (range) selector switch in one step intervals until a 3 or 4 digit display appears.

   Conversely, if a decimal display appears (such as 0.11) move the range selector switch to the left until a 3 or 4 digit number, 1.00 or larger, appears on the display. This puts the unit in a range affording the best accuracy. Caution: A single "1" always means that the conductance is higher than the selected range.

9. Slide the right hand function selector switch to "pH".

10. Insert the pH cable connector onto the tester. Push on and twist clockwise.

11. Remove the tape from the plastic storage cap.

12. Remove the plastic storage cap slowly.

13. Place the pH electrode in the sample cup or any non-metallic container holding the remainder of the sample to be measured. If you use the tester's sample cup, you will have to hold the electrode.

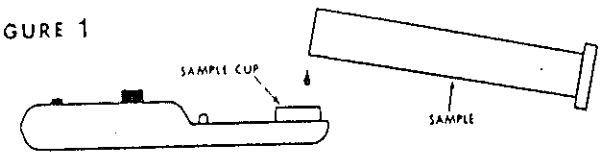
Attachment I

14. Press the "READ" button: pH value will appear on the digital display.

15. Always obtain conductivity reading before placing pH probe in sample cup. pH probes tend to carry contamination over into the sample.

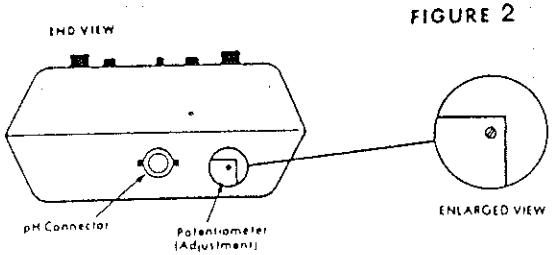
CAUTION:
The main body is not waterproof.

FIGURE 1



CONDUCTIVITY CALIBRATION

FIGURE 2



(Note Hole is normally covered by a black plug)

CALIBRATION

Temperature and Conductance are factory calibrated. You may check conductance accuracy with a solution of known conductance and recalibrate, if necessary.

See Figure 2. To recalibrate conductance, remove black plug revealing the adjustment potentiometer screw. Add standard solution to cup, discard and refill. Repeat procedure until the digital display indicates the same value twice in a row. Adjust the potentiometer until the digital display indicates the known value of conductance. To increase the digital display reading, turn the adjustment potentiometer screw counterclockwise (clockwise to decrease).

To standardize the pH electrode and meter, place the pH electrode in the 7.0 buffer bottle. Adjust the "ZERO" potentiometer on the face of the tester so that the digital display indicates 7.00.

Then place the pH electrode in the 4.0 or 10.0 buffer bottle (depending on where you expect the actual measurement to be). Adjust the "SLOPE" potentiometer on the face of the tester so that the digital display indicates the value of the buffer chosen.

NOTE: There is interaction between the "ZERO" and "SLOPE" adjustments, so the procedure should be repeated several times.

Attachment I

DO NOT SUBJECT THE pH ELECTRODE TO FREEZING TEMPERATURES!

It is good practice to rinse the electrode in distilled water when going from one buffer to another. When not in use the cap should be kept on the electrode. Keeping the cotton in the cap moist will keep the electrode ready to use. Moisten the cotton frequently (once a week, usually).

Maintenance

Battery replacement

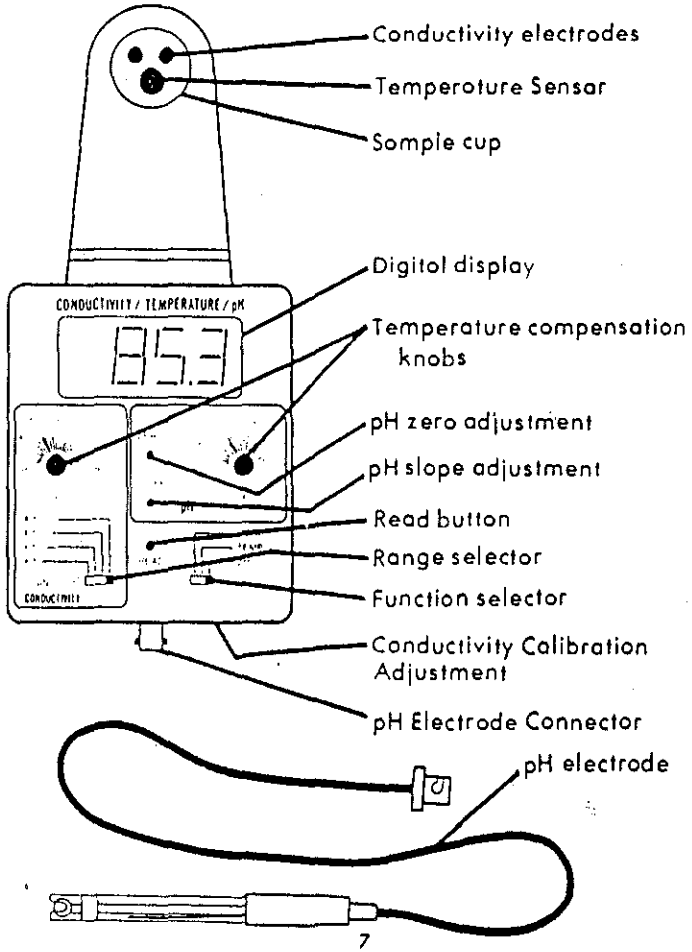
The battery is located behind the snap-off cover on the bottom of the tester. Use a small tool to pop out the cover. Replace battery with a 9 volt; an alkaline battery such as Duracell MN 1604. Replace the battery whenever "LO BAT" appears on the display.

Sample cup:

The carbon electrodes in the cup may be cleaned with a mild abrasive, 400 grit or finer on the end of the flat surface.

SPECIAL NOTE: To avoid ever having to resort to harsher methods of cleaning, when rinsing cup out with liquid to be measured, wipe cup with paper towel or kleenex and rinse again.

Wipe cup after every sample and rinse with tap water when possible.



FIELD MONITORING - pH AND TEMPERATURE

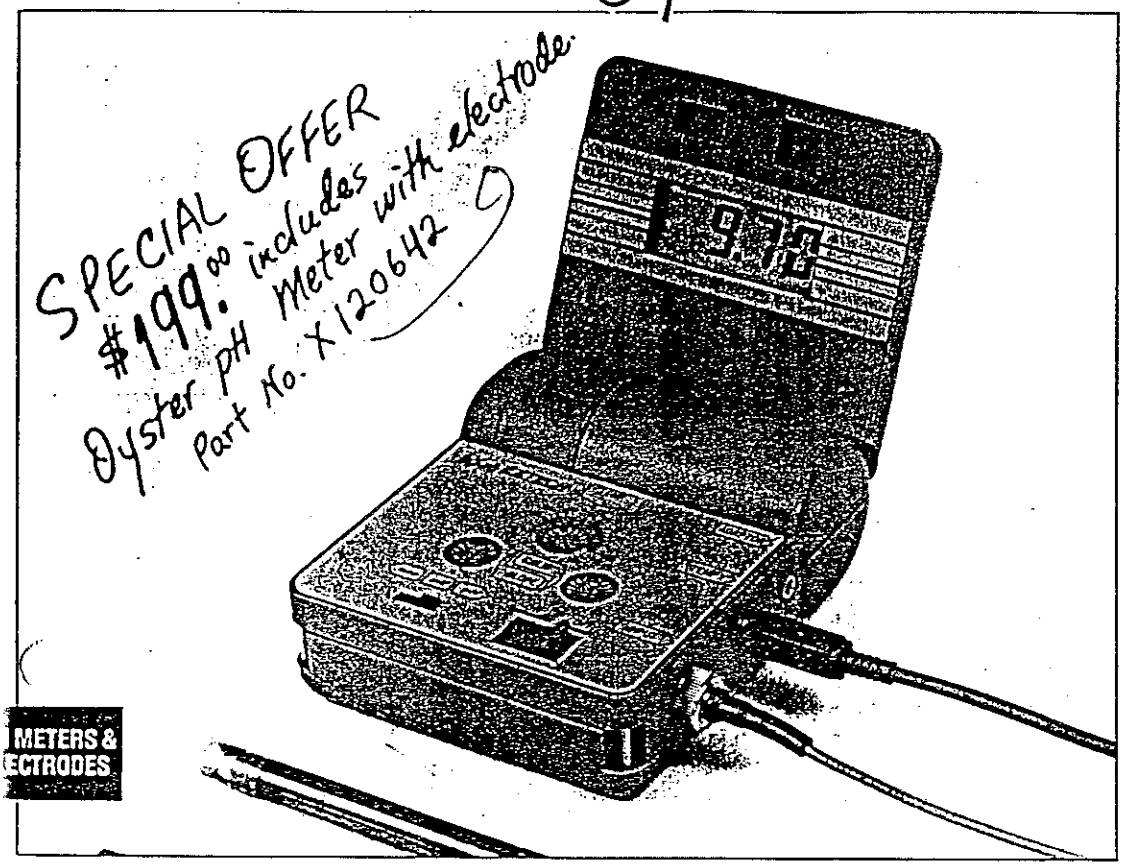
Attachment I

Revision 1
8/22/88

More Great Values from EXTECH INSTRUMENTS

NEW THE OYSTER™— Pearl of pH Meters

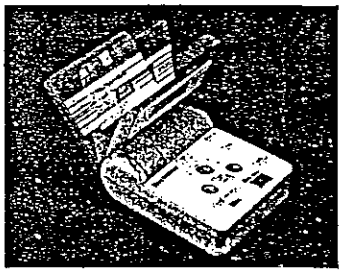
The Oyster™



METERS & ELECTRODES

Laboratory precision to 0.01 pH.

With neck strap and battery power you can measure pH, mV or temperature in the field.



Adjustable hinged cover with built in LCD for best viewing angle in the lab, plant or field.

Measure pH/mV/Temperature in your hand or on your laboratory bench. ← Order this!

The Oyster is a go-anywhere portable meter housed in a rugged, impact resistant, uniquely hinged package. This design offers several exclusive advantages.

- Large 1/2" (12.7mm) LCD display built into the inside cover of the instrument case can be positioned at any angle for optimal reading.
- Recessed knurled controls eliminate inadvertent changes in calibration, slope or temperature adjustment.
- Power switch automatically turns OFF when you close the cover, protects against unnecessary battery drainage.

Stable measurements. CMOS and LSI circuitry achieve high stability, repeatability and low power consumption. Use with AC adaptor for precise laboratory measurements of pH in the range of 0 to 14.00 with 0.01 resolution; or mV from 0-1999 at 0.1% accuracy or temperature with PT100 probe from 0-100°C at 0.1°C resolution.

Compact and rugged. Use the Oyster with battery to achieve the same accurate measurements in the field. It measures 3 3/4x4 3/8x1 3/4" (96x108x45mm) folded, and weighs only 12 oz (340 gm) with battery (supplied with meter).

Ga[illegible] nvenience and save money with the Oyster pH/mV/Temp [illegible]it. Kit includes the Oyster, combination pH/reference polymer-b[illegible]ed electrode, temperature probe, buffer capsules and containers packaged in foam-padded carrying case. A $295 value.

SPECIFICATIONS	
Range:	0-14 pH; ±1999 mV; 0-100°C
Resolution:	0.01 pH; 1 mV; 0.1°C
Accuracy:	0.01 pH; 0.1% mV; ±0.5°C
Temp Compensation:	0-100°C Manual
Input Impedance:	Greater than 10^{12} ohms
Display View Angle:	Adjustable from 90 to 180 Degrees
Power:	9V Battery or VAC Adaptor
Battery Life:	100 Hours Continuous
Electrode connection:	BNC for pH or ORP (REDOX) electrode

120640	Oyster pH/mV/Temp Meter only	$179.00
120645	Oyster pH/mV/Temp Meter Kit Includes meter, combination pH/Ref electrode, temperature probe, buffer capsules (pH 4 and 7) with containers, 9V battery, neckstrap and carrying case	$269.00

Optional Accessories

610011	Flexible Probe Support Holder	$39.00
60120B	General Purpose pH/Ref electrode	$39.00
850185	Temp Probe RTD PT100 ohm	$62.00
650470	pH Buffer Tripak (4, 7, 10 pH)	$18.00
149118	AC Adaptor 117 VAC	$15.00
149231	AC Adaptor 230 VAC	$15.00

EXTECH INSTRUMENTS CORPORATION
150 Bear Hill Road ■ Waltham, MA 02154 ■ Phone 617-890-7440

THE OYSTER INSTRUCTION MANUAL

OPERATING PROCEDURE

pH MEASUREMENTS

1. Fully extend the hinged cover, open the battery compartment and connect the 9V battery, close compartment and adjust cover to desired viewing angle.

2. Press the on switch down and set the mode switch to the pH position. This will activate the liquid crystal display, LCD.

3. Remove the wetting cap from the electrode tip and connect cable to BNC input. Condition the new electrode in buffer 7.00 until the LCD is stable (30 min.). Give a vigorous stirring action to electrode each time it is placed in a new solution.

4. Equilibrate buffers and samples to ambient temperature. Adjust the temperature control to read this ambient value. Good for 0-100C for this electrode.

5. Adjust the calibration control to make the LCD read the temperature corrected value shown on the standard buffer 7.00 bottle.

6. Rinse the electrode with buffer 10.00, blot dry, and immerse in buffer 10.00. When the LCD is stable (30 sec.), adjust the slope control to make the LCD read the temperature corrected value shown on the standard buffer 10.00 bottle. The system is now calibrated.

7. Rinse the electrode with a small portion of sample, blot dry and immerse in the sample. When the LCD is stable (30 sec.), it will read the pH of the sample. Repeat this step for continued samples. Periodically check calibration, steps 5 and/or 6.

8. When all samples are completed unplug and always rinse electrode with buffer 7.00. Place a small portion (1 ml) in the wetting cap, place over the electrode tip until the next pH measurements. Closing hinged cover will automatically shut off system.

TEMPERATURE MEASUREMENT

1. Set the mode switch to temperature.

2. Connect the temperature probe to instrument input.

3. The LCD will indicate the temperature of the sample under test in degree C.

4. When measuring liquid, be sure the tip of the probe is at least 1 inch below the surface.

5. When the temperature of samples is different than buffers allow enough time for electrode to reach sample temperature.

mV MEASUREMENTS

1. Set the mode switch to millivolts, mV.

2. Remove the wetting cap from the ORP electrode (EXTECH P/N 67500B) and connect the cable to the BNC input.

3. Equilibrate standards and samples to ambient temperature. Adjust the temperature control to read this ambient value.

4. Immerse the ORP electrode in a standard solution free of any redox material and set the calibration control to read zero mV.

5. Rinse the ORP electrode and place in the sample solution, when the LCD is stable it will read the redox potential of the sample in mV. Repeat this step for continued samples.

6. When all samples are completed unplug and rinse the ORP electrode. Place a small postion (1 ml) of distilled water in the wetting cap. Place over the electrode tip until the next ORP measurements. Closing the cover will automatically shut off the system.

BATTERY REPLACEMENT

1. Install a new 9V battery by opening the battery compartment cover, replacing a new battery and closing the cover. There is no low battery indicator, however repeated fluctuations of more than +/- 0.1pH is an indication that the battery is low and should be replaced.

PREPARATION FOR AC OPERATION

Connect AC adaptor to pH meter power outlet. Meter is now "on" and should be calibrated by following steps in calibration procedure. With AC line adaptor, the internal battery is automatically by-passed.

TROUBLE SHOOTING

INSTRUMENT:

Meters are usually the least likely cause of the pH measuring system to go wrong. (About 4%). To identify that the meter is the source of the problem, the following checks can be performed.

1. Check battery. Replace if low.
2. Be sure line cord makes a firm connection to its electrical outlet and input connector when using AC adaptor.
3. Replace existing electrode connectors with BNC shorting plug (P/N 149110) included with each instrument package.
4. Set the mode switch to pH. LCD should be stable.
5. Vary the calibration control to set the LCD to 7.00.
6. Change the mode switch to millivolts. The LCD should read 0.0 mV.
7. This diagnostic check covers 98% of the instruments circuitry. If any one of the above tests fail, the meter should be scheduled for service.
8. If you feel the instrument requires service, call (617) 890-7440 to receive a return authorization number and information on IN and OUT of warranty repairs. Out of warranty repairs are good for 60 days.

ELECTRODE

Symptom	Cause	Recommended Solution
Long Response Time. Drifting	Clogged Junction	Soak in 4.07 M KCl @ 60°C for 30 min.
	Strong Alkaline Measurements Deterioate Gel Layer	Soak in 0.1 M HCl Overnight
	Proteins Coat Electrode Surface	Soak in 1 GM Pepsin dissolved in 100 ML 0.1 M HCl for 30 min. or as needed.
	Oil, Paint, Dyes, Suspended Solids on Sensor	Rinse electrode alternately with materials solvent. Then buffer 7.00
	Organic Solvents Coat Sensor, Dehydrate Membrane	Organic mole fraction has to be less than 50% to assure reasonable readings. Limit time of measurement. Keep probe in buffer 7.00 between readings.
Dry Bulb	Long Term Storage Without Wetting Cap Dehydrates Bulb	Soak electrode tip in wetting cap filled with 1 ML buffer 7.00 for 24-48 hrs.
Static Charge	Wiping Electrodes	Rinse electrode in buffer 7.00 and blot. DO NOT WIPE ELECTRODE.
Same Readings In Different Buffers And Samples	Cracked or Broken Bulb	Replace electrode. Use bulb guard. Avoid plunging electrod to bottom of container and spinning bars. A wetting cap will protect bulb between measurements.
	Wetting Cap on Electrode	Remove wetting cap.

For Fill Type Electrode

Large Crystals Of KCl Appear Within Electrode	Water (Solvent Fraction) Evaporates, Precipitating KCl.	Exchange fill solution with fresh SAT. KCl. Soak electrode tip in wetting cap filled with 1 ML SAT. KCl.
Erratic LCD Display, Readings Fluctuate	Samples have low ionic strength (lack salt) e.g., distilled, deionized, boiler, lake water - due to high resistance.	For each 50 ML of sample add 1 drop (50 uL) of SAT. KCl. No alteration in pH will occur by inert KCl.

7/16/85

EXTECH INSTRUMENTS CORP.
150 Bear Hill Road, Waltham, MA 02154
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Attachment I

ATTACHMENT 16

Statistical Analysis Methods

A. Interim

ATTACHMENT

STATISTICAL PROCEDURE

Two statistical tests will be used to determine if the concentrations of hazardous waste constituents exceed their respective background in a given monitoring well or sump. The sign-test will be used to determine if there is an increase in the concentrations of a significant number of parameters, independent of the magnitude of the changes. The t-test with Continuity Correction will be used to detect a significant increase in the concentration of any individual parameters. This attachment describes the sign-test, the t-test with Continuity Correction, and then the application of these tests at the

A. The Sign-Test

The sign-test does not assume any particular distribution for the parameter data. Any data below the limit of quantification will be treated as having a value of one-half the limit of quantification. Starting with the first sampling period, a comparison is made for each parameter between the mean of its background values and the mean of its foreground values. If the mean of the foreground values is greater than the mean of the background values, a plus (+) is assigned to that measurement data. If the mean of the foreground values is less than the mean of the background values, a minus (-) is assigned. A zero (0) is assigned for equivalent means.

The hypothesis tested is the null hypothesis, H_0, that background values are greater than or equal to foreground values, against the alternative hypothesis, H_1, that the foreground values are greater than background values. The test statistic for this test is:

$$T = \text{total number of pluses}$$

Large values of T indicate that a plus is more probable than a minus, as stated by the alternative hypothesis. The critical region corresponds to a value of T greater than or equal to (n-t), where n is the total amount

of pluses and minuses. The term t is found from Table 1 by entering the table at n and finding the largest tabled value of alpha that is less than or equal to the significance (0.05 in this case). The value of y corresponding to alpha is t.

In the case where there are no table entries, alpha, which are less than or equal to the significance (0.05 in this case), it is necessary to set t = -1; the RCRA Permit Writer's Manual describes this situation thusly:

> "At a level of significance of 0.05, this test requires that five sample events be compared before the test is appropriate (before trends can be deduced)."[1]

The procedure is concluded by comparing the quantity T with the quantity n-t. If T is greater or equal to n-t, the null hypothesis, H_0, is rejected and the alternate hypothesis, H_1, accepted, establishing significance. On the other hand, when T is less than n-t, the null hypothesis H_0 is maintained and no significance is demonstrated.

The RCRA Permit Writer's Manual describes the sign-test as "well-known".[2] Indeed, the sign-test is described in many statistics texts. The RCRA Permit Writer's Manual, for example, mentions[3] Conover (1971)[4]. A treatment of the sign-test may also be found in Siegel[5].

The basic concept behind the sign test is the reduction of two sets of continuous data (i.e., the background and foreground observations) to one set of dichotomous data (i.e., the set of pluses and minuses), and the subsequent application of the binomial test to the dichotomous data set.

This approach is noted for its great power. Siegel writes about the power of this approach, the application of the binomial test to continuous data that have been dichotomized:

> "...if the data are basically dichotomous, even though the variable has an underlying continuous distribution, the binomial test may have no more powerful alternative."[6]

TABLE 1

BINOMIAL DISTRIBUTION

Alpha = P[X≤y] for b(X;n,0.50)

n	y	Alpha
1	0	0.5000
1	1	1.0000
2	0	0.2500
2	1	0.7500
2	2	1.0000
3	0	0.1250
3	1	0.5000
3	2	0.8750
3	3	1.0000
4	0	0.0625
4	1	0.3125
4	2	0.6875
4	3	0.9375
4	4	1.0000
5	0	0.0313
5	1	0.1875
5	2	0.5000
5	3	0.8125
5	4	0.9687
5	5	1.0000
6	0	0.0156
6	1	0.1094
6	2	0.3437
6	3	0.6562
6	4	0.8906
6	5	0.9844
6	6	1.0000
7	0	0.0078
7	1	0.0625
7	2	0.2266
7	3	0.5000
7	4	0.7734
7	5	0.9375
7	6	0.9922
7	7	1.0000
8	0	0.0039
8	1	0.0352
8	2	0.1445
8	3	0.3633
8	4	0.6367
8	5	0.8555
8	6	0.9648
8	7	0.9961
8	8	1.0000
9	0	0.0028
9	1	0.0195
9	2	0.0898
9	3	0.2539
9	4	0.5000
9	5	0.7461
9	6	0.9102
9	7	0.9805
9	8	0.9980
9	9	1.0000
10	0	0.0010
10	1	0.0107
10	2	0.0547
10	3	0.1719
10	4	0.3770
10	5	0.6230
10	6	0.8281
10	7	0.9453
10	8	0.9893
10	9	0.9990
10	10	1.0000
11	0	0.0005
11	1	0.0059
11	2	0.0327
11	3	0.1133
11	4	0.2744
11	5	0.5000
11	6	0.7256
11	7	0.8867
11	8	0.9673
11	9	0.9941
11	10	0.9995
11	11	1.0000
12	0	0.0002
12	1	0.0032
12	2	0.0193
12	3	0.0730
12	4	0.1938
12	5	0.3872
12	6	0.6128
12	7	0.8062
12	8	0.9270
12	9	0.9807
12	10	0.9968
12	11	0.9998
12	12	1.0000
13	0	0.0001
13	1	0.0017
13	2	0.0112
13	3	0.0461
13	4	0.1334
13	5	0.2905
13	6	0.5000
13	7	0.7095
13	8	0.8666
13	9	0.9539
13	10	0.9888
13	11	0.9983
13	12	0.9999
13	13	1.0000
14	0	0.0001
14	1	0.0009
14	2	0.0065
14	3	0.0287
14	4	0.0898
14	5	0.2120
14	6	0.3953
14	7	0.6047
14	8	0.7880
14	9	0.9102
14	10	0.9713
14	11	0.9935
14	12	0.9991
14	13	0.9999
14	14	1.0000
15	0	0.0000
15	1	0.0005
15	2	0.0037
15	3	0.0176
15	4	0.0592
15	5	0.1509
15	6	0.3036
15	7	0.5000
15	8	0.6964
15	9	0.8491
15	10	0.9408
15	11	0.9824
15	12	0.9963
15	13	0.9995
15	14	1.0000
15	15	1.0000

B. The t-Test with Continuity Correction

Statistical Concept: This section describes the application of Continuity Correction to Cochran's Approximation to the Behrens-Fisher Student's t-test (i.e., the RCRA t-test, or "Basic Statistical Procedure") in order to correct several of the difficulties with the RCRA version. Continuity Correction, to some extent, alleviates the following difficulties with the t-test:

1. Parameters at or near detection limit.
2. Data too discrete.
3. Observations nearly constant

Continuity Correction does not alleviate the other difficulties associated with mis-application of the t-test:

4. Mis-representative variance (i.e., observations not independent)
5. Imbalance between risk of false positives and failure to detect changes that are actually present (caused by too many applications of the test).
6. Inappropriateness of the t-test when there are only very small numbers of observations.

Although the employment of Continuity Correction does not provide relief from Problems 4, 5 and 6, the circumstances of data collection and application of the t-test partially mollify problems 4 and 5. The problem of the lack of independent observations still exists when four samples are taken from the same well in resampling. The use of the t-test in limited situations, rather than as an initial exploratory tool, mitigates problem 5.

We will use Cochran's Approximation to the Behrens-Fisher Student's t-test (i.e., the RCRA t-test, or "Basic Statistical Procedure") with two adjustments for continuity:

1. The variance, s^2, of each data set will be computed in a manner that takes into account the fact that each data point represents a range of possible values rather than a single precisely determined real number

2. The standard error of the mean (used in the denominator of the equation for the t-statistic) acts as an indicator of the precision with which the mean of a data set has been determined. A lower limit to the standard error of the mean will be used to prevent it from decreasing beyond the precision of the analytical precision, thus inflating the t-statistic.

Continuity Correction is appropriate when data observations do not represent precisely determined real numbers but a range of possible values. Suppose, for example, that the laboratory test for a chemical parameter has a limit of quantification of 30 units and that the test is able to generate results with a precision of 10 units. The test has a discrete set of possible outcomes:

<30 units (i.e., below limit of quantification)
30 units (i.e., at limit of quantification)
40 units
50 units
60 units
etc.

Each of these outcomes does not represent a specific point on the real number line but rather a range of possible values established by the laboratory techniques and instrumentation. The outcome "<30 units" indicates any value from 0 units up to 30 units. The outcome 50 units indicates any value from 45 units to 55 units. The outcome 30 units probably indicates any value from 25 to 35 units. Each of these outcomes thus represents a range of possible values.

Continuity Correction involves doing computations in a way that acknowledges that the data represent ranges on the real number lines, not specific points.

The t-test requires the calculation of the mean of each of two sets of data (the background set and the foreground set). The mean = $(x_1 + \ldots + x_n)/n$. If we regard each x_i as representing a range, in finding the mean

example, if the limit of quantification is 30 units, an observation of "<30 units" would be treated as 15 units in calculating the mean.

The t-test also requires the calculation of the variance of each of the two data sets. The equation for the variance is

$$s^2 = \frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2$$

Each of the terms of the summation has the form $(x_i - \bar{x})^2$. To apply Continuity Correction it is necessary to treat each observation as representing a range of values from $x_i - \Delta_i$ through $x_i + \Delta_i$, and compute each term of the form $(x_i - \bar{x})^2$ as the mean of all possible values that would result if x_i were replaced by each real number from $x_i - \Delta_i$ up to $x_i + \Delta_i$.

Specifically, instead of $(x_i - \bar{x})^2$, we use

$$\frac{1}{2\Delta} \int_{x_i - \Delta_i}^{x_i + \Delta_i} (u - \bar{x})^2 \, du.$$

This expression simplifies, through calculation of the integral, to

$$(x_i - \bar{x})^2 + (1/3)\, \Delta_i^2.$$

Using this expression in the place of $(x_i - \bar{x})^2$ gives us a modified equation for the variance

$$s^2 = \frac{1}{n-1} \sum_{i=1}^{n} \left[(x_i - \bar{x})^2 + (1/3)\Delta_i^2\right]$$

In the example considered earlier, where the limit of quantification was 30 units and values above 30 units were obtained to the closest 10-unit level, we would treat an observation "<30 units" as having $x_i = 15$ and $\Delta_i = 15$. An observation of "30 units" would be treated as having $x_i = 30$ and $\Delta_i = 5$. An observation of "40 units" would be treated as having $x_i =$

The expression for the variance s^2 has a very natural interpretation. The numerator of the expression, i.e.,

$$\sum_{i=1}^{n} \left[(x_i - \bar{x})^2 + (1/3)\,\Delta_i^2\right]$$

represents the sum of the second moments of the various observations about the mean. Each of the summands,

$$(x_i - \bar{x})^2 + (1/3)\,\Delta_i^2,$$

consists of two terms:

a. The quantity $(1/3)\,\Delta_i^2$ is the second moment of the uniformly distributed range of points from $x_i - \Delta_i$ up to $x_i + \Delta_i$ about its mean x_i.

b. The quantity $(x_i - \bar{x})^2$ represents the contribution made by observation x_i to the second moment about $\bar{x}$ if the observation were concentrated at the single point x_i.

That the expression $(x_i - \bar{x})^2 + (1/3)\,\Delta_i^2$ gives the second moment of the range of values from $x_i - \Delta_i$ through $x_i + \Delta_i$ about $\bar{x}$ is the consequence of the theorem that the second moment of a set of points about an arbitrary real number is equal to the sum of (1) the second moments of the points about their own mean and (2) the second moment the points would have about the real number if the set of points concentrated into a single point located at their mean.

The t-test requires calculation of the t-statistic

$$t^* = (\bar{x}_m - \bar{x}_b) \,/\, (s_m^2/n_m + s_b^2/n_b)^{0.5},$$

Where:

n_m = the number of foreground observations,

n_b = the number of background observations,

$\bar{x}_m$ = the mean of the foreground observations,

$\bar{x}_b$ = the mean of the background observations,

s_m^2 = the variance of the foreground observations, and

s_b^2 = the variance of the background observations

In this equation for t*, the numerator is the difference between the means of the two data sets. The size of the difference is evaluated in terms of the denominator, which is the standard error of the difference of the two means. This standard error of the difference of the means is computed as the square root of the sum of the squares of the standard errors of each of the two means. The standard error expressions are:

$s_m/\sqrt{n_m}$ = the standard error of the foreground mean, and

$s_b/\sqrt{n_b}$ = the standard error of the background mean.

The standard error quantities are intended as indicators of how precisely each mean has been established. As a general rule of thumb, we would expect that there is a probability of about 95% that the true mean (i.e., the mean of the population from which the sample was drawn) differs from the sample mean by less than two standard errors.

The square of the standard error of the estimator of the mean may be called the "variance of the mean". Thus:

$W_m = s_m^2/n_m$ = the variance of the foreground mean, and

$W_b = s_b^2/n_b$ = the variance of the background mean.

Suppose in the example described above, where the limit of detection was 30 units, that one data set consisted of a series of identical observations "<30 units". In this situation, the precision with which the mean is determined is not increased by having a great number of observations. No matter how many observations of "<30 units" we have, all we know about the mean is that it probably lies between 0 units and 30 units. It would be appropriate in this situation to regard the mean, $\overline{x}$, as 15 units (i.e., one-half the limit of quantification), and to regard the standard error of the mean as 7.5 units (i.e., one quarter the limit of quantification, or one-half of Δ_i). To say that the true mean (i.e., the mean of the population from which the sample was drawn) lies between 0 units and 30 units would then be equivalent to saying that it lies within two standard errors of the sample mean, $\overline{x}$.

Suppose, again as in the example described above, that the precision of the analytical procedure was 10 units, so that 30 units, 40 units, 50 units, etc., were the possible observed values. Suppose that one data set consisted entirely of observations of "50 units". No matter how many observations of "50 units" we have, all we know about the mean is that it probably lies between 45 units and 55 units. It would be appropriate in this situation to regard the mean, $\overline{x}$, as 50 units and to regard the standard error of the mean as 2.5 units (i.e., one-quarter of the precision, or one-half of Δ_i). To say that the true mean (i.e., the mean of the population from which the sample was drawn) lies between 45 units and 55 units would then be equivalent to saying that it lies within two standard errors of the sample mean $\overline{x}$.

For each of the two data sets, when the variance of the mean is computed, care should be taken that its square root, the standard error of the mean, is not less than precision of the analytical procedure is able to establish.

Specifically, a Lower Limit for the Variance of the Mean (LLVOM) should be computed:

$$LLVOM = \frac{1}{n}\sum_{i=1}^{n}\left[\frac{\Delta_i}{2}\right]^2 \text{, where}$$

Δ_i = one half the limit of quantification if the observation x_i is below the limit of quantification, or one-half the precision of the analytical procedure otherwise.

If the variance of the mean ($V = s^2/n$) is less than LLVOM, it should be replaced by the quantity LLVOM.

In the case where all the observations of a data set are below the level of quantification, the standard error of the mean will thus be treated as one quarter of the limit of quantification. In the case where all the observations of a data set are at a constant value at or above the level

of the background mean, W_b, and the variance of the estimator of the foreground mean, W_m. From this information, the t-statistic is computed as:

$$t^* = \frac{\bar{x}_m - \bar{x}_b}{\sqrt{W_m + W_b}}$$

Calculation of the comparison t-statistic (t_c) against which t* will be compared necessitates first computing t_b and t_m from standard one-tailed tables where

t_b = value of t from t-table with n_b - 1 degree of freedom and confidence level 0.05;

t_m = value of t from t-table with n_m - 1 degree of freedom and confidence level 0.05.

A copy of the appropriate t-table is included here as Table 2. The comparison t-statistic t_c is:

$$t_c = \frac{W_b t_b + W_m t_m}{W_b + W_m}$$

The t-statistic, t*, is now compared with the comparison t-statistic, t_c, using the following decision rule:

If t* is greater than or equal to t_c then the null hypothesis, H_0, is rejected, H_1 is accepted, and the foreground mean is found to be greater than the background mean.

However, if t* is less than t_c then the foreground mean is not found to exceed the background mean and the null hypothesis, H_0, is maintained.

of quantification, the standard error of the mean will thus be treated as one quarter of the precision.

Statistical Procedure: The null hypothesis, H_0, to be tested states that the background mean is greater than or equal to the foreground mean. The alternate hypothesis, H_1, states that the foreground mean exceeds the background mean.

In general, when an observation is below the minimum detection limit (MDL), we will use x_i = MDL/2 and Δ_i = MDL/2. If an observation is at or above the level of quantification, we will set x_i = the observed value and Δ_i= one-half the difference between the next possible higher observed value and x_i (determined by the analytical process and instrumentation).

The mean of a set of values $x_i, \ldots, x_n$ will be computed by $\bar{x} = (x_i + \ldots + x_n)/n$ and the variance s^2 will be computed by:

$$s^2 = \frac{1}{n-1} \sum_{i=1}^{n} \left[(x_i - \bar{x})^2 + (1/3)\Delta_i^2\right]$$

The variance of the mean, W, will be computed as s^2/n. W will be compared with the quantity

$$\text{LLVOM} = \frac{1}{n} \sum_{i=1}^{n} \left[\frac{\Delta_i}{2}\right]^2$$

If the computed W is less than LLVOM it will be replaced by LLVOM.

Except for these modifications, the RCRA t-test computational procedure will be unchanged. After the mean and variance have been computed as described, the Cochran's Approximation to the Behrens-Fisher Student's t-test will be used.

Let n_b = the number of background observations and n_m = the number of foreground observations. From the background and foreground data calculate the background mean. $\bar{x}_b$, the foreground mean, $\bar{x}_m$, the background variance, s_b^2, the foreground variance, s_m^2, the variance of the

TABLE 2

t-TABLE FOR PROPOSED STATISTICAL TEST

Degress of Freedom	t for Alpha = 0.05
1	6.314
2	2.920
3	2.353
4	2.132
5	2.015
6	1.943
7	1.895
8	1.860
9	1.833
10	1.812
11	1.796
12	1.782
13	1.771
14	1.761
15	1.753
16	1.746
17	1.740
18	1.734
19	1.729
20	1.725
21	1.721
22	1.717
23	1.714
24	1.711
25	1.708
26	1.706
27	1.703
28	1.701
29	1.699
30	1.697
40	1.684
60	1.671
120	1.658
Infinity	1.645

References

1. Geo-Trans, Inc., Draft RCRA Permit Writer's Manual, Ground-Water Protection, 40 CFR Part 264 Subpart F, submitted October 4, 1983 to the U.S. EPA, sec. 6.3.1, "Basic Statistical Procedure", pp. 149.
2. ibid., p. 148.
3. ibid., p. 149 and p. 156
4. Conover, W.J., 1971, Practical Nonparametric Statistics,, John Wiley, New York.
5. Siegel, Sidney, Nonparametric Statistics for the Behavioral Sciences, McGraw-Hill, 1956, pp. 68-75 and 36-42.
6. ibid., p. 42.

CONTINUITY CORRECTION FORMULAS

If detection limit is 30 to the closest 10 units
then an observation of "<30 units" is x = 15
i = 15

if "30 units" then x = 30 i = 5
if "40 units" then x = 40 i = 5 and so on...

Parameter:

Measured						
x						
i						

Measured						
x						
i						

Measured						
x						
i						

n = $\sqrt{x = \sqrt{\text{sum } x^2 = \sqrt{\text{sum } i^2 =}}}$

Parameter: Well:

$$s^2 \equiv (\text{sum } x^2 - n\,\bar{x}^2 \pm 1/3 \text{ sum } i^2)/\,n-1$$

$$W_m = s_m^2 / n_m$$

Background	Foreground
N_b =	N_m =
x_B =	x_m =
t_b =	t_m =
W_b =	W_m =

$$t^* = X_m - X_b / (W_m + W_b)^{.5}$$

$$t_c = W_b t_b + W_m t_m / W_b + W_m$$

t^* t_c

B. Final

STATISTICAL PROCEDURE

GROUNDWATER MONITORING PLAN

MICHIGAN DISPOSAL, INC.
WASTE PROCESSING FACILITY
MID000724831

AUGUST, 1988

INTRODUCTION

Michigan Disposal, Inc. (MDI) will use the statistical procedure presented below to determine if the concentration of hazardous waste constituents in the groundwater has significantly increased due to its Waste Processing Facility at Wayne Disposal Site No. 2 Landfill. The statistical procedure is part of the groundwater monitoring program and is developed to comply with Rule 299.9611 of the rules promulgated under Public Act 64 and CFR 264.97 in effect on September 1, 1987.

The overall statistical procedure includes several different statistical methods to be used in four different ways: 1) for standard evaluation of the primary monitoring parameters described on Table 3 in the Groundwater Sampling and Analysis Plan; 2) for analysis of secondary parameters; and for both primary and secondary parameters, 3) for comparison of individual downgradient monitoring wells with the upgradient background (which is represented by well nos. 18 and 19) and 4) intra-well comparisons. In order to serve these functions, the plan also includes methods for determining the likely statistical population distribution, correcting for serial dependence and seasonal trends and correcting the background mean and variance for parameters with censored data sets (a data set for any parameter is considered censored if it has a significant number of values from quarterly sampling results which are listed as below the detection limit (BDL)).

RATIONALE FOR THE SELECTED STATISTICAL PROCEDURE - CHARACTERISTICS OF THE GROUNDWATER DATA FROM WDI/MDI

The selection of the statistical procedure described below has taken into account the inherent characteristics of the groundwater data collected since 1985 from WDI's HWMA monitoring well network (i.e., well nos. 18 through 31) and an attempt to minimize false positives while maintaining good power to detect significant changes in the monitoring parameters. Analysis of the inherent characteristics of the groundwater data indicated two factors which must be considered in a statistical procedure: the distribution of the data and the extent of BDL values in the data set for each parameter. The effect of these two factors on the

statistical procedure selection process are described in the following paragraphs.

Review of the data collected since 1985 from well nos. 18 through 31 indicate that the amount of censored data is significant. The parameters tested in samples from well nos. 18 through 31 can be placed into three separate groups. The heavy metals and organic compounds are in the first group (which will be referred to as Group 1) which is heavily censored, i.e. 98 to 100% of the values measured were reported as BDL. The second group (Group II), includes parameters where the percentage of BDL values ranges from approximately 50 to 98%. This second group includes parameters such as nitrate, manganese, gross beta, and total organic halogens (TOX). The last group (Group III) includes parameters which are rarely BDL. This includes parameters like pH and specific conductance, and parameters such as chloride, sodium, iron, and sulfate which are commonly found in groundwater. An initial review of statistical methods available indicates that the applicability of the various tests are highly dependent on the degree to which the data set being analyzed is censored. Therefore, separate tests were considered for each of the three parameter groups described above.

As in all statistical evaluations, the underlying distribution of the data is an important consideration. In order to use parametric statistics, the underlying population distribution must be normal. Where a data set to be analyzed is not normally distributed but can be transformed or adjusted to approximately conform to the normal distribution (i.e., log normally distributed), parametric test procedures can be applied. In other cases, the lack of an underlying normal distribution for the parameter will force the use of non-parametric statistical techniques which do not assume any underlying distribution. The statistical procedures introduced in the following sections are designed to account for the three groups of censored data and the need to analyze the underlying distribution of the data set before it is statistically analyzed.

The other criteria for the selection of an appropriate statistical procedure is a proper balance between the rate of false positives ( ), an indication of a significant increase when none has occurred and the rate of false negatives ( ), the failure to detect a significant increase when it has occurred. The power of a statistical test is defined as the probability of correctly identifying a significant increase (i.e., 1_). The optimum statistical test is one that maintains power while yielding a low rate of false positives. The rate of false positives is theoretically chosen by the investigator (i.e., 1% or 5%) but in reality depends on the applicability of the data to

the particular statistical test. The power depends on the rate of false positives chosen, the sample size and the applicability of the data for the statistical test. MDI has attempted to choose statistical procedures that are applicable to the various monitoring parameters and proposed the collection of a background data set large enough to maintain proper power. In this way, a proper balance between the rate of false positives and statistical power is provided.

INTRODUCTION TO THE STATISTICAL PROCEDURE

MDI will use a two-step statistical procedure to analyze groundwater quality data from its subset of wells at the HWMA at WDI's, Site No. 2. Background groundwater quality at wells upgradient of the MDI facility will be established in the first step. The second step will be to routinely analyze and report data collected on a semi-annual basis during the period in which the facility is in detection monitoring. The procedures to be used during the background data collection period are summarized in outline form on Figure 1. Procedures to be used during the detection monitoring program are outlined in the form of a decision chart presented as Figures 2a - 2c. Each of the steps in the overall procedure are described in separate sections below.

Discussion of Statistical Procedures During the Background Period

As presented on Figure 1, the statistical procedures for the background data collection period are divided into 7 separate tasks. Discussion and description of each step follow:

1.0 Collection of Background Data - To establish upgradient background groundwater quality data for the facility MDI will collect samples from well nos. 18 and 19 on a quarterly basis for a period of two years. Each of the primary and secondary parameters listed in Table 3 in the Environmental Monitoring Program will be analyzed for in each sample. For parameters with some existing background data, this existing data will be added to the next two years of data collection. Table A shows the amount of existing data for each parameter which will be added to the additional background data. In addition, "background" groundwater quality will be established for each individual downgradient well based on the data collected from this period. These downgradient wells for MDI are wells 21, 23, 36 and 41 (proposed).

FIGURE 1: OUTLINE AND FLOW DIAGRAM OF STATISTICAL ANALYSIS DURING THE BACKGROUND PERIOD

1.0 Collect samples from well nos. 18, 19, 21, 23, 36 and 41 (proposed) on a quarterly basis for a two-year period. Each sample should be analyzed for all of the primary and secondary parameters listed in Table 3 in the Environmental Monitoring Program.

2.0 Establish the underlying statistical distribution for each parameter using all data from the background wells.

3.0 Evaluate the degree of censorship of the data set for each parameter by determining the percentage of values below the detection limit.

4.0 For Group II and Group III parameters, inspect the data set for each parameter for outlier values.

5.0 Establish an analytical precision for the detection limit for each parameter based on an examination of laboratory quality control.

6.0 Analyze the background data set for each parameter for serial correlation, seasonal cycles and long-term trends.

7.0 Establish an adjusted mean and standard deviation for each parameter for each downgradient well and for the upgradient area using Well Nos. 18 and 19.

Figure 2a: MDA DETECTION MONITORING PROGRAM - STATISTICAL PROCEDURE FOR GROUP I PARAMETERS

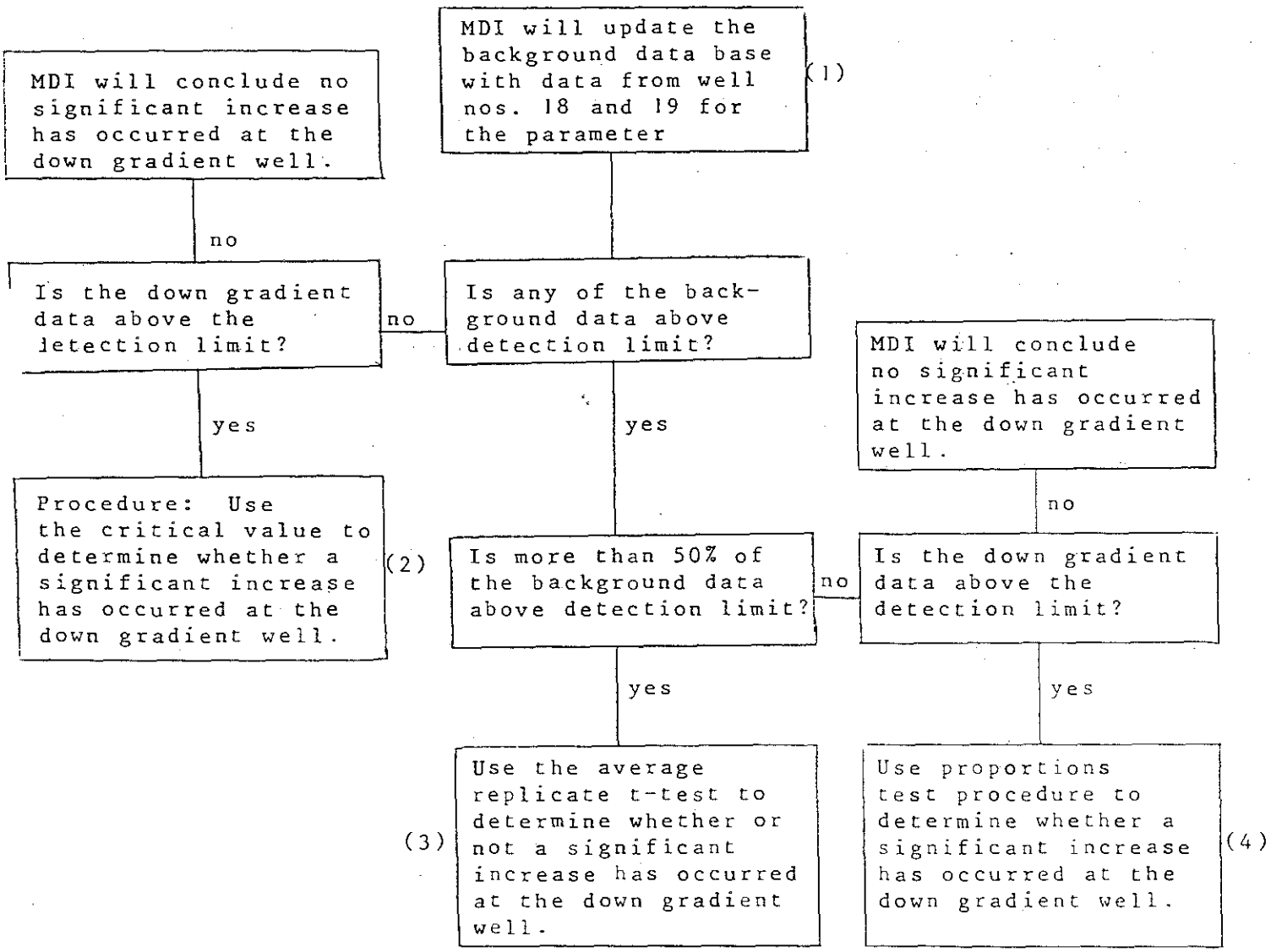


Figure 2b: MDI DETECTION MONITORING PROGRAM - STATISTICAL PROCEDURE FOR GROUP II PARAMETERS

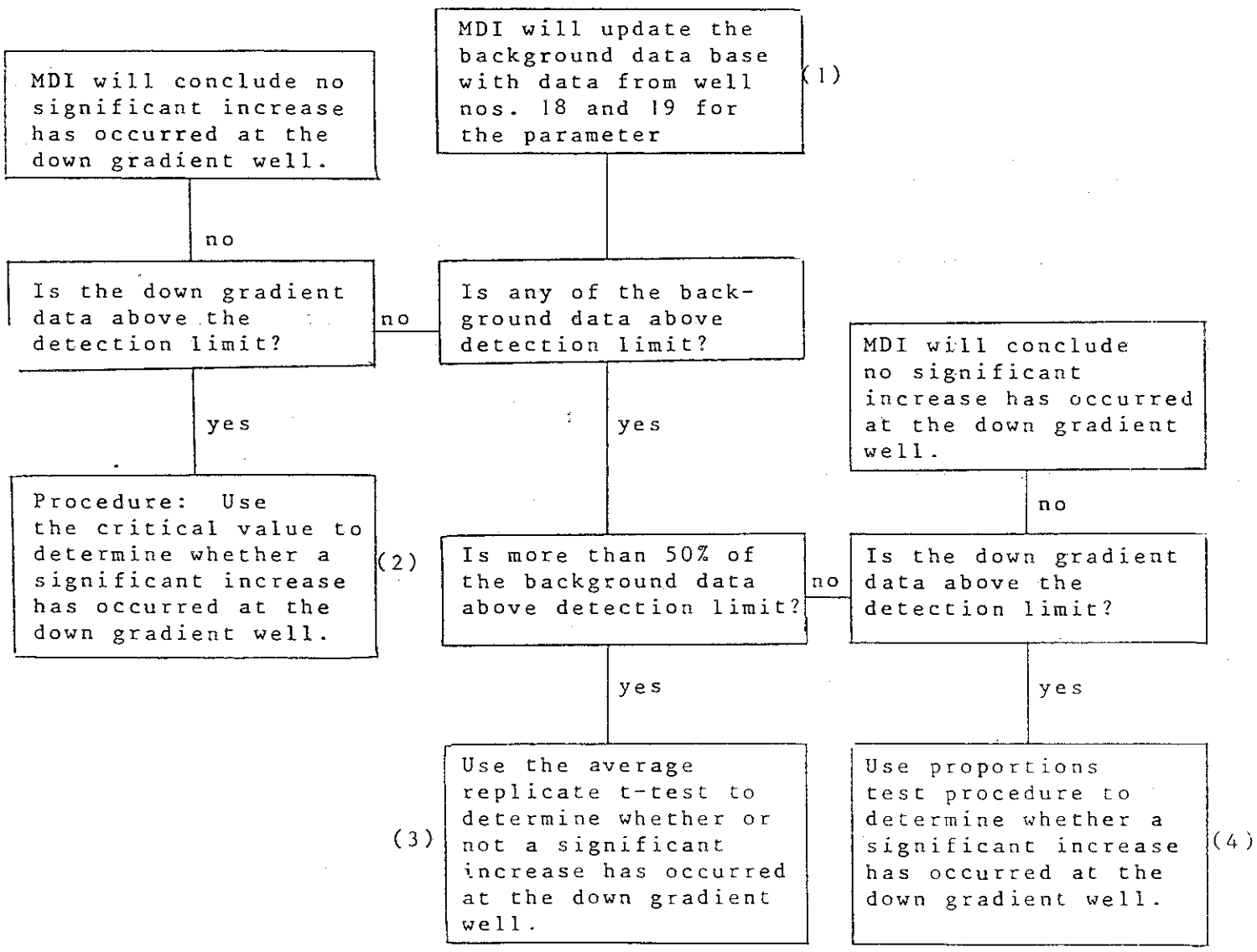


Figure 2c: MDI DETECTION MONITORING PROGRAM - STATISTICAL PROCEDURE FOR GROUP III PARAMETERS

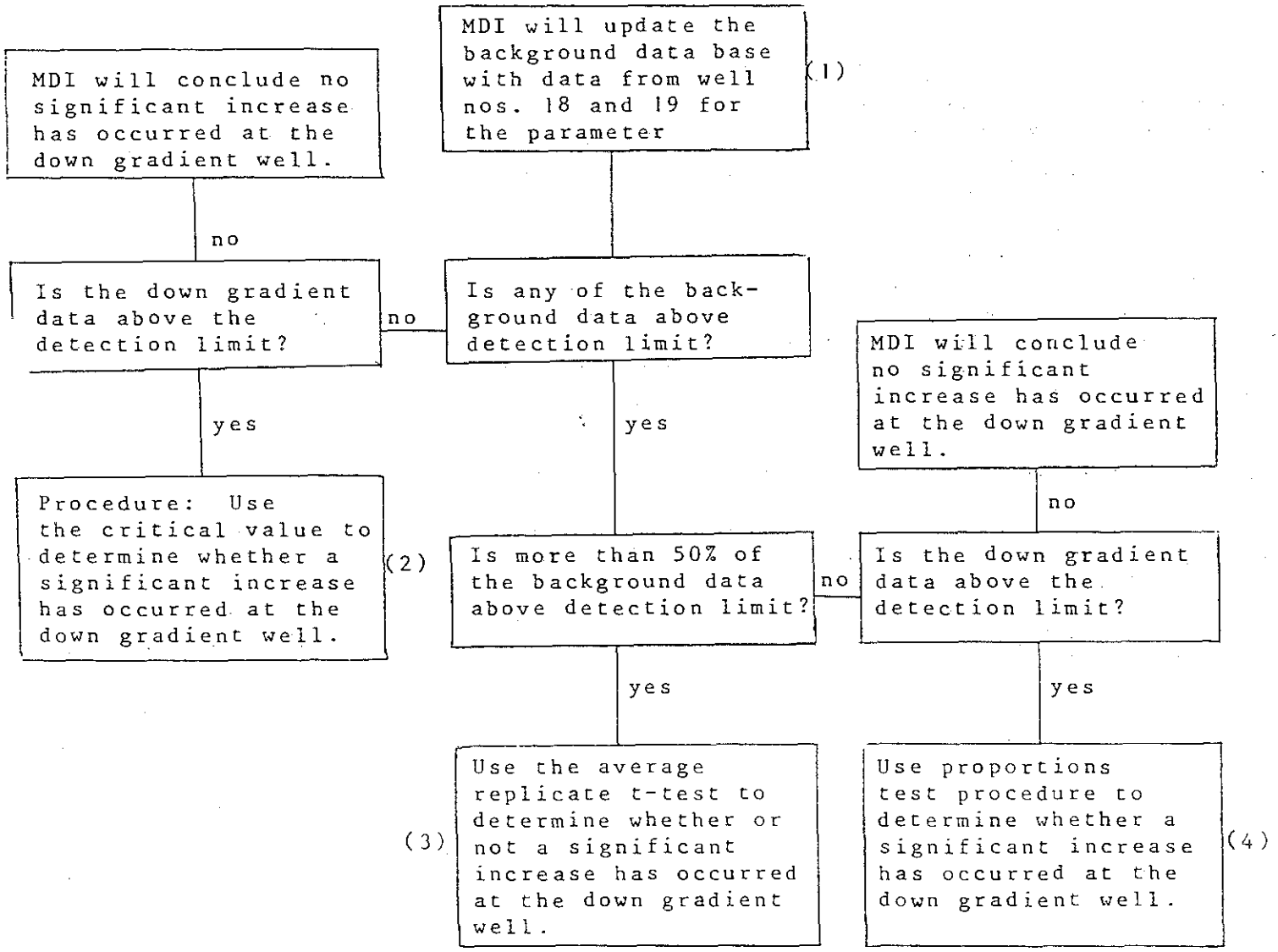


TABLE A

Available Groundwater Quality Data
HMWA Wells 18-31
September 1, 1987

Parameter	No. of Quarters of Existing Data	Group Designation
Iron	5	III
Manganese	5	II
Sodium	5	III
Chloride	5	III
Phenols	5	I
Sulfate	5	III
Arsenic	4	I
Barium	4	II
Cadmium	4	I
Chromium (Total and Hexavalent)	4	I
Lead	4	I
Mercury	4	I
Selenium	4	I
Silver	4	I
Zinc	4	II or III
Nitrate	4	II
Fluoride	4	III
Endrin	4	I
Methoxychlor	4	I
Toxaphene	4	I
2, 4-D	4	I
Silvex	4	I
Benzene	0	I*
1, 1-Dichloroethane	0	I*
1, 2-Dichloroethane	0	I*
1, 2-Dichloroethylene	0	I*
1, 1, 1-Trichloroethane	0	I*
Trichloroethylene	0	I*
Ethylbenzene	0	I*
Toluene	0	I*
Xylene	0	I*
Calcium	0	III*
Magnesium	0	III*
Alkalinity (Bicarbonate Carbonate	0	III*
Copper	0	I
Cyanide	0	I*
1, 2 Dichlorobenzene	0	I*
Methylene Chloride	0	I*
Vinyl Chloride	0	I*
TOC	5	III*
Specific Conductivity	5	III*
pH	5	III*

*Most likely group designation.

A two-year background data collection period is necessary to have sufficient data to properly characterize the underlying statistical distribution and to select the proper statistical method for data analysis during detection monitoring. Data collection on a quarterly basis will reduce the potential for serially correlated data as the possibility for time dependence between samples should be minimized.

2.0 Determination of Underlying Statistical Distribution

For each parameter found to be in Group II and Group III, MDI will determine whether the background data is drawn from a normally distributed population and, if not, will transform or adjust the data for the normal distribution. Determining whether or not the data are drawn from a normally distributed population will be conducted by a two-step procedure. First, the coefficient of variation will be computed and then a normal probability plot will be constructed. A regression analysis of the data will be performed on the normal probability plot. If the coefficient of variation and normal probability plot regression analysis strongly suggests that the background data set is not normally distributed, MDI will adjust the mean and variance of the data prior to its use in any parametric statistical procedures. The specific steps for conducting this two-step analysis are presented in Appendix 1.0, Part A. For data which are log normally distributed, the data will be transformed using the method presented in Appendix 1.0, Part B.

3.0 Evaluation of Degree of Censorship

In order to determine the most appropriate statistical procedure, MDI will determine the degree of censorship within the background data set for each parameter. This will be determined simply by evaluating the percentage of each of the parameter's values which are BDL for each sampling session in all five upgradient wells. MDI will use this information as the basis for selecting the appropriate statistical procedure as described in the next section. If censored data is used in parametric statistics, the mean and variance will be adjusted by the regression method presented in Appendix 2.0.

4.0 Inspection of the Data Set for Outliers

MDI will identify erroneous values (i.e., outliers) within the background data set for any parameter with less than 50 percent of it's values below the detection limit and a known distribution. An outlier will be defined as a value for any parameter which is more than three standard deviations smaller or larger than the mean value for the parameter. The mean and standard deviation values will be computed from the data collected at the upgradient wells after all corrections as described above have been made.

5.0 Establishment of Analytical Precision for the Detection Limits

At the conclusion of the background monitoring period, MDI will establish an analytical precision for the detection limit of any of the parameters included in the primary and secondary parameter lists which are severely censored. This analytical precision will be based on the laboratory quality control information which will be collected by the laboratory at each quarterly sampling during the background period.

This analytical precision will be critically important in statistically evaluating the Group I data sets. These statistical procedures are addressed in the next section.

6.0 Determination of Seasonal Cycles, Long-Term Trends and Serial Correlation

MDI will analyze the background data to determine whether or not a serial dependence or seasonal trend exists in the data. This will be determined by examining a graph of the concentration of each parameter plotted as a function of time. The data will be considered to have a seasonal trend if the concentration values for any parameter show a repetitive periodicity during the background period. If a seasonal influence is indicated in the background data, MDI will use the procedure described in Appendix 3.0 to reduce the effect of seasonal influences. The time series plot will also be evaluated for long term trends. If a trend appears to exist, its significance will be tested by the procedures described in Appendix 3.0. If the trend is significant, MDI will remove the linear trend as described in Appendix 3.0. MDI has chosen quarterly sampling in an effort to

minimize the probability of serial dependence. However, MDI will test for autocorrelation, and if it is found, will devise a method to adjust the data.

7.0 MDI will establish a mean concentration and standard deviation for each parameter at each individual downgradient well. These values will be used for subsequent intra-well statistical analysis during detection monitoring. A similar mean and standard deviation will be computed for each parameter for well numbers 18 and 19. This will be used as the background mean and standard deviation used in statistical analysis during the detection monitoring program.

Description of Statistical Procedures During Detection Monitoring

MDI will begin the detection monitoring program after the completion of the two-year background data collection period. During detection monitoring, samples will be collected on a semi-annual basis as described in the Groundwater Sampling and Analysis Plan. Samples will be tested for the parameters listed on Table 3 in the attachments to the Environmental Monitoring Program. The statistical procedure described below will be routinely applied to the primary monitoring parameters (Table 3a) on a semi-annual basis. For each sampling session, statistical comparisons using the methods described below will be made for each individual downgradient well with the upgradient background represented by well nos. 18 and 19, and individual intra-well comparisons will be made for each downgradient well.

The statistical procedures described below are keyed to the percentage of BDL values in the background data set for the parameter to be analyzed. In this program, MDI will update the upgradient background and will then separate the parameters into three groups based on the percentage of BDL values. The statistical test which will be used to determine whether or not a statistically significant increase has occurred at a downgradient well for each semi-annual sampling session will be different for each of the three groups. The program and individual statistical test procedures are described in the form of a series of decision tree diagrams (Figures 2a - 2c). The procedures for Group I parameters are marked on Figure 2a, the procedures for Group II parameters are marked on Figure 2b, and the procedures for Group III parameters are marked on Figure 2c. The text below describes each of the components of the program in more detail.

1.0 Update the Background Data Base

MDI will confirm the first-moment statistics computed from background data base by re-analyzing the data after including the values for each parameter that are collected from well nos. 18 and 19 during each successive semi-annual sampling session. This information will be added to the data base and all of the statistical correction methods described earlier will be performed on the new, slightly expanded background data set. MDI will update and confirm the data set in this way by adding new data from well nos. 18 and 19 as the detection monitoring program proceeds. Prior to analyzing the detection monitoring data for each parameter, MDI will reevaluate the percentage of values which are above the detection limit. The process of updating the background will be critically important in order to assure that the appropriate statistical techniques are applied and that any serial dependence or seasonal trends are accounted for before the statistical procedure is applied to the detection monitoring data. The background data for intra-well comparisons will not be updated.

2.0 Procedures When All Background Data are Below the Detection Limit - Group I

As shown in Figure 2a, for Group I parameters, MDI will evaluate whether or not a statistically significant increase has occurred at the downgradient wells by using the Critical Value Procedure. This procedure will be used only if the value for the parameter at the downgradient well in question is above the detection limit. If it is not, MDI will conclude that no leak has occurred. A detailed description of the Critical Value Procedure is presented in Appendix 4.0.

The Critical Value Procedure is dependent on the laboratory precision of the measured parameter. If all of the background data for the parameter in question is below the detection limit, this method provides a means to evaluate the significance of any isolated occurrence of the parameter above the detection limit during the detection monitoring program. Because it is not possible to enumerate standard first-moment statistics or to assess the underlying distribution of parameters of this type, no power analysis or other comparative tests were possible.

3.0 Statistical Procedure to be Used When More than 50% of the Background Data are Below the Detection Limit - Group II Parameters

In this case, if the downgradient value for the parameter is above the detection limit, MDI will use the Proportions Test and a Tolerance Limit default to determine whether or not a statistically significant increase has occurred in the downgradient well. The specific requirements for use of this test are provided in Appendix 5.0.

4.0 Procedures to be Used When Less than 50% of Background Data is Below the Detection Limit - Group III Parameters

In this case, MDI will use the Corrected Average Replicate T-test in order to determine whether or not a significant increase has occurred in any given parameter in the downgradient well. The background data used in the Average Replicate T-test will be corrected and updated as described above prior to application of this test. The detailed description of the test and the procedure for using the test are presented in Appendix 6.0.

The average replicate T-test with the Bonnferoni correction is a parametric test with significant power. Based on a power curve analysis, the test is more powerful (i.e., better at minimizing false negatives) than the Dunnet's Parametric Test, but is less powerful than the Cochran-Behren's T-test. Analysis of the false positive rates for these tests indicate that the test would be expected to produce significantly lower false positives rate than the Cochran-Behren's Test. As with all parametric tests, the background data set must be corrected for the presence of trends, serial dependence, non-normal distribution and must have mean and variance values in the background data corrected for BDL values.

During the detection monitoring program, MDI will report for each parameter and each downgradient well any statistically significant increase shown for any of the primary parameters. If statistically significant increases occur in the primary parameters, then the statistical evaluation of all of the secondary parameters will also be reported.

APPENDIX 1.0 METHOD FOR DETERMINING WHETHER THE BACKGROUND DATA WAS DRAWN FROM A NORMAL OR LOGNORMAL DISTRIBUTION AND ADJUSTMENTS FOR LOGNORMAL CHARACTER

A. TESTING FOR NORMALITY

Case I. No Background Data are Below the Detection Limit

If none of the data are BDL the evaluation of the distribution of background data will be conducted by a two step procedure. The first step is to compute the coefficient of variation (COV) which is the standard deviation divided by the mean:

$$s_b/\bar{x}_b$$

where for each parameter, s_b = the standard deviation of the background
$\bar{x}_b$ = the mean of the background

The analysis of the COV calculations are divided into three categories, which are detailed below.

I) If the COV is > 1.0, then it is very unlikely that the data came from a normal distribution and some adjustment of the data for the non-normality must be undertaken before the data is used in statistical procedures. In this situation the data should be examined for lognormal character (see below). If the mean and variance can be adjusted for lognormality, these values can be used in a parametric statistical procedure.

II) If the COV is > 0.50 and < 1.0, the data should be further examined to determine whether it comes from a normal distribution. If the covariance is in this range, then a normal probability plot will be constructed and regression analysis will be performed. The regression analysis must include the calculation of the standard parameters such as the correlation coefficient, the slope and intercept, and the corrected sum of the squares. The normal probability plot is constructed by the following steps:

1. Rank order the data (x_i) from smallest to largest.

2. Assign the (x_i) values ranks (r_i) from 1 to N, where N is the number of independent background observations.

3. Divide the ranks (r_i) by the total sample size (N) plus one (i.e. N + 1) to obtain the plotting positions F. For example:

$$F_1 = r_1 / (N + 1), \quad F_2 = r_2 / (N + 1)$$

4. Compute the normal score (Z) corresponding to each value of F by the following equation (Gilliam and Helsel, 1986):

$$Z_i = 4.91 * [F_i^{.14} - (1 - F_i)^{.14}]$$

5. Plot the ordered data values (x_i) as a function of the normal scores (Z_i), with the normal scores on the x-axis. Then perform a linear regression analysis of the x_i values on the Z_i values. Obtain the value for the correlation coefficient, ^r, for the line fitted to the data.

The plot of x as a function of Z is a normal probability plot which can be examined visually to determine if the data points approximate a straight line relationship. A straight line indicates normality and, conversely, a highly non-linear relationship is an indication of non-normality.

If the linearity of the normal probability plot is questionable, the probability that the data are from a normal distribution can be tested by comparing the correlation coefficient (^r) to a critical value, $\hat{r}_c$, from table 1., using the following steps:

6. For the desired level of alpha (such as 0.05), enter the table at N, the number of values in the data set, and determine the critical value, $\hat{r}_c$.

7. The correlation coefficient from the regression, ^r, is compared to the critical value ^r. The possible results are:

   i. $\hat{r} > \hat{r}_c$. In this case the hypothesis that the data is normally distributed is accepted for the significance level chosen (ie. alpha = 0.05).

   ii. $\hat{r}_c > \hat{r}$. In this case there is reason to question the hypothesis that the data are normal. The deviation from normality is not serious enough to prevent the use of this data in parametric statistics, as there is some tolerance for non-normality. However, the data should be checked for lognormal character, and if there is strong evidence for lognormal character, the data should be adjusted appropriately (see Part B., below).

III) If the COV is less than 0.5, the data should be regarded as coming from a normal distribution and can be used in parametric statistical procedures.

Case II. The Data Contain Below Detection Limit Values

In the case where there are below detection limit values in the background data set, the coefficient of variation should not be calculated because the mean and variance can be calculated only from the ADL data and thus are only estimates. The distribution should be determined from a regression analysis of the above detection limit (ADL) data.

The steps in this procedure is as follows:

1. Identify the number of BDL values. Label this quantity n_1.

2. Rank order the above detection level data (x_2) from smallest to largest.

3. Assign the ADL values ranks (r_i) using a method which accounts for the n_1 values of the data set that are below detection. The values for r are calculated by the following equation:

$$r_1 = n_1 + 1,\ r_2 = n_1 + 2,\ \ldots\ldots\ r_N = N$$

4. Divide the ranks (r_i) by the total sample size (N) plus one (i.e. N + 1 = ADL + BDL + 1) to obtain the plotting positions F. For example:

$$F_1 = r_1 / (N + 1),\ F_2 = r_2 / (N + 1)$$

5. Compute the normal score (Z) corresponding to each value of F by the equation:

$$Z_i = 4.91 * [\ F_i^{.14} - (1 - F_i)^{.14}\ ]$$

6. Plot the ordered ADL values (x_2) as a funtion of the normal scores (Z_i), with the normal scores on the x-axis. Perform a regression analysis of the x_2 values on the Z values. Obtain the value of the correlation coefficient, ^r, for the line fitted to the data.

The determination of normality is then made using visual inspection, and if necessary, the correlation coefficient test as in steps 6 and 7 above (except that the value of N in step 6 is the number of ADL values). If the data are found to be non-normally distributed, they should then be checked for a lognormal distribution using the steps below.

B. TRANSFORMATION OF LOGNORMAL DATA TO NORMALITY

If the coefficient of variation or normal probability plot regression analysis strongly suggest that a background data set was not normally distributed, the data should be evaluated for lognormal character. The lognormal distribution is apparently a common distribution for groundwater data. The check for lognormality is conducted as follows:

1. Transform the above detection limit (ADL) data, x_i, to natural logarithms: $y_i = \ln(x_i)$

2. The transformed data, y_i, are then used in steps 1-5 above for the appropriate case (I or II), to construct a normal probability plot and perform a linear regression analysis of y_i on Z_i.

3. The normal probability plot is then analyzed visually for a linear trend of the data, and the correlation coefficient can be tested at the significance level chosen (i.e. alpha = 0.05) as described above.

If the results of this test indicate the log-transformed data are now normally distributed, an adjustment of the mean and variance must be made to take into account the lognormal character. Because power is lost by use of log-transformed data, and because the use of transformed data can result in difficulty in understanding the results of a statistical test, the direct use of log-transformed data in a parametric statistical test is not recommended. However an adjusted mean and variance can be calculated from the log-transformed data. The sequence of calculations depend on whether the data is censored or not, and hence the adjustment for lognormality is given for each case separately.

Case I. No BOL Data

When there is no BOL data, a non-log mean and variance can be estimated from the log-transformed data with the following equations:

$$4)\quad \bar{x}_{yb} = \exp(\bar{y}_b + ((w_{yb})^2/2))$$

$$5)\quad s^2_{yb} = (\bar{x}_{yb})^2(\exp(w_{yb})^2 - 1)$$

where $\bar{x}_{yb}$ = mean of lognormal distribution estimated from the log-tranformed values
s^2_{yb} = variance of lognormal distribution estimated from the log-transformed values
$\bar{y}_b$ = mean of log-transformed values
w_{yb} = standard deviation of log transformed values

These non-log parameters, $\bar{x}_{yb}$ and s_{yb}^2 represent the estimate of the mean and variance of the data which take into consideration the lognormal character. Because this is not the same as transforming the data to normality, it should be understood that if there is a very large deviation from normality, it still may not be entirely appropriate to use parametric statistics.

Case II. Data Contain BDL Values

If the data contain BDL values (i.e. the data are censored) the mean and variance of the log-transformed data must be adjusted using the methods in Appendix 2.0. Once the new mean ($\bar{y}_b'$) and variance $(w_{yb}')^2$ have been estimated, they can be used in the equations in steps 6 and 7 below:

6) $\bar{x}_{yb}' = \exp(\bar{y}_b' + ((w_{yb}')^2/2))$

7) $s^2_{yb}' = (\bar{x}_{yb}')^2 (\exp(w_{yb}')^2 - 1)$

where $\bar{x}_{yb}'$ = the mean of the lognormal distribution estimated from the adjusted log-transformed values.

s^2_{yb}' = the variance of the lognormal distribution estimated from the adjusted log-transformed values.

$\bar{y}_b'$ = the mean of the adjusted log-transformed values

w_{yb}' = the standard deviation of the adjusted log-transformed values

In this case the values for the parameters $\bar{x}_{yb}'$ and s_{yb}' are now suitably adjusted for use in parametric statistical procedures.

APPENDIX 2.0 METHOD FOR ESTIMATING THE MEAN AND VARIANCE OF CENSORED DATA

If the background data set contains below detection level (BDL) data, the mean and variance of the above detection level (ADL) data must be adjusted, or estimated to account for the proportion BDL. Also, the sample size of the background data (N) must be adjusted to an effective sample size (N_{eff}), which takes into consideration the lack of information due to the BDL values. The following procedure may be used on either raw or log-transformed ADL data.

A. Estimation of Mean and Standard Deviation

The estimation of the mean and standard deviation of censored data can be obtained from the regression analysis of the ADL data described in Case II, Part A., Appendix 1.0, in the following steps:

1. Use steps 1-5 from Case II, Part A., Appendix 1.0 to perform the regression of x_i (or the log-transformed values, y_i) on Z_i.

2. From the regression analysis, the y-intercept (value of x_i (or y_i) where Z=0) is the new estimate of the mean, called $\bar{x}_b'$ (or $\bar{y}_b'$ if the data were log-transformed). The slope of the regression line is the estimate for the standard deviation, s_b' (or w_b' if the data were log-transformed).

The regression estimates, $\bar{x}_b'$ and s_b', are parameters suitable for use in parametric statistical procedures. If the regression was performed on log-transformed data, these values of $\bar{y}_b'$ and w_b' must be used to estimate non-log parameters by the use of the equations in steps 6 and 7 in Case II, Part B, Appendix 1.0.

B. Estimation of Effective Sample Size

The effective sample size, N_{eff} can be estimated by the following procedure. The first step is the calculation of the variance of the mean [VARX]. This is accomplished in the following steps:

3. calculate the mean of the normal scores, $\bar{z}$, which were computed in steps 1-4 in Case II, Part A., of Appendix 1.0.

4. perform another regression analysis of the normal scores, z_i, on the plotting positions, F_i, (computed in steps 1-3, Case II, Part A., Appendix 1.0). The purpose of this regression analysis is to obtain a term called the total corrected sum of the squares, $s(z^2)$ which is defined as:

$$s(z^2) = \sum z_i^2 - n_2\bar{z}^2$$

where: $\sum z_i^2$ = the sum of the squares of the normal scores
n_2 = the number of ADL values
$\bar{z}^2$ = the mean of the normal scores squared

5. calculate the standard deviation of the ADL values, s_2, by the standard equation for standard deviation:

$$s_2 = [[\sum (x_i - x_2)^2) / (n_2 - 1)]^{0.5}$$

where: $\bar{x}_2$ = the mean of the ADL values
n_2 = the number of ADL values

If the data have been log-transformed, the equation is:

$$s_2 = [[\sum (y_i - y_2)^2) / (n_2 - 1)]^{0.5}$$

where: $\bar{y}_2$ = tbe mean of the log-transformed ADL values

6. calculate [VARX] from the equation:

$$[VARX] = [(1/n_2) + (\bar{z}^2/s(z^2)] s_2^2$$

where: n_2 = number of ADL values
$\bar{z}$ = the mean of the normal scores, z (step 3 above)
$s(z^2)$ = corrected sum of the squares (step 4 above)
s_2 = standard deviation of ADL values (step 5)

7. the effective sample size, N_{eff}, is then calculated from the equation:

$$N_{eff} = s^2{}_b'/[VARX]$$

where: s_b' = the estimated standard deviation (step 2 above). This is w_b' if the data were log-transformed.
[VARX] = variance of the mean (step 6 above)

The effective sample size N_{eff} is the value which represents the number of independent background observations in the average replicate t-test and should be used to calculate the degrees of freedom. Because the regression method is a means of estimating the variance of the mean, [VARX], and assumes the data are normally distributed, the parameter N_{eff} is also only an estimate. In general, N_{eff} should not be larger than the total sample size or smaller than the number of ADL values. If N_{eff} exceeds the upper limit, N_{eff} will be set to the total sample size. If N_{eff} is smaller than the number of ADL values, it will be set at the number of ADL values.

EXAMPLE OF ADJUSTING BACKGROUND MEAN AND VARIANCE FOR DEVIATION TO NORMAL DISTRIBUTION AND CENSORSHIP

In the following example a statistical software package was used which contained the following features: 1) a data editor which has rank ordering capabilities, 2) a summary statistics routine which includes mean and standard deviation, and 3) a linear regression routine which includes plotting capabilities and can produce a printout of parameters such as slope, intercept, correlation coefficient and the total corrected sum of the squares. A package of this type greatly facilitates the implementation of the statistical procedures.

Example Adjustment of Background Data: Iron

To date, 5 quarters of background data for iron has been collected at upgradient wells OB-18, OB-19 and OB-31. These 15 independent observations will be used as a completed background data set in this example.

A. Testing for Normality

Because 2 of the 15 background values were below detection, case II from Appendix 1.0 is applicable to this example. Thus the first step is the regression of the ADL data on the normal scores. This is done in the following steps:

1. The ADL data, x_2, are rank ordered from smallest to largest. This is shown on figure 1.

2. The ADL data are assigned ranks (R_i), taking into account the 2 BDL values. Thus x_1 has a rank of 3, x_2 has a rank of 4, etc. This data is shown in figure 1, second column.

3. The plotting positions (F_i) are calculated by dividing each value (R_i) by N + 1, which in this example is 16. The plotting positions are shown in column 3, figure 1.

4. The normal scores (z_i) are calculated from the F_i values with the equation:

$$z_i = 4.91 * (F_i^{.14} - (1 - F_i)^{.14})$$

5. The ordered ADL values, x_2, are then regressed on the normal scores. The probability plot and regression results are shown on figure 2.

6. The plot is then visually examined for linearity. As seen from figure 2, the data plot in a highly non-linear manner suggesting the data are not normally distributed.

7. This subjective interpretation is then checked by comparing the correlation coefficient from the regresssion ($\hat{r}$ = 0.766), to a critical value from table 1. From the table, using α = 0.05 and N = 15, the critical value ($\hat{r}_c$) is 0.938. Since $\hat{r}_c$ >> $\hat{r}$ the data do not appear to have been drawn from a normal distribution (i.e. hypothesis of normality is rejected).

The next step is to evaluate the possibility that the data are lognormally distributed.

B. Testing for Lognormality

To test for an underlying lognormal distribution, the ordered ADL data is first log-transformed:

$$y_i = \ln(x_i)$$

Then steps 2-4 above are repeated to prepare for the regression of y on z (i.e. columns 2-4 on figure 1 are also used in the present regression analysis). The columns 1-4 for the current regression analysis are shown in figure 4.

The log-transformed values, y_i, are then regressed on the normal scores, z_i. The resulting probability plot and regression parameters are shown on figure 5. From this normal probability plot it can be seen the the log-transformed data now have a strong linear trend. This is good evidence for a lognormal distribution. The correlation coefficient, $\hat{r}$, is 0.987, which is greater than the critical value of 0.938 (see above). Thus the hypothesis that the log-transformed values are normally distributed cannot be rejected. In other words, the data appear to have been drawn from a lognormal distribution.

Before estimating the mean and variance of the lognormal distribution, the data must be adjusted for censorship, as there were 2 BDL values in the iron example.

C. Adjustment of Mean and Variance for Censored Data

From the regression analysis of y_i on z_i completed above, a new estimate of the mean and variance has been determined which take into account the BDL values. The estimate of the mean, labelled $\bar{y}_b'$, is the y-intercept of this regression analysis, -0.963 (from figure 5). The estimate of the standard deviation, labelled w_{yb}', is the slope of the regression analysis, 1.912 (from figure 5).

The remaining step is the calculation of the effective sample size, N_{eff}. This requires the calculation of the standard deviation of the ADL values and an estimate of the

variance of the mean [VARX]. The standard deviation of the log-tranformed ADL values is 1.41 (shown in figure 6). The calculation of [VARX] is done with the following equation:

$$[VARX] = ((1/n_2) + (\bar{z}^2/s(z^2)))\ s_2^2$$

where: n_2 = number of samples above the detection limit
$\bar{z}^2$ = square of the average normal score (from figure 7)
$s(z^2)$ = corrected sum of the squares from the regression of z on F (from figure 8)
s_2 = standard deviation calculated from the log-transformed ADL values (computed in the summary statistics shown on figure 6)

In this example:

$$[VARX] = ((1/13) + (.207^2/6.319))\ 1.405^2$$
$$= 0.1653$$

The effective sample size is then calculated from:

$$N_{eff} = (w_{yb}')^2/[VARX]$$

where: w_{yb}' = the estimated standard deviation from the regression of y_i on z shown above.

In the iron example, w_{yb}' was 1.912 (see figure 5). Thus:

$$N_{eff} = 1.912^2/\ 0.1635$$
$$= 22$$

Since 22 is greater than the total sample size of 15, N_{eff} is assigned the value of 15. The adjusted log-transformed parameters are:

$\bar{y}_b'$ = -.963
w_{yb}' = 1.912
N_{eff} = 15

D. Estimation of Mean and Variance of Lognormal Distibution

The above log-transformed parameters should not be used in a statistical test. A new mean and variance based on the above log-transformed estimates must first be computed. In this final step, an estimate of the mean and variance that are not log-transformed, but take into account the lognormal character of the data, are computed. This is done in the following equations:

$$\bar{x}_{yb}' = \exp(\bar{y}_b' + ((w_{yb}')^2/2))$$

$$s^2_{yb}' = (\bar{x}_{yb}')^2(\exp(w_{yb}')^2 - 1)$$

So in this example:

$$\bar{x}_{yb}' = \exp(-.963 + (1.912^2/2))$$
$$= 2.37 \text{ mg/l}$$

$$s^2_{yb}' = 2.37^2 \ (\exp(1.912^2) - 1)$$
$$= 211.6$$

$$s_{yb}' = 14.5 \text{ mg/l}$$

The resulting mean and standard deviation to be used in the average replicate t-test are:

$$\bar{x}_{yb}' = 2.37 \text{ mg/l}$$

$$s_{yb}' = 14.5 \text{ mg/l}$$

ETERMINATION OF NORMALITY

Figure 1.

X	R		-
0.06	3	0.1875	-0.885123
0.13	4	0.25	-0.672345
0.15	5	0.3125	-0.486919
0.29	6	0.375	-0.317299
0.34	7	0.4375	-0.156612
0.36	8	0.5	0
0.37	9	0.5625	0.156612
0.52	10	0.625	0.317299
0.83	11	0.6875	0.486919
1.5	12	0.75	0.672345
2.4	13	0.8125	0.885123
2.7	14	0.875	1.14921
9.6	15	0.9375	1.53537

Figure 3.

NUMBER OF OBSERVATIONS = 13
SAMPLE AVERAGE = 1.48077
SAMPLE VARIANCE = 6.70197
SAMPLE STANDARD DEVIATION = 2.58882

MINIMUM VALUE = 0.06 MAXIMUM = 9.6
LOWER AND UPPER QUARTILES = 0.29 1.5
INTERQUARTILE RANGE = 1.21
MEDIAN = 0.37

Figure 2.

Simple Regression of FEBKGND on Z

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	0.91646	0.502798	1.82272	0.0956151
Slope	2.73265	0.691469	3.95195	2.2651E-3

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio
Model	47.188181	1	47.188181	15.617933
Error	33.235511	11	3.021410	
Total (Corr.)	80.423692	12		

Correlation Coefficient = 0.765993
Stnd. Error of Est. = 1.73822

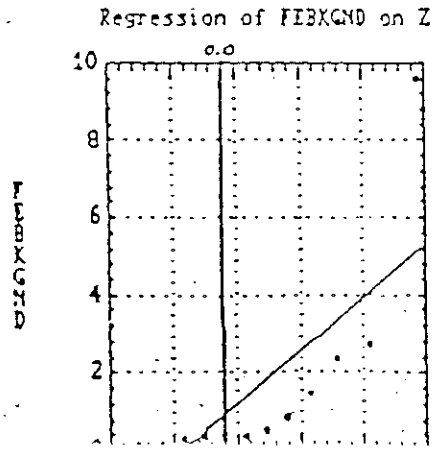


Figure 4.

y	R	F	z
-2.81341	3	0.1875	-0.88312
-2.04022	4	0.25	-0.67234
-1.89712	5	0.3125	-0.48591
-1.23787	6	0.375	-0.31729
-1.07881	7	0.4375	-0.15661
-1.02165	8	0.5	[illegible]
-0.994252	9	0.5625	0.156612
-0.653926	10	0.625	0.317295
-0.18633	11	0.6875	0.485915
0.405465	12	0.75	0.672343
0.875469	13	0.8125	0.885123
0.993252	14	0.875	1.14921
2.26176	15	0.9375	1.53533

Figure 6.

NUMBER OF OBSERVATIONS = 13
SAMPLE AVERAGE = -0.56828
SAMPLE VARIANCE = 1.9752
SAMPLE STANDARD DEVIATION = 1.40542

MINIMUM VALUE = -2.81341 MAXIMUM = 2.26176
LOWER AND UPPER QUARTILES = -1.23787 0.405465
INTERQUARTILE RANGE = 1.64334
MEDIAN = -0.994252

Figure 5.

Simple Regression of LOGFE on Z

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	-0.963065	0.0679662	-14.1698	2.07216E-8
Slope	1.91173	0.09347	20.4529	4.20246E-10

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio
Model	23.09507	1	23.09507	418.32156
Error	.607298	11	.055209	
Total (Corr.)	23.702369	12		

Correlation Coefficient = 0.987106
Stnd. Error of Est. = 0.234966

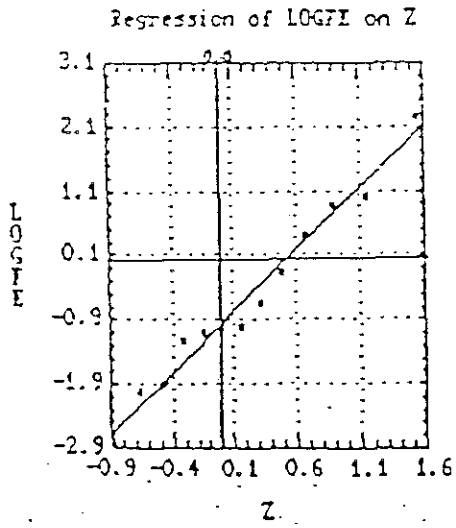


Figure 7.

ENTER THE NAME OF THE VARIABLE CONTAINING YOUR DATA: Z
NUMBER OF OBSERVATIONS = 13 (0 MISSING VALUES EXCLUDED)
SAMPLE AVERAGE = 0.206506
SAMPLE VARIANCE = 0.526603
SAMPLE STANDARD DEVIATION = 0.725674

MINIMUM VALUE = -0.885123 MAXIMUM = 1.53537 RANGE = 2.42049
LOWER AND UPPER QUARTILES = -0.317299 0.672345
INTERQUARTILE RANGE = 0.989644
MEDIAN = 0.156612

COEFF. OF SKEWNESS = 0.251442 STANDARDIZED VALUE = 0.370113
COEFF. OF KURTOSIS = 2.12124 STANDARDIZED VALUE = -0.646749

Figure 8.

Simple Regression of Z on F

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	-1.45959	0.0624062	-23.3886	9.91074E-11
Slope	2.96195	0.102444	28.9129	9.95892E-12

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio
Model	6.23716	1	6.23716	835.95705
Error	.082072	11	.007461	
Total (Corr.)	6.319237	12		

Correlation Coefficient = 0.993485
Stnd. Error of Est. = 0.0863777

APPENDIX 3.0 METHODS FOR REDUCING THE EFFECT OF SEASONALITY, TREND AND SERIALLY INFLUENCED DATA

After the background data for a group III parameter has been collected, it must be evaluated for seasonal cycles, long term trends and serial dependence as any of these properties can result in an increased rate of false positives, and may hinder the ability of the statistical program to detect real changes in groundwater quality. If any of these properties can be shown to occur, steps must be taken to reduce their effects on the statistical procedures. Because two years of data represents a minimum time period for detecting seasonality, trends or serial correlation, the analysis presented below should continue throughout the detection monitoring program as the background is updated. Steps for determining and correcting for these properties are given below.

A. DETERMINING AND CORRECTING FOR SEASONALITY

To determine whether the data show seasonal cycles, the background data are plotted as a function of time (i.e. a time series plot) and examined for repeated cycles. If there are recurrent highs or lows during one or more particular season (quarter), it is concluded that a seasonal cycle may exist. An adjustment for seasonality can be attained by the following correction to the background data set:

1. Average the quarterly values for the two years of background collection (i.e. the 1st quarter of year one, plus the 1st quarter of year two, divided by 2). This is the quarterly mean, $\bar{x}_q$.

2. Compute a seasonally corrected value, x_s, by subtracting the appropriate quarterly mean from each quarterly value and adding on the mean for the entire data set $\bar{x}_b$. For adjusting the first quarter of data the equation is:

$$x_{s1} = x_1 - \bar{x}_q + \bar{x}_b$$

3. Use these seasonally corrected values to perform a trend analysis (see below).

If the background data are adjusted for seasonality, then all of the values of the parameter in question must also be corrected using the approriate seasonal correction. During detection monitoring, the semi-annual samples are adjusted for the appropriate season. This seasonal correction will be most valid if these semi-annual samples are collected on dates corresponding to two of the quarterly dates used to establish background.

B. DETERMINING AND CORRECTING TRENDS

From the time series plot from part A above, any pattern of decreasing or increasing concentration with time should be evident. If there is an indication of such a trend, the strength of the trend can be determined with the following test:

1. Perform a linear regression of the time series plot (ie. regression of concentration on time).

2. From the regression analysis determine the F statistic which is defined as:

$$F = MSR/MSE$$

where: MSR = Regression Mean Square
MSE = Error Mean Square

3. Compare this F statistic to a critical value, F_c, at a chosen significance level (0.05), which is determined from Table 2. This critical value is determined from $\nu_1 = 1$ and $\nu_2 = n-2$ where n is the number of independent observations. If $F > F_c$ the hypothesis that the slope of the regression line is zero is rejected, hence a trend exists in the data.

If the data is shown to contain a trend, the trend can be removed by subtracting the regression line equation out of the data and adding the resulting value to the overall mean. For example, the first quarter data is adjusted as follows:

$$x_{t1} = x_1 - (y + mt) + \bar{x}_b$$

where: x_{t1} = trend corrected first quarter data
x_1 = original first quarter data
y = intercept of regression line
m = slope of regression line
t = time (such as the number of quarterly samples since the trend began)
$\bar{x}_b$ = overall mean of the data set

Each parameter sampled during detection monitoring which has a trend in the background data, must also be adjusted with the above equation, if the trend is shown to continue. It is very important to re-evaluate the trend in the background data with each sampling subsequent to background.

C. DETERMINING AND CORRECTING FOR SERIAL CORRELATION

The test for serial correlation is an autocorrelation function. This process requires a computer package to implement. It is not a powerful technique unless many years

of data have been collected. Fortunately, published analyses have shown that serial correlation is unlikely in samples collected on a quarterly basis. The adjustment for serial correlation is complex. The easiest remedy is to use data collected at larger time intervals.

APPENDIX 4.0 THE CRITICAL VALUE METHOD

The critical value method is for evaluating Group I parameters (i.e. parameters with background data all below detection limit) in cases where the concentration is above the detection limit in a downgradient well during routine semi-annual detection monitoring. The "critical value" method is a test of confidence that any measured value is actually above the detection limit. The critical value represents an estimate of the 95th percentile for a laboratory analysis of a sample which is at the detection limit. Hence, the critical value is a kind of tolerance limit which will be established based on the detection limit of the lab method used to measure the concentration and the analytical precision, rather than by the population distribution. When a measured value exceeds the critical value, it is concluded that the increase is significant and is not due to lab error. If the precision of the analytical method is very good, the critical value will be very close to the detection limit.

The critical value (CV) is given by:

$$CV = DL + S_p Z$$

where: DL = method detection limit
S_p = standard error of lab analysis representing the test precision
Z = normal variate corresponding to the pth percentile (eg for p=95, Z=1.645)

The "test" consists of comparing the downgradient value with the critical value. If the critical value is exceeded, then it is concluded that the detection limit has been exceeded and indicates that a significant increase in concentration has occurred at the downgradient well. This method assumes only that the laboratory errors are normally distributed, but requires no information on the distribution of the parameter data.

EXAMPLE OF CRITICAL VALUE METHOD

As a first approximation, it was recommended that analytical precision be assigned a value of one-half the detection limit.

Example: The critical value of Benzene

Necessary information:

Method Detection Limit (DL) = 5.0 ppb
Analytical Precision (S_p) = 2.5 ppb
Normal Variate for 95th Percentile (Z) = 1.645

Equation for Critical Value (CV):

$$CV = DL + S_p Z$$

Results:

$$CV = 5.0 + (2.5)(1.645)$$
$$= 9.1 \text{ ppb}$$

Any measured concentration of benzene over 9 ppb would be considered a significant increase over upgradient background where the detection limit for benzene was 5.0 ppb.

APPENDIX 5.0 THE PROPORTIONS TEST WITH THE TOLERANCE LIMITS DEFAULT

The proportions test with the tolerance limits default is a two-step procedure for testing for a significant increase in Group II parameters (parameters with a high proportion of below detection limit data). Step 1 is the proportions test and step 2 is a tolerance limit comparison test. Both tests should be performed during detection monitoring. A failure of either test results in the conclusion that a significant increase has occurred.

A. The Proportions Test

The proportions test is a non-parametric procedure to be used on Group II parameters. This test addresses the following question: are the concentrations in the downgradient well more likely to be above the detection limits than the concentrations in the background well(s). In this relatively simple procedure, the first step is to compute the proportion of the above detection level (ADL) values, P_b of the background data. After establishment of background, the proportion of ADL values, P_m, is tabulated for each downgradient well, throughout the detection monitoring program. Thus, the downgradient proportions are cumulative and several measurements are required before the test becomes applicable.

The statistical test is performed as follows:

1. the Z^* statistic is computed from the equation:

$$Z^* = \frac{P_m - P_b}{[\,p(1-p)(1/N_m + 1/N_b)]^{.5}}$$

where:
- P_m = proportion of ADL values since background (i.e. downgradient)
- P_b = proportion of background ADL values
- N_m = total number of samples since background (i.e. downgradient)
- N_b = total number of background samples
- p = a weighted proportion, defined as:

$$p = \frac{n_m + n_b}{N_m + N_b}$$

where:
- n_m = number of ADL downgradient
- n_b = number of ADL background

2. The approximation is made that Z^* is normally distributed (i.e. the estimates of the proportions are normally distributed, not the actual data set) and then Z^* is

compared to a critical value, Z_c, corresponding to the desired level of significance (e.g. $Z_c = 1.645$ for 0.05 level of significance). The hypothesis states that if the computed value $Z^* > Z_c$, then it is concluded that the higher proportion of downgradient ADL values is significant.

The strength of this test is that it does not require that the data follow any particular distribution. The weaknesses of this method are that several detection monitoring measurements are necessary before the test is valid, and if an extremely high concentration of the parameter were to appear, the concentration itself is not evaluated, only the fact that it is ADL.

B. The Tolerance Limit Default

To guard against these problems, a tolerance limit will be established for each parameter in this category. It must be noted that this a parametric statistical method which requires the condition of normality. Hence the proper adjustments for non-normality (Appendix 1.0) and the adjustment of the mean and variance of censored data (Appendix 2.0) must be implemeted before the tolerance limit can be calculated. The tolerance limit (TL) is established by the equation:

$$TL = \bar{x}_b + Ks_b$$

where: $\bar{x}_b$ = the estimated background mean
s_b = the estimated background standard deviation
K = a tolerance factor

The tolerance factor, K, depends on the desired percentile of background distribution (e.g. 95th percentile) and the number of independent background samples. For the 95% confidence limit, K can be determined from Table 3. The test is then very simple: if the downgradient concentration exceeds the tolerance limit, then the concentration at the downgradient well represents a significant increase over the background concentration.

The tolerance limit default takes care of both weaknesses in the proportions test in that the tolerance limit is established upon completion of background and will pick up very high values as they occur.

EXAMPLE OF PROPORTIONS TEST WITH TOLERANCE LIMITS DEFAULT

For an example of the proportions test with the tolerance limits default, the background data for nitrate was used because 67% of the 12 background samples (4 each from wells OB-18, OB-19 and OB-31) were below detection levels; hence nitrate is a group II parameter.

A. Proportions Test

Because the proportions test is non-parametric, the only information required is as follows:

Proportion of backgound samples ADL (P_b) = 0.33
Proportion of downgradient samples ADL (P_m) = .50 to 1.0
Number of background samples (N_b) = 12
Number of downgradient samples since background (N_m) = 4

It is assumed that 4 downgradient samples have been taken since the establishment of background and the test will be conducted assuming 2, 3 and 4 of these saaples are above the detection limit.

For P_m = 2/4 = 0.5, the Z statistic is calculated as:

1. $$p = \frac{2 + 4}{4 + 12} = .375$$

2. $$Z^* = \frac{.50 - .33}{[.375(1-.375)(.25 + .083)]^{.5}} = 0.60$$

For P_m = 3/4 = .75, Z^* = 1.47

For P_m = 4/4 = 1.0, Z^* = 2.32

At a significance level of 0.05, the critical Z_c statistic is 1.645 as determined from a normal distribution table. So for the three cases the results are as follows:

For P_m = 0.5, $Z^* \ll Z_c$ so there is no significant increase in the downgradient concentration

For P_m = 0.75 $Z^* \ll Z_c$ so there is no significant increase in the downgradient concentration

For P_m = 1.0 $Z^* \gg Z_c$ so it is concluded that the higher proportion of ADL values downgradient is significant and there is a significant increase in the downgradient concentration.

B. The Tolerance Limits Default

For the parametric tolerance limits test, the distribution of the nitrate data was first tested for normality. A regression analysis was performed on this data (Appendix 1.0). This analysis showed the condition of normality could not be rejected at the 0.05 significance level, and no transformation was necessary. The regression analysis was also used to adjust the mean, variance and effective sample size to take into account the BDL values. The results of the regression analysis were as follows:

$$\bar{x}_b = 0.135 \text{ mg/l}$$
$$s_b = 0.268 \text{ mg/l}$$
$$N_{eff} = 4$$

Using the above data and the tolerance factor (K) of 5.14 for $\alpha = 0.05$ (from Table 3), the tolerance limit is calculated as:

$$\begin{aligned} TL &= \bar{x}_b + Ks_b \\ &= 0.0135 + (5.14)(.268) \\ &= 1.39 \text{ mg/l} \end{aligned}$$

Thus, based on the tolerance limit default, WDI would conclude that a significant increase in the downgradient concentration had occurred, if a nitrate concentration greater than 1.39 mg/l were measured downgradient, regardless of the results of the proportions test.

APPENDIX 6.0 THE AVERAGE REPLICATE T-TEST WITH THE BONFERRONI CRITICAL TEST STATISTIC

The average replicate t-test (AR-Test) is to be used to evaluate Group III parameters. Before implementation of the AR-Test, any replicate data are averaged and the average of the replicates is treated as a single sample. As opposed to the traditional t-test, only the background variance is used in the calculation of the test statistic.

The AR-Test statistic, t_m^*, is generated by the following equation:

$$t_m^* = \frac{\bar{x}_m - \bar{x}_b}{s_b\,(1 + (1/N))^{.5}}$$

where: $\bar{x}_m$ = the mean of the downgradient well
$\bar{x}_b$ = the mean of the background well(s)
s_b = the standard deviation of the background
N = number of independent background samples (i.e. number of background wells multiplied by the number of samples taken at each well)

The t_m^* statistic is then compared to the critical value of t obtained from a cumulative t-table (Table 4) using the Bonferroni correction. To implement the Bonferroni correction, the following definitions are necessary:

α = false positive rate for each test
α_f = false positive rate for all HWMA wells
K = total number of AR-Tests to be performed during the current statistical evaluation (i.e. number of downgradient wells multiplied by the number of parameters to be analyzed by the AR-Test)

The Bonferroni correction states that when the facility wide error rate, α_f, for all of the HWMA wells is set at a desired level (e.g. 0.05), the t_c for each test should be determined for an individual error rate α of:

$$\alpha = \frac{\alpha_f}{K}$$

The critical t statistic, t_c, is obtained from the cumulative t-table (Table 4) as the value of of t (from the column on the far left) corresponding to the value of $(1-\alpha)$ beneath the column for (N-1) degrees of freedom. This value of t_c is then compared to t_m^* as in the traditional Cochrans-Behrens approach where the condition:

$$t_m^* > t_c$$

EXAMPLE OF AVERAGE REPLICATE T-TEST

For this example, it was assumed that the available five quarters of chloride data for wells OB-18, OB-19 and OB-31 comprise a completed background data base. Furthermore, it was assumed that there were a total of four Group III parameters to be analyzed by the AR-Test.

A normal probability regression analysis (Appendix 1.0) on the chloride data showed that the hypothesis that the data are normally distributed could not be rejected at the 0.05 sinificance level. Because the background chloride data were not 100% above detection level (93%), the mean and variance of the data were modified by the regression method (Appendix 2.0).

The necessary data for the AR-Test are as follows:

Number of background samples (N_{eff}) = 15
Adjusted Background Mean ($\bar{x}_b'$) = 10.52 mg/l
Adjusted Background Standard Deviation (s_b') = 7.63
Error Rate for HWMA wells (α_f) = 0.05
Number of downgradient wells = 11
Total No. of AR-Tests (X) = 11 X 4 = 44
Downgradient value (x_m) = 16.0 mg/l

The test statistic, t_m^* is calculated by:

$$t_m^* = \frac{x_m - \bar{x}_b'}{s_b'(1 + (1/N_{eff}))^{.5}} = \frac{16.0 - 10.52}{7.63(1 + (1/15)^{.5}} = 0.695$$

The critical statistic is determined from:

the individual error rate $\alpha = \frac{\alpha_f}{X} = \frac{0.05}{44} = 0.0014$

t_c is then determined from Table 4, the cumulative distribution of the student's T, for $(1 - \alpha)$ and N - 1 degrees of freedom. For $(1 - \alpha) = .9986$ and $(N - 1 = 14)$ the value of t_c is 3.6.

Since $t_m^* <<< t_c$, the conclusion is there has been no significant increase of the downgradient concentration of chloride. In order to obtain a significant increase, it would have been necessary to have measured a chloride concentration of 38.9 mg/l in the downgradient well.

Table 1. Critical Values of ^r.

	alpha		
N	0.10	0.05	0.01
4	.8951	.8734	.8318
5	.9033	.8804	.8320
10	.9347	.9180	.8804
15	.9506	.9383	.9110
20	.9600	.9503	.9290
25	.9662	.9582	.9408
30	.9707	.9639	.9490
40	.9767	.9715	.9597
50	.9807	.9764	.9664
60	.9835	.9799	.9710
75	.9865	.9835	.9757

From, "Minitab Manual"

Table 2. Critical Values of F.

Level of Significance = 0.05

$\nu_2 \backslash \nu_1$	1	2	3	4	5	6	8	12	15	20	30	60	∞
1	161.4	199.5	215.7	224.6	230.2	234.0	238.9	243.9	245.9	248.0	250.1	252.2	254.3
2	18.51	19.00	19.16	19.25	19.30	19.33	19.37	19.41	19.43	19.45	19.46	19.48	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.85	8.74	8.70	8.66	8.62	8.57	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.04	5.91	5.86	5.80	5.75	5.69	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.82	4.68	4.62	4.56	4.50	4.43	4.36
6	5.99	5.14	4.76	4.53	4.39	4.28	4.15	4.00	3.94	3.87	3.81	3.74	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.73	3.57	3.51	3.44	3.38	3.30	5.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.44	3.28	3.22	3.15	3.08	3.01	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.23	3.07	3.01	2.94	2.86	2.79	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.07	2.91	2.85	2.77	2.70	2.62	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	2.95	2.79	2.72	2.65	2.57	2.49	2.40
12	4.75	3.89	3.49	3.26	3.11	3.00	2.85	2.69	2.62	2.54	2.47	2.38	2.30
13	4.67	3.81	3.41	3.18	3.03	2.92	2.77	2.60	2.53	2.46	2.38	2.30	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.70	2.53	2.46	2.39	2.31	2.22	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.64	2.48	2.40	2.33	2.25	2.16	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.59	2.42	2.35	2.28	2.19	2.11	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.55	2.38	2.31	2.23	2.15	2.06	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.51	2.34	2.27	2.19	2.11	2.02	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.48	2.31	2.23	2.16	2.07	1.98	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.45	2.28	2.20	2.12	2.04	1.95	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.42	2.25	2.18	2.10	2.01	1.92	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.40	2.23	2.15	2.07	1.98	1.89	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.37	2.20	2.13	2.05	1.96	1.86	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.36	2.18	2.11	2.03	1.94	1.84	1.73
25	4.24	3.39	2.99	2.76	2.60	2.49	2.34	2.16	2.09	2.01	1.92	1.82	1.71
26	4.23	3.37	2.98	2.74	2.59	2.47	2.32	2.15	2.07	1.99	1.90	1.80	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.31	2.13	2.06	1.97	1.88	1.79	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.29	2.12	2.04	1.96	1.87	1.77	1.65
29	4.18	3.33	2.93	2.70	2.55	2.43	2.28	2.10	2.03	1.94	1.85	1.75	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.27	2.09	2.01	1.93	1.84	1.74	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.18	2.00	1.92	1.84	1.74	1.64	1.51
60	4.00	3.15	2.76	2.53	2.37	2.25	2.10	1.92	1.84	1.75	1.65	1.53	1.39
120	3.92	3.07	2.68	2.45	2.29	2.17	2.02	1.83	1.75	1.66	1.55	1.43	1.25
∞	3.84	3.00	2.60	2.37	2.21	2.10	1.94	1.75	1.67	1.57	1.46	1.32	1.00

From, "Handbook of Mathematical Functions", by Abromowitz and Stegun, (1972)

Table 3. Values of Tolerance Factor, K.

One-Sided Tolerance Limit Factors for a Normal Distribution

	Values of k for $\gamma = 0.90$ and $n = f + 1$						Values of k for $\gamma = 0.95$ and $n = f + 1$				
n	0.900	0.950	0.975	0.990	0.999	n	0.900	0.950	0.975	0.990	0.999
2	10.253	13.090	15.536	18.500	24.582	2	20.581	26.260	31.257	37.094	49.276
3	4.258	5.311	6.244	7.340	9.651	3	6.155	7.656	8.944	10.553	13.857
4	3.188	3.957	4.637	5.438	7.129	4	4.162	5.144	6.015	7.042	9.214
5	2.744	3.401	3.983	4.668	6.113	5	3.413	4.210	4.916	5.749	7.509
6	2.494	3.093	3.621	4.243	5.556	6	3.008	3.711	4.332	5.065	6.614
7	2.333	2.893	3.389	3.972	5.201	7	2.754	3.401	3.971	4.643	6.044
8	2.219	2.754	3.227	3.783	4.955	8	2.582	3.188	3.724	4.355	5.689
9	2.133	2.650	3.106	3.641	4.771	9	2.454	3.032	3.543	4.144	5.414
10	2.066	2.568	3.011	3.532	4.628	10	2.355	2.911	3.403	3.981	5.204
11	2.012	2.503	2.936	3.444	4.515	11	2.275	2.815	3.291	3.852	5.036
12	1.966	2.448	2.872	3.371	4.420	12	2.210	2.736	3.201	3.747	4.900
13	1.928	2.403	2.820	3.310	4.341	13	2.155	2.670	3.125	3.659	4.787
14	1.895	2.363	2.774	3.257	4.274	14	2.108	2.614	3.060	3.585	4.690
15	1.866	2.329	2.735	3.212	4.215	15	2.068	2.566	3.005	3.520	4.607
16	1.842	2.299	2.700	3.172	4.164	16	2.032	2.523	2.956	3.463	4.534
17	1.819	2.272	2.670	3.139	4.118	17	2.002	2.486	2.913	3.414	4.471
18	1.800	2.249	2.643	3.106	4.078	18	1.974	2.453	2.875	3.370	4.415
19	1.781	2.228	2.618	3.078	4.041	19	1.949	2.423	2.840	3.331	4.364
20	1.765	2.208	2.597	3.052	4.009	20	1.926	2.396	2.809	3.295	4.319
21	1.750	2.190	2.575	3.028	3.979	21	1.905	2.371	2.781	3.262	4.276
22	1.736	2.174	2.557	3.007	3.952	22	1.887	2.350	2.756	3.233	4.238
23	1.724	2.159	2.540	2.987	3.927	23	1.869	2.329	2.732	3.206	4.204
24	1.712	2.145	2.525	2.969	3.904	24	1.853	2.309	2.711	3.181	4.171
25	1.702	2.132	2.510	2.952	3.882	25	1.838	2.292	2.691	3.158	4.143
30	1.657	2.080	2.450	2.884	3.794	30	1.778	2.220	2.606	3.064	4.022
35	1.623	2.041	2.406	2.833	3.730	35	1.732	2.166	2.544	2.994	3.934
40	1.598	2.010	2.371	2.793	3.679	40	1.697	2.126	2.501	2.941	3.866
45	1.577	1.986	2.344	2.762	3.638	45	1.669	2.092	2.463	2.897	3.811
50	1.560	1.965	2.320	2.735	3.604	50	1.646	2.065	2.432	2.863	3.766
60	1.532	1.933	2.284	2.694	3.552	60	1.609	2.022	2.384	2.807	3.695
70	1.511	1.909	2.257	2.663	3.513	70	1.581	1.990	2.348	2.766	3.643
80	1.495	1.890	2.235	2.638	3.482	80	1.560	1.965	2.319	2.733	3.601
90	1.481	1.874	2.217	2.618	3.456	90	1.542	1.944	2.295	2.706	3.567
100	1.470	1.861	2.203	2.601	3.435	100	1.527	1.927	2.276	2.684	3.539
120	1.452	1.841	2.179	2.574	3.402	120	1.503	1.899	2.245	2.649	3.495
145	1.436	1.821	2.158	2.550	3.371	145	1.481	1.874	2.217	2.617	3.455
300	1.386	1.765	2.094	2.477	3.280	300	1.417	1.800	2.133	2.522	3.335
500	1.362	1.736	2.062	2.442	3.235	500	1.385	1.763	2.092	2.475	3.277
∞	1.282	1.645	1.960	2.326	3.090	∞	1.282	1.645	1.960	2.326	3.090

From, "Handbook of Statistical Tables", by
D.B. Owen, (1962)

Table 4. Cumulative Distribution of Student's T

Table 4. (continued)

Cumulative distribution of Student's t distribution (Continued)

t \ ν	20	21	22	23	24	30	40	60	120	∞
0.00	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
0.05	0.51969	0.51970	0.51971	0.51972	0.51973	0.51977	0.51981	[illegible]	0.51990	0.51994
0.10	0.53943	0.53935	0.53938	0.53939	0.53941	0.53950	[illegible]	[illegible]	0.53974	0.53983
0.15	0.55887	0.55890	0.55893	0.55896	[illegible]	[illegible]	[illegible]	[illegible]	0.55949	0.55962
0.20	0.57825	0.57830	0.57834	0.57838	0.57842	0.57856	0.57873	[illegible]	0.57909	0.57928
0.25	0.59743	0.59749	0.59755	0.59760	[illegible]	[illegible]	0.59607	[illegible]	0.59849	0.59871
0.30	0.61636	0.61644	0.61650	0.61656	[illegible]	0.61658	0.61713	[illegible]	0.61765	0.61791
0.35	0.63500	0.63509	0.63517	0.63524	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.63683
0.40	0.65330	0.65340	0.65349	[illegible]	[illegible]	[illegible]	[illegible]	0.65471	[illegible]	0.65542
0.45	0.67122	0.67134	0.67144	0.67154	[illegible]	0.67203	0.67253	0.67304	0.67324	0.67364
0.50	0.68873	0.68886	0.68898	0.68909	0.68919	[illegible]	[illegible]	[illegible]	0.69100	0.69146
0.55	0.70579	0.70594	0.70607	0.70619	[illegible]	[illegible]	0.70731	[illegible]	[illegible]	0.70834
0.60	0.72238	0.72254	0.72268	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.72573
0.65	0.73846	0.73863	0.73879	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.74218
0.70	0.75400	0.75419	0.75437	[illegible]	[illegible]	[illegible]	[illegible]	0.75664	[illegible]	0.75804
0.75	0.76901	0.76921	0.76940	0.76957	0.76973	0.77035	0.77115	0.77191	[illegible]	0.77337
0.80	0.78344	0.78367	0.78387	0.78405	0.78422	[illegible]	[illegible]	[illegible]	[illegible]	0.78814
0.85	0.79731	0.79754	0.79776	0.79796	0.79814	[illegible]	[illegible]	[illegible]	[illegible]	0.80224
0.90	0.81058	0.81084	0.81107	0.81128	0.81147	[illegible]	[illegible]	[illegible]	[illegible]	0.81594
0.95	0.82337	0.82364	0.82388	0.82410	0.82431	[illegible]	[illegible]	[illegible]	[illegible]	0.82894
1.00	0.83537	0.83565	0.83591	0.83614	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.84134
1.05	0.84658	0.84717	0.84744	0.84769	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.85314
1.10	0.85780	0.85811	0.85839	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.86433
1.15	0.86814	0.86846	0.86875	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.87493
1.20	0.87792	0.87823	0.87855	0.87882	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.88493
1.25	0.88714	0.88747	0.88778	0.88807	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.89433
1.30	0.89581	0.89616	0.89647	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.90320
1.35	0.90395	0.90431	0.90463	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.91149
1.40	0.91158	0.91194	0.91227	0.91257	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.91924
1.45	0.91872	0.91908	0.91942	0.91972	[illegible]	0.92123	[illegible]	[illegible]	[illegible]	0.92647
1.50	0.92538	0.92575	0.92608	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.93319
1.55	0.93159	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.93943
1.60	0.93736	0.93773	0.93807	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.94520
1.65	0.94272	0.94309	0.94343	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.95053
1.70	0.94766	0.94805	0.94839	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.95543
1.75	0.95225	0.95264	0.95297	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.95993
1.80	0.95652	0.95688	0.95720	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.96407
1.85	0.96043	0.96078	0.96110	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.96784
1.90	0.96404	0.96437	0.96469	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.97128
1.95	0.96733	0.96767	0.96798	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.97441
2.0	0.97037	0.97070	0.97100	0.97128	0.97153	0.97265	[illegible]	[illegible]	[illegible]	0.97725
2.1	0.97569	0.97601	0.97629	0.97655	0.97679	[illegible]	[illegible]	[illegible]	[illegible]	0.98214
2.2	0.98014	0.98043	0.98070	[illegible]	0.98116	[illegible]	[illegible]	[illegible]	[illegible]	0.98610
2.3	0.98354	0.98410	0.98435	0.98457	0.98476	[illegible]	[illegible]	[illegible]	[illegible]	0.98928
2.4	0.98668	0.98712	0.98735	0.98756	0.98774	[illegible]	[illegible]	[illegible]	[illegible]	0.99180
2.5	0.98938	0.98981	0.98982	0.99000	0.99017	[illegible]	[illegible]	[illegible]	[illegible]	0.99379
2.6	0.99144	0.99164	0.99183	0.99200	0.99215	[illegible]	[illegible]	[illegible]	[illegible]	0.99534
2.7	0.99311	0.99329	0.99346	0.99361	0.99375	[illegible]	[illegible]	[illegible]	[illegible]	0.99653
2.8	0.99447	0.99463	0.99478	0.99492	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.99744
2.9	0.99557	0.99572	0.99585	0.99596	0.99607	[illegible]	[illegible]	[illegible]	0.99778	0.99813
3.0	0.99648	0.99659	0.99670	0.99681	0.99690	[illegible]	0.99768	[illegible]	[illegible]	0.99865
3.1	0.99718	0.99729	0.99739	0.99748	0.99756	[illegible]	[illegible]	[illegible]	0.99879	0.99903
3.2	0.99773	0.99783	0.99793	0.99801	0.99808	[illegible]	[illegible]	[illegible]	0.99912	0.99931
3.3	0.99821	0.99829	0.99837	0.99844	0.99849	0.99875	[illegible]	[illegible]	0.99936	0.99952
3.4	0.99854	0.99865	0.99871	0.99877	0.99882	[illegible]	[illegible]	[illegible]	0.99954	0.99966
3.5	0.99887	0.99893	0.99899	0.99904	0.99908	0.99926	0.99942	[illegible]	0.99967	0.99977
3.6	0.99911	0.99916	0.99920	0.99925	0.99928	[illegible]	[illegible]	[illegible]	0.99977	0.99984
3.7	0.99929	0.99933	0.99937	0.99941	0.99944	0.99957	0.99967	[illegible]	0.99984	0.99989
3.8	0.99944	0.99948	0.99951	0.99954	0.99956	0.99967	0.99976	[illegible]	0.99989	0.99993
3.9	0.99958	0.99959	0.99961	0.99964	0.99966	0.99973	0.99982	[illegible]	0.99992	0.99995
4.0	0.99965	0.99967	0.99970	0.99973	0.99974	0.99981	0.99987	[illegible]	0.99995	0.99997
5.0	0.99997	0.99997	0.99998	0.99998	0.99998	0.99999	0.99999			

ATTACHMENT 17

Surface Water Monitoring Plan

SURFACE WATER SAMPLING AND ANALYSIS PLAN

MICHIGAN DISPOSAL, INC. - SITE #2 LANDFILL

The surface water will be sampled and analyzed to meet the requirements of Act 64, P.A. 1979 (Hazardous Waste Management Act). This plan includes procedures and techniques for the following items:

1. Sample Collection
2. Sample Preservation and Shipment
3. Analytical Procedures
4. Chain-of-Custody Control

Three sampling locations are proposed for the surface water monitoring program at the Wayne Disposal Site #2 landfill. The locations of these sampling points are shown on Plate 2 of the Environmental Monitoring Plan. analysis of surface water samples will be conducted by Encotech Laboratory in Ann Arbor.

If Michigan Disposal decides to contract analysis of surface water samples to other laboratories, the change will be made only after at least two concurrent sampling/analysis events showing adequate correlation of analysis results of the existing and proposed contract laboratories.

A small notebook and chain-of-custody forms from the appropriate laboratory are required for recordkeeping. Items to be recorded in the notebook include, but are not limited to; name of sampler, date, time, sampling point, results of any field or lab tests conducted after sampling and any other observations of the sample character or sampling environment. Sample copies of the chain-of-custody forms are included in the Groundwater Sampling and Analysis Plan as Attachment B. This sheet must be filled out fully.

1. **Sample Collection**

Sample bottles will be prepared before sample collection by calling Encotech Laboratory at 761-1389. Surface water samples shall be collected by obtaining a grab sample from the specific sampling points. Each sample bottle shall be filled to the very top, resulting in minimal or no voidspace. No voidspace is permitted in the small glass volatile organic vials. the inside of bottlenecks or caps shall not be touched while handling. The number and type of samples and the time of sampling shall be recorded on the chain-of-custody record and in the field notebook.

1. **Sample Collection** (Continued)

Trip blanks shall be used each sampling day and are available from the laboratory. field blanks shall be collected and submitted each sampling day. In preparing field blanks, the appropriate location relative to wind direction and the location of landfilling operations should be considered. Replicate samples shall be collected from at least one sampling location each sampling period.

2. **Sample Preservation and Shipment**

All sample bottles shall be transferred to a cooler packed with ice, then transported immediately to the on-site laboratory. the samples from the cooler shall be transferred to the refrigerator, with the exception of those samples taken for pH measurement. These samples should be taken immediately to the lab. Measurements of pH and temperature should be completed in as short a time as possible after sampling, but in no case longer than 30 minutes. Procedures for pH measurements are covered in the Analytical Procedures portion of this document.

2. **Sample Preservation and Shipment** (Continued)

The pH and temperature data shall be recorded in the field notebook and on the chain-of-custody form. The tested samples should be placed in the refrigerator. At the close of the sampling day, all collected samples and blanks shall be placed in coolers, packed with ice and transported to the contract laboratory. all chain-of-custody records must be transported to the laboratory. The handling of these forms is covered in the Chain-of-Custody Control portion of this document. Refer to Attachment F, the Groundwater Sampling and Analysis Plan, for a tabulation of sample preservation procedures for the laboratory.

3. **Analytical Procedures**

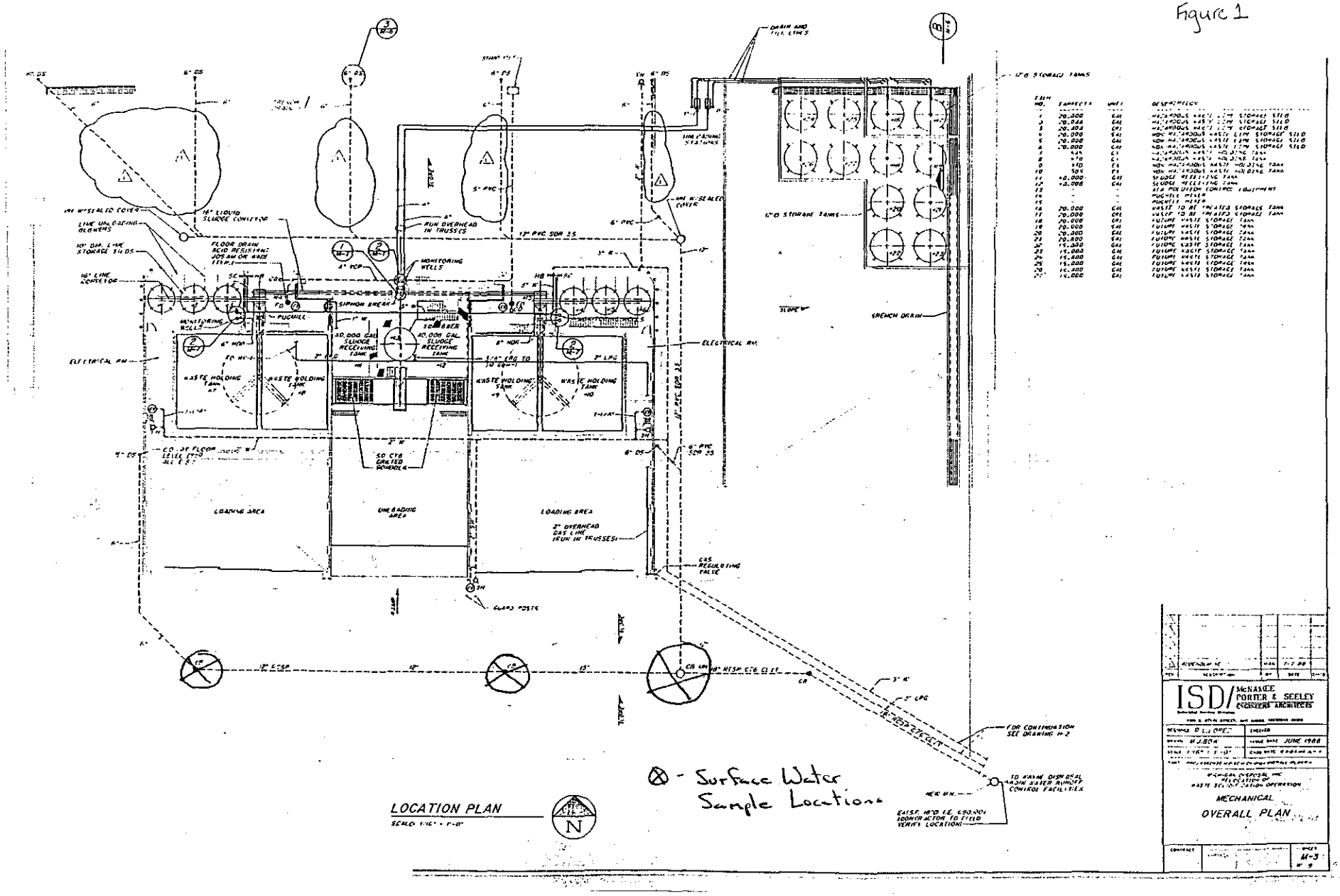
The analytical procedures presented in the Goundwater Sampling and analysis Plan (revised 8/88) shall be followed.

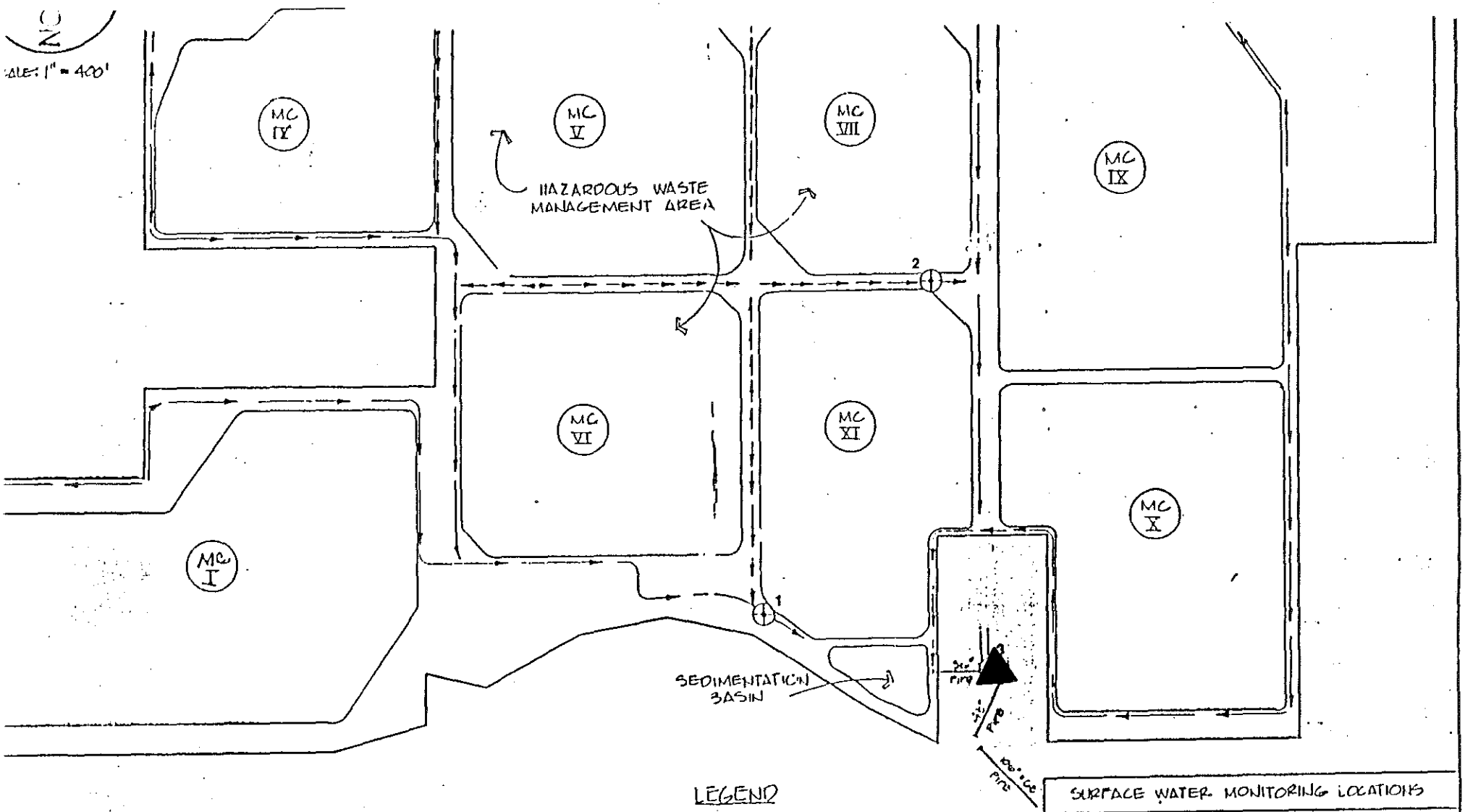
4. **Chain-of-Custody Control**

The procedures for chain-of-custody presented in the Groundwater Sampling and Analysis Plan (revised 8/88) shall be followed.

TAB V ATTACHMENT II
DATE 6/30
REVISION

Figure 1





LEGEND

→ SURFACE DRAINAGE DITCH LOCATION AND DIRECTION OF FLOW

1 ▲ SURFACE WATER SAMPLE LOCATION

SURFACE WATER MONITORING LOCATIONS

WAYNE DISPOSAL, INC.
VAN BUREN TOWNSHIP
WAYNE COUNTY, MICHIGAN

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS AND GEOLOGISTS
38055 HILLS TECH DRIVE • FARMINGTON HILLS, MI 48018

PROJECT NO. 87117 DRAWN BY: RK DATE: 6-2-87
SCALE: AS SHOWN CHECKED BY SHEET: 1 of 1

PLATE 2

TABLE 4

SURFACE WATER MONITORING PARAMETERS

4a. Leachate Parameters

1,1-Dichloroethane
1,2-Dichlorobenzene
1,2-Dichloroethene
Ethyl Benzene
Phenols
Toluene
Xylene

4b. Conventional Parameters

Alkalinity as $CaCO_3$
Bicarbonate
Carbonate
Chloride
Fecal Coliform
Nitrate
pH
Sulfate
Total Suspended Solids

4c. Metals

Arsenic
Barium
Cadmium
Calcium
Chromium (total)
Chromium (hexavalent)
Iron
Magnesium
Manganese
Mercury
Selenium
Silver
Sodium
Zinc

ATTACHMENT 18

Ambient Air Monitoring Plan

Ambient Air Monitoring Program

AMBIENT AIR MONITORING PROGRAM

1. Michigan Disposal, Inc. will monitor ambient air quality at five locations shown on figure one attached hereto.

2. High volume particulate samplers and organic samplers will be located at all five sampling stations. In addition PM-10 samplers will be located at stations 6 and 9.

3. High volume and PM-10 samplers will be operated every 6th day for a 24 hour period. Organic samplers will operate every 6th day for an 8 hour period unless the number of parameters sampled is reduced pursuant to item 8 of this monitor program.

4. Samples collected in the high volume samplers will be analyzed for the parameters listed in Table 6. Organic samples will be analyzed for the parameters in Table 7.

5. Total suspended particulates and metals concentrations will be determined employing EPA Reference Method for the Determination of Suspended Particulates in the Atmosphere (hi-volume Method). Samples will be collected for twenty-four (24) hour periods with a nominal flow rate of 50 cfm$\pm$ 10 cfm. Quality control and assurance requirements specified in the Method will be incorporated in the sampling protocol.

   Respirable particulate, less than ten microns, will be collected with PM-10 air samplers equipped with ten micron cutoff inlet heads. These samplers will be operated for twenty-four (24) hour periods at 50 cfm$\pm$ 10 cfm.

   The organic samplers will employ a system of sorbent tubes, capable of effectively collecting the listed compounds, and a constant flow sampling pump capable of flow rates from 20 cc/min to 3,000 cc/min. Samples will be collected for eight (8) hour periods at flow rates ranging from 100 cc/min to 250 cc/min to reflect the required limits of detection.

AMBIENT AIR MONITORING PROGRAM (Continued)

6. Total suspended particulate and respirable particulate analysis is a gravimetric determination measured to + 1 mg and employing all appropriate quality control and quality assurance requirements.

   Metal determination will be performed by atomic absorption spectroscopy employing appropriate QA and QC measures.

   Organic determinations will be performed by thermal desorption with gas chromatograph/mass spectrometer analysis.

7. Data will be reported to Wayne County Air Pollution Control Division and the Chief of the Waste Management Division in AIRS format with 30 days after the end of the month in which it was collected. Precision and accuracy data will be reported within 30 days after the end of each quarter.

8. If one year of sampling events show non-detectable levels of an organic parameter (listed in table 7) Michigan Disposal, Inc. may petition the Chief of the Waste Management Division and the Wayne County Air Pollution Control Division to discontinue sampling for that parameter. The parameter reduction specified in this item will be implemented only if:

   a) The monitoring program has been in operation under the item 3 schedule for at least one year, and;

   b) 80% of the data collected has been confirmed as valid under the quality assurance program, and;

   c) A minimum of 33% of the sampling events occurred when the wind direction aligned the sampling stations with the land disposal operations.

9. The Ambient Air Monitoring Program herein described is used to characterize the ambient air quality associated with both Michigan Disposal, Inc. and Wayne Disposal, Inc.

FIGURE 1

WDI/MDI AIR MONITORING

SITE LOCATIONS

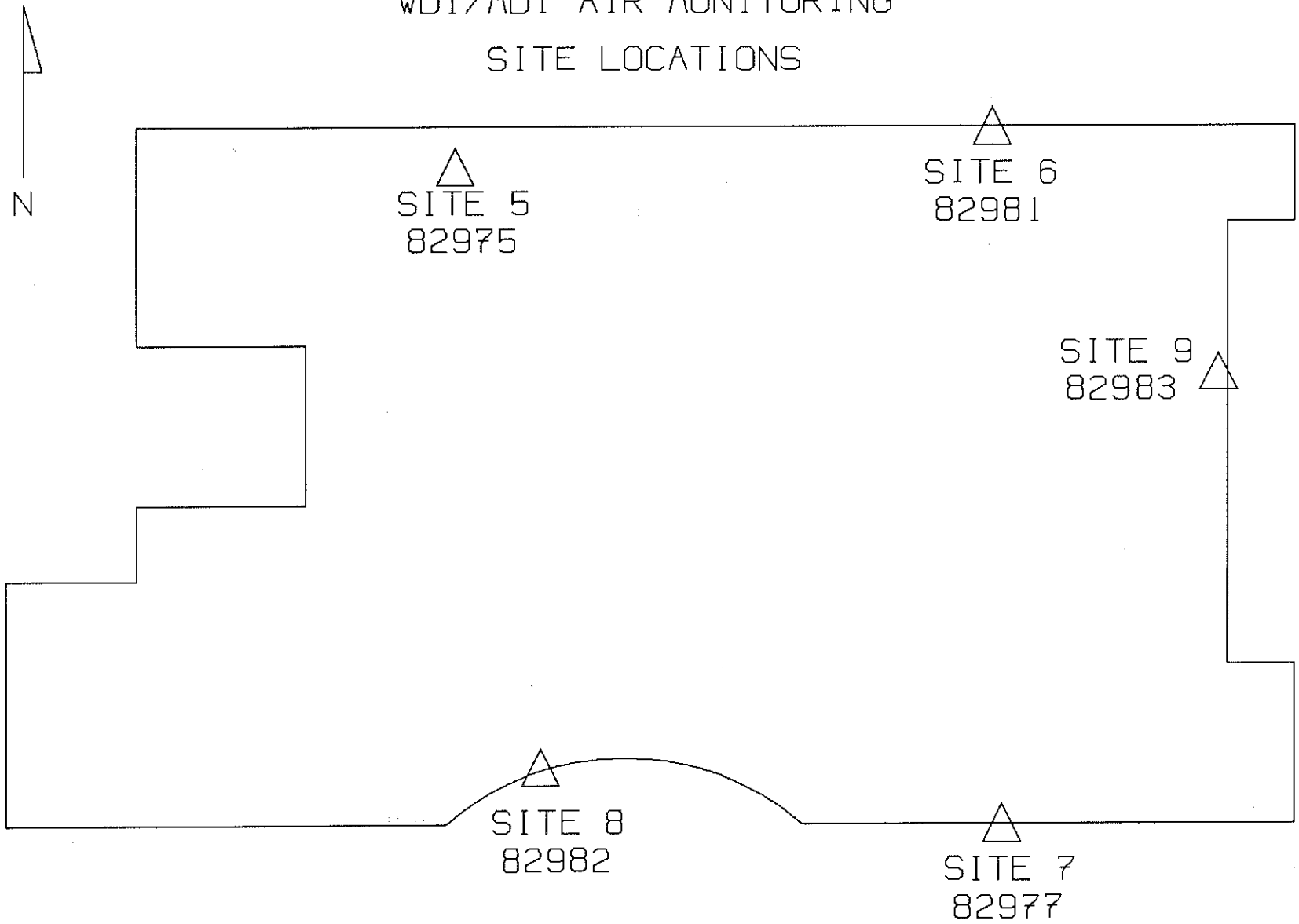


TABLE 6

AIR MONITORING PARAMETERS
(TSP & METALS)

	Detection Limit ($\mu g/m^3$)
Cadmium	< 0.005
Chromium	< 0.009
Lead	< 0.025
Copper	< 0.005
Zinc	< 0.005
Total Suspended Particulate	< 0.02

TABLE 7

AIR MONITORING PARAMETERS
(ORGANIC COMPOUNDS)

ORGANIC COMPOUND	DETECTION LIMIT ($\mu g/m^3$)
Chloroform	0.05
Chloroethane	1.00
Methylene Chloride	1.0
1-1 Dichloroethene	1.0
Chloromethane	1.00
1-1 Dichloroethane	1.0
1-2 Dichloroethene	1.0
1-2 Dichloroethane	0.2
1-1-1 Trichloroethane	1.0
Carbon Tetrachloride	0.25
1-2 Dichloropropane	1.0
1-3 Dichloropropene	1.0
Trichloroethene	0.1
1,1,2 Trichloroethane	0.10
1,1,2,2, Tetrachloroethane	0.10
Tetrachloroethene	0.1
Vinyl Chloride	0.40
Benzene	0.04
Toluene	1.0
Chlorobenzene	1.0
Ethylbenzene	1.0

ATTACHMENT 19

Sedimentation Basin Monitoring Plan

SEDIMENTATION BASIN SAMPLING AND ANALYSIS PLAN

MICHIGAN DISPOSAL, INC. - 1987

Sediment that has settled to the bottom of the Sedimentation Basin will be sampled and analyzed to meet the requirements of Act 64, P.A. 1979 (Hazardous Waste Management Act). This plan includes procedures and techniques for the following items:

1. Sample Collection
2. Sample Preservation and Shipment
3. Analytical Procedures
4. Chain of Custody Control

MDI shall sample and analyze the sediment in the sedimentation basin from six locations. Tab V Attachment III - 3a shows the sedimentation sampling points. MDI shall sample and analyze the sediment for the parameters listed on Tab V Attachment III - 3b on an annual basis and the test results will be reported to MDNR within 60 days of each sampling event. Analysis of sediment samples will be conducted by Encotec Laboratory of Ann Arbor.

If Michigan Disposal, Inc. decides to contract analysis of sediment samples to other laboratories, the change will be made only after at least two concurrent sampling/analysis events showing adequate correlation of analysis results of the existing and proposed contract laboratories.

A small notebook and chain-of-custody forms from the appropriate laboratory are required for recordkeeping. The

items to be recorded in the notebook include, but are not limited to, the name of sampler, date, time, sampling point, results of any field or lab tests conducted after sampling and any other observations of the sample character or sampling environment. Sample copies of the chain-of-custody forms are included in the Groundwater Sampling and Analysis Plan, Attachment B. This sheet must be filled out fully.

Sample Collection

Sample bottles will be prepared before sample collection by calling Encotec Laboratory at 761-1389. Samples shall be collected by driving a Shelby tube into the sediment a distance of 6 to 12 inches. If this method does not result in adequate sample recovery, alternative methods using as piston-type sampler methods are preferred because these methods should minimize the exposure of the sample to the air.

After the sample is extracted from the sediment, the sample recovery will be measured and the samples will be extruded into containers as indicated by the Groundwater Sampling and Analysis Plan Attachment F. The number and type of samples taken shall be recorded and the time of sampling on the chain-of-custody record and in the field notebook.

Sample Preservation and Shipment

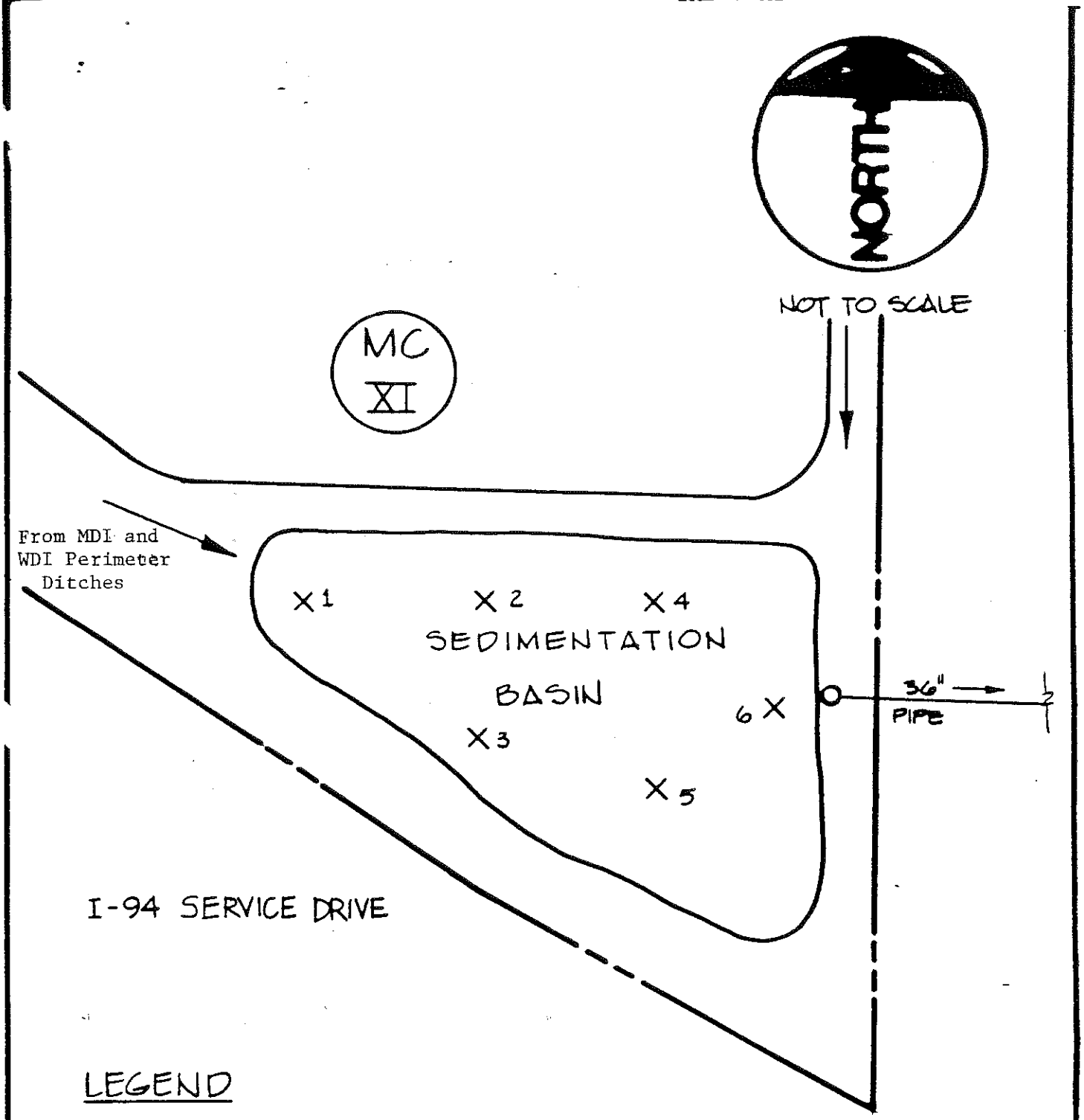
All sample bottles shall be placed in a cooler packed with ice as soon as practicable after sample collection. No on-site testing of the sediment samples is required. At the close of the sampling day, all collected samples and blanks shall be placed in coolers, packed with ice and transported to the laboratory. All chain-of-custody records must accompany the sample. The handling of these forms is covered in the Chain-of-Custody Control portion of this document. Refer to Attachment F, the Groundwater Sampling and Analysis Plan, for a tabulation of sample preservation procedures for the laboratory.

Analytical Procedures

The analytical procedures used to prepare the sediment samples for analysis are specified in Attachment M. The procedures used to analyze the samples are presented in the Groundwater Sampling and Analysis Plan (rev. date 8/88).

Chain-of-Custody Control

The procedures for chain-of-custody presented in the Groundwater Sampling and Analysis Plan (rev. date 8/88) shall be followed.



LEGEND

X - SEDIMENT SAMPLING LOCATION POINTS.

→ DRAINAGE DITCH LOCATION AND DIRECTION OF FLOW.

NOTE: FOR LOCATION WITH RESPECT TO EXISTING FACILITY REFER TO PLATE 2.

SEDIMENTATION BASIN MONITORING PLAN

WAYNE DISPOSAL, INC.
VAN BUREN TOWNSHIP
WAYNE COUNTY, MICHIGAN

NEYER, TIGEO & HINDO, LTD.
CONSULTING ENGINEERS AND GEOLOGISTS
[illegible] HILLS TECH DRIVE • FARMINGTON HILLS, [illegible]

PROJECT NO.: 87117	DRAWN BY: [illegible]	DATE: 6-2-87
SCALE: N.T.S.	CHECKED BY: [illegible]	

PLATE 3

TABLE 5

SEDIMENT BASIN MONITORING PARAMETERS

5a. Organic Parameters

1,1-Dichloroethane
1,2-Dichlorobenzene
Xylene
Ethyl Benzene
Phenols
Toluene

5b. Metals

Arsenic
Barium
Cadmium
Calcium
Chromium (total)
Chromium (hexavalent)
Iron
Lead
Mercury
Selenium
Silver
Zinc

ATTACHMENT 20

Waste Delivery Procedures

ATTACHMENT 20

RECEIPT OF HAZARDOUS WASTES

A) Normal Hours 7:00 a.m. - 7:00 p.m.

B) Procedure for Accepting Hazardous Wastes After 7:00 p.m. and Before 7:00 a.m.

1) Only the Site Manager, Technical Director, Vice President or President may authorize off hour receipt of hazardous wastes.

2) The facility must be properly staffed to conduct the waste analysis plan and all record keeping procedures. This may represent as few as one chemist or technician (working under the instruction of a chemist) in place to receive the load and three plant operators to unload the truck.

C) Michigan Disposal, Inc. (MDI) operates a transportation fleet 24 hours per day, seven days per week. The Act 64 licensed facility is used as a terminal for transportation activities. Trailers, owned or operated by MDI, containing hazardous wastes may be received and temporarily stored (for up to 10 days) at any time.