

STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES

RICHMOND SANITARY LANDFILL, INC. TUEBOR

SOLID WASTE DISPOSAL AREA CONSTRUCTION PERMIT

This construction permit is issued under the provisions of Act 641, Public Acts of 1978, as amended, to permit the construction of a solid waste disposal area in the State of Michigan. This document does not obviate the necessity of obtaining other clearances and permits as may be required by state law or local ordinance. It is further made a condition of this permit that the applicant give notice to public utilities in accordance with Act No. 53 of the Public Acts of 1974, being sections 460.701 to 460.718 of the Michigan Compiled Laws, and comply with each of the requirements of that Act. Solid wastes shall not be received at this disposal area until a license has been issued.

GRANTED TO: RICHMOND SANITARY LANDFILL, INC.

COUNTY: OSCEOLA

ISSUE DATE: FEB 27 1981

RESPONSIBLE PERSON TO CONTACT:

EXPIRATION DATE: (One year from date of issue unless development of facility begins within the year)

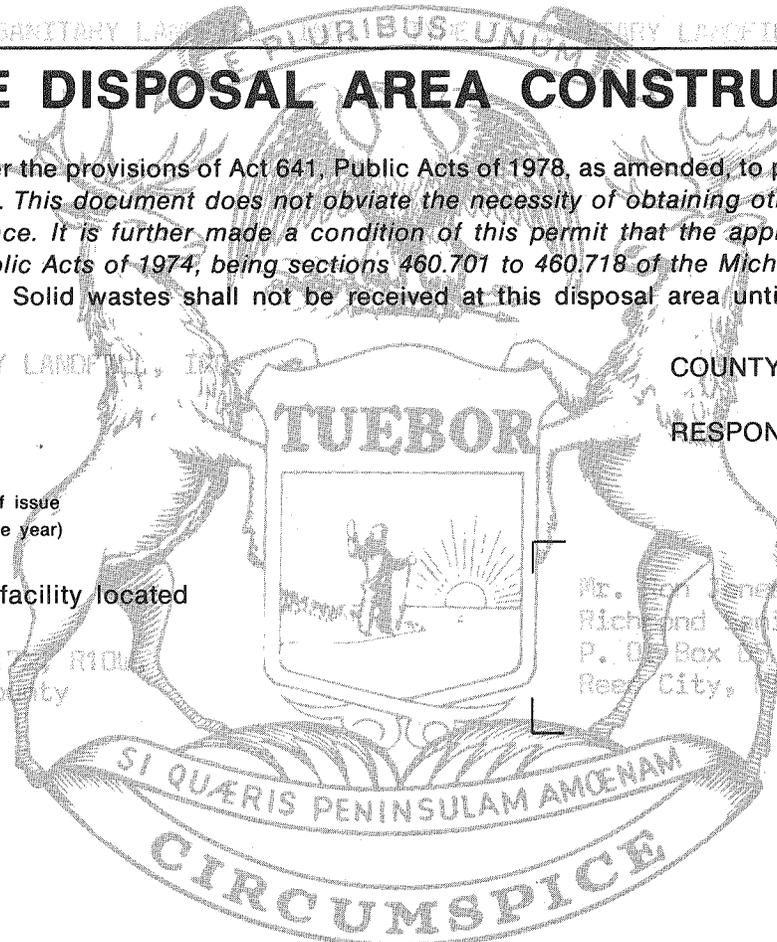
This document is applicable to the facility located at and described as follows:

SW 1/4 of the NE 1/4 of Sec. 30, T17N, R10W, Richmond Township, Osceola County

Mr. [Name] Richmond Sanitary Landfill, Inc. P. O. Box [Number] Reed City, Michigan 49677

Stipulations:

See Attached



This permit is subject to revocation by the Director of the Department of Natural Resources for any violation of the law under which it is issued or for any violation of the rules authorized thereunder, or any stipulations noted. This permit shall be available through the applicant during the entire effective date and remains the property of the Director of the Department of Natural Resources. THIS PERMIT IS NOT TRANSFERABLE.

PERMIT NO.

0234

David P. Hales, Director

RICHMOND SANITARY LANDFILL, INC.  
CONSTRUCTION PERMIT CONDITIONS

A. COVERAGE OF PERMIT

1. Pursuant to the Solid Waste Management Act, 1978 PA 641, as amended (hereinafter the "Solid Waste Management Act"), and rules promulgated thereunder by the Michigan Department of Natural Resources (hereinafter the "Department"), a permit is issued to Richmond Sanitary Landfill Inc. (hereinafter the "permittee") to construct a type II sanitary landfill on an 80 acre site known commonly as the Richmond Sanitary Landfill. The legal description of the 80 acre site is as follows:

All that part of the south half of the  
northeast quarter of Section 30, T. 17 N.,  
R 10 W., Richmond Township, Osceola County

2. This permit authorizes the construction of 22 acres of active fill area consisting of the southwest cell and the southeast cell within the above described site and as depicted on the site plan enclosed as Attachment A. Also authorized for construction as part of the sanitary landfill are the related appurtenances (piping, pumps, operation and maintenance buildings, etc.). The permittee shall not dispose of solid waste in any area authorized for construction by this permit until an operating license for the area is issued by the Department Director.
3. The permittee shall comply with all terms and conditions of this permit. This permit consists of the conditions contained herein, including those in any attachments, approved engineering plans, and the applicable regulations of the Solid Waste Management Act.
4. This permit is based on the assumption that the information submitted in the construction permit application dated August 23, 1990, and any subsequent amendments is accurate. Any inaccuracies found in this information may be grounds for the revocation or modification of this permit or other enforcement action. The permittee shall inform the Department Director or his or her designee of any deviation from or changes in the information in the application which would affect the permittee's ability to comply with the applicable rules or permit conditions.

B. LINER CONSTRUCTION AND CERTIFICATION

1. The permittee shall evaluate the subgrade below any liner system in the southwest or southeast cells for stability and shall correct or remove any wet or unstable area.

2. The permittee shall assure that synthetic liners used as part of the liner system are laid on a foundation which is all of the following:
  - a. Compacted to not less than 90 percent of the maximum dry density, as determined by the modified proctor test.
  - b. Graded to a smooth and true line and grade, not deviating more than 0.2 feet from those elevations shown on approved plans.
3. The permittee shall remove any stones, organic material, and debris which may have detrimental effects on the liner system.
4. All fill soils shall be compacted in lifts to provide the necessary structural stability to support the subsequent loading upon them.
5. Measurement of the liner subgrade slope shall be by final elevation checks.
6. The bottom liner and sidewall liner or dike shall be continuous and completely keyed together at all construction joints.
7. The permittee shall seam the synthetic liner in the following manner:
  - a. The field seams are installed parallel to the line of maximum slope, when possible.
  - b. The seaming is done in accordance with manufacturer's specifications.
  - c. The seam area is free of moisture, dust, dirt, debris, and foreign material of any kind before seaming.
  - d. The field seaming is not done in any of the following adverse weather conditions:
    - i. Air temperatures below 40° F.
    - ii. Precipitation events.
    - iii. Winds in excess of 20 miles per hour.
8. The permittee shall install the synthetic liner in the following manner:
  - a. Any imperfections found in a liner or seam are repaired immediately.
  - b. The anchor trench for the liner is excavated to the depth and width shown on the approved plans, and that the liner is sufficiently anchored within this trench.

- c. The liner is covered with soil or other material specified in approved plans, immediately following placement.
9. A registered professional engineer or other qualified individual shall provide and/or conduct the following quality control on all synthetic liners used:
    - a. The following information on the raw materials used to manufacture the synthetic liner:
      - i. Origin and identification of the raw materials.
      - ii. Copies of quality control certificates issued by the producer of the raw materials.
      - iii. Reports of tests conducted to verify the quality of the raw materials, such as specific gravity, melt flow index, and percent carbon black.
    - b. The following quality control testing of any synthetic liner fabricated at the factory:
      - i. Continuous visual inspection for uniformity, damage, and imperfections, including holes, cracks, thin spots, tears, punctures, blisters, and foreign materials.
      - ii. Non-destructive seam testing on all fabricated seams long their full length.
      - iii. Destructive seam testing on a minimum of one sample per blanket per day.
    - c. The following quality assurance testing performed in the field:
      - i. Continuous visual inspection for uniformity, damage, and imperfections, including holes, cracks, thin spots, tears, punctures, blisters, and foreign materials.
      - ii. Non-destructive testing on all field seams according to manufacturer's specifications.
      - iii. Destructive testing on at least one sample per day seamed in the field, or every 500 feet of seam, whichever is greater. The destructive test shall be conducted for both of the following:
        - (a) Seam strength in shear according to ASTM D882, Method A, or an equivalent method approved by the Department.
        - (b) Seam strength in peel according to ASTM D413, Method 1, or an equivalent method approved by the Department.
      - iv. Hourly records of ambient air temperature and liner temperature during liner installation or field seaming.

10. The permittee shall install all soil drainage layers for leachate collection or leak detection in accordance with approved plans by doing both of the following:
  - a. Making elevation checks at least 200 feet to verify the appropriate thickness of granular material.
  - b. Sampling randomly at least every 5,000 cubic yards to verify the required aggregate classification.
11. A registered professional engineer shall document quality control tests required by this permit on forms enclosed as Attachment B. The permittee shall submit copies of these forms with field notes and as built plans required under R 299.4313.

C. MAINTENANCE OF CONSTRUCTED DISPOSAL AREAS

1. The permittee shall protect, as reasonable, all constructed, but uncovered, portions of liners and leachate collection systems from vegetation, desiccation, freeze-thaw, weathering, and all other deteriorating processes so as to maintain the same degree of system performance and environmental protection that was present at the time of their original construction.
2. Any portion of a constructed liner or leachate collection system which is found to be deficient prior to licensure of the area shall be repaired and recertified by a registered professional engineer in accordance with R 299.4313 before a license application for the area is submitted.

D. ENVIRONMENTAL AND HUMAN HEALTH STANDARDS

The permittee shall construct the landfill in a manner that will prevent all of the following:

1. Violations of the Water Resources Commission Act, 1929 PA 245, as amended (hereinafter "Act 245").
2. Violations of the federal Resource Conservation and Recovery Act.
3. Violations of the Soil Erosion and Sedimentation Control Act, 1972 PA 347, as amended.

E. GROUNDWATER MONITORING REQUIREMENTS

1. For the southwest cell, the permittee shall immediately initiate a monitoring program for groundwater consisting of groundwater wells MW 6A, 16S, 16D, 17, 19, 20, 21, and 22.

2. For the southeast cell, the permittee shall initiate a monitoring program for groundwater consisting of groundwater wells MW 1, 5, 14, 23, 24, 25, 26, 27, 28, 29, and 30 on a schedule which complies with the requirements of Condition E.6 are met.
3. The permittee shall sample and analyze water from the monitoring wells in accordance with the procedures specified below:
  - a. The static water elevation shall be determined by methods giving precision to 1/8 inch or 0.01 foot within 24 hours 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 wells systems 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 quality to or greater than three times the amount of water in the well casing or until dry before obtaining a sample for analysis. 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 does not occur.
  - d. Water pumped from each monitoring well shall be discharged in a manner consistent with Act 245 and away from the well to avoid recycling of the flow.
  - e. All wells shall be clearly labeled, securely capped, and locked when not in use.
  - f. Prior to undertaking well replacement or repair, the permittee shall obtain the approval of the Chief of the Department's Waste Management Division.
4. Except as provided in Condition E.6, the permittee shall sample and analyze all monitoring wells for those parameters and at that frequency listed in Attachment C, using the test methods and detection limits specified in Attachment D.

5. The permittee shall submit all monitoring results to the Department with the operating license application for the new disposal area.
6. The permittee shall, for each parameter and monitoring well specified above, collect and analyze no less than eight (8) samples prior to submitting an application for an operating license, for purpose of the statistical analysis specified in Condition E.7 below.
7. The permittee shall provide the following statistical analysis of all data collected from the monitoring wells listed in Condition E.1 and E.2 above:
  - a. The number of data points for each parameter from each well.
  - b. The mean, variance, and standard deviation for each parameter from each well.
  - c. The normality of the data, by dividing the standard deviation by the mean.
8. If the data from any monitoring well is below the detection limit for a particular parameter, the permittee shall use the detection limit. However, if more than 50 percent of the data for any given parameter are below the detection limit, the permittee shall substitute zero (0) for every other detection limit value.
9. If the coefficient of variation is less than 1.00, the data is normal, and the permittee shall propose a statistical method for data interpretation, using a tolerance interval from groundwater monitoring data collected before license issuance. A one-sided upper tolerance limit shall be determined by taking the mean plus a tolerance coefficient (K) (See Attachment E) times the standard deviation as follows:
$$TL = X + KS$$
10. If the coefficient of variation is greater than 1.00, the data is not normal, and the permittee shall propose a method for data interpretation with the first operating license application, which accounts for the non-normality of the data.
11. The permittee shall submit with the first operating license application for each new cell the calculations in Conditions E.7, E.8 and E.9 above for each parameter and each well specified above.
12. After operation of the site commences, the data from each monitoring well shall be compared to the tolerance limit to determine if a discharge to groundwater may exist.

F. SECONDARY COLLECTION SYSTEM MONITORING

1. The permittee shall sample and analyze the liquid from all secondary collection systems (hereinafter "SCS") as follows:
  - a. Prior to operation of the southwest or southeast landfill cells, the permittee shall collect water from the leak detection system drainage layer and piping to allow the establishment of background water quality within this system prior to waste being placed in the cell. To establish background water quality, the permittee shall collect at least eight samples of this liquid and analyze each portion for each parameter listed in Attachment C. The mean value of the results of this testing will establish the baseline water quality for each parameter and each cell.
  - b. Once the landfill all begins operation, the permittee shall monitor the volume of water, if any, in the SCS on a weekly basis by pumping and metering the discharge. The permittee shall collect a representative sample on a quarterly basis and run quarterly and annual sampling analyzes on that sample, if water is present during the period, for each parameter listed in Attachment C.
2. The permittee shall submit all monitoring results to the Department within 30 days of receipt from the laboratory on forms provided by the Department.
3. The permittee shall provide the following statistical analysis:
  - a. The mean, variance, and standard deviation for each detectable analytical result.
  - b. The normality of the data, by dividing the standard deviation by the mean.
4. If the data from the leak detection system is below the detection limit for a particular parameter, the permittee shall use the detection limit. However, if more than 50 percent of the data for any given parameter are below the detection limit, the permittee shall substitute zero (0) for every other detection limit value.
5. If the coefficient of variation is less than 1.00, the data is normal, and the permittee shall construct a tolerance interval from background data collected from the leak detection system before license issuance. A one-sided upper tolerance limit shall be determined by taking the mean plus a tolerance

coefficient (K) (See Attachment E) times the standard deviation as follows:

$$TL = X + KS$$

6. The permittee shall submit with the first operating license application for the southwest and southeast cells the calculations in Conditions F.3, F.4, and F.5 above for each parameter analyzed in the SCS.
7. After operation of the site commences, the data from the leak detection system shall be compared to the tolerance limit to determine if the primary liner is leaking.
8. If new Solid Waste Management Act administrative rules, which establish new standards for determining statistically significant increases, become effective, the permittee shall submit a revised monitoring plan to comply with the new rules.

G. LEACHATE STORAGE AREA

1. The permittee shall provide detailed plans for Department review and approval on the leachate storage tanks, the piping layout, and associated appurtenances prior to installation.

H. INTERIM AND FINAL COVER FOR ACTIVE FILL AREAS

1. The permittee shall place interim and final cover over licensed landfill areas in accordance with R 299.4316.
2. The permittee shall have a registered professional engineer verify construction of all final cover in accordance with R 299.4313.
3. The permittee shall inspect and install the synthetic membrane cover liner to comply with conditions B.7, B.8, and B.9 of this document.
4. The permittee shall submit the verification of closure by a registered professional engineer not more than six months after placement of the final cover.
5. A registered professional engineer shall document quality control tests required by this permit on forms enclosed as Attachment B. The permittee shall submit copies of these forms with field notes and as-built plans required under R 299.4313.

I. POST-CLOSURE MAINTENANCE AND MONITORING

1. The permittee shall maintain and monitor the southwest and southeast cells for 30 years from the date that

a registered professional engineer certifies that these units have been closed in accordance with the approved engineering plans.

2. During the 30-year post-closure period, the permittee shall make repairs to the final cover as necessary to correct the effects of settling, subsidence, erosion, or other events. The permittee shall periodically monitor the post-construction settlement and, if necessary, adjust the final cover to compensate for anticipated future settlement.
3. During the 30-year post-closure period, the permittee shall conduct biannual groundwater monitoring in accordance with Condition E of this permit and biannual leak detection monitoring in accordance with Condition F of this permit, unless the Department Director or his or her designee approves a modification of this program.

J. CLOSURE AND POST-CLOSURE BONDING

1. The permittee shall maintain a bond for all licensed and previously licensed sanitary landfill areas in accordance with Section 19 of the Solid Waste Management Act.
2. The permittee shall be deemed to be without the bonding required under Section 19 of the Solid Waste Management Act in the event of bankruptcy of the issuing institution, or a suspension of the authority of the institution issuing the bond. The permittee shall establish other bonding within 60 days of such an event.
3. The permittee shall renew a bond and submit documentation of such renewal to the Department Director at least 60 days prior to the expiration date of the bond.

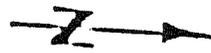
SEA-C-7126, DATA USGS  
LOCATION: NW COR OF 5 1/4 NE 1/4  
OF SEC 30-17-10  
COORDINATES: N 23165.63° E 150000

NORTHWEST CELL

PROPOSED SOUTHWEST  
CELL INITIAL  
DEVELOPMENT

FORMER REED CITY LANDFILL

PROPOSED SOUTHEAST  
CELL SECONDARY  
DEVELOPMENT



130th AVENUE

RICHMOND LANDFILL

**WESTSHORE ENGINEERING & SURVEYING, INC.**  
2334 BLACK CREEK ROAD  
MUSKOGEE, MICHIGAN 49844-2674  
PH. (616) 777-5447

DRAWN: RLS  
DATE: 4-8-88  
CNO: DFD  
DATE: 4-88

SITE PLAN

SHT. 1 OF 8 SCALE: 1" = 100' JOB NO. 0711

**ATTACHMENT B**  
**QUALITY CONTROL DOCUMENTATION**  
**FORMS**





# PANEL PLACEMENT LOG

Panel Number _____	
Owner: _____	Weather: _____
Project: _____	Temperature: _____
Date/Time: _____	Wind: _____
-----Subgrade Conditions-----	
Line & Grade: _____	
Surface Compaction: _____	
Protrusions: _____	
Ponded Water: _____	Dessication: _____
-----Panel Conditions-----	
Transport Equipment: _____	
Visual Panel Inspection: _____	
Temporary Loading: _____	
Temp. Welds/Bonds: _____	
Temperature: _____	
Damages: _____	
_____	
-----Seam Details-----	
Seam Nos. _____	
Seaming Crews: _____	
Seam Crew Testing: _____	
Notes: _____	
_____	
_____	

ATTACHMENT C

MONITORING PARAMETERS

This attachment provides the parameters to be sampled and the sampling frequency. For the acceptable test methods and method detection limits see Attachment D. Only the parameters checked in the annual/quarterly column are required to be sampled.

ANNUAL	QUARTERLY	PARAMETER
	X	Static Water Levels (U.S.G.S.)
	X	pH (Field Measurement)
	X	Specific Conductance (Field Measurement)
		Arsenic (dissolved)
	X	Cadmium (dissolved)
	X	Calcium (dissolved)
	X	Chromium (dissolved)
	X	Cobalt (dissolved)
	X	Copper (dissolved)
	X	Iron (dissolved)
	X	Lead (dissolved)
	X	Lithium
	X	Magnesium (dissolved)
	X	Manganese (dissolved)
	X	Nickel (dissolved)
	X	Potassium (dissolved)
		Selenium (dissolved)
	X	Sodium (dissolved)
	X	Zinc (dissolved)
	X	Ammonia Nitrogen
	X	Nitrate Nitrogen
	X	Bicarbonate Alkalinity as HCO <sub>3</sub>
	X	Carbonate Alkalinity as HCO <sub>3</sub>
	X	Total Alkalinity
	X	Chloride
	X	Phenolics
	X	Phosphorus
	X	Sulfate
		Total Dissolved Solids
		Biochemical Oxygen Demand (BOD-5)
	X	Chemical Oxygen Demand (COD)
	X	Total Organic Carbon (TOC)
		Dissolved Oxygen (DO)
		Fecal Coliform Bacteria
X		SCAN 1 - Purgeable Halocarbons
X		SCAN 2 - Purgeable Aromatic Hydrocarbons
		SCAN 3 - Chlorinated Hydrocarbons, PCB's and Organochlorine Pesticides
		SCAN 8 - Phenols
		GC/MS Base Neutrals in Water

ATTACHMENT D

TEST METHODS & DETECTION LIMITS

This attachment provides the acceptable test methods and method detection limits. For the specific parameter to be analyzed and the sampling frequency see Attachment C.

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**METALS & IONS**

PARAMETER	TEST METHOD	METHOD DETECTION LIMIT mg/l
Arsenic (dissolved)	-----3114B-----	0.0025
Barium (dissolved)	-----3500-Ba(B)-----	0.01
Cadmium (dissolved)	-----3500-Cd(B)-----	0.02
Calcium (dissolved)	-----3111B-----	1.0
Chromium (dissolved)	-----3500-Cr(B)-----	0.05
Copper (dissolved)	-----3500-Cu(B)-----	0.02
Iron (dissolved)	-----3500-Fe(B)-----	0.1
Lead (dissolved)	-----3500-Pb(B)-----	0.05
Magnesium (dissolved)	-----3500-Mg(B)-----	1.0
Manganese (dissolved)	-----3500-Mn(B)-----	0.02
Mercury (dissolved)	-----3500-Hg(B)-----	0.01
Nickel (dissolved)	-----3500-Ni(B)-----	0.05
Potassium (dissolved)	-----3500-K (B)-----	0.1
Selenium (dissolved)	-----3500-Se(C)-----	0.0025
Sodium (dissolved)	-----3500-Na(B)-----	1.0
Zinc (dissolved)	-----3500-Zn(B)-----	0.05
Ammonia Nitrogen	----- 4500-NH <sub>3</sub> (D)-----	0.005
Bicarbonate Alk. as HCO <sub>3</sub>	-----2320B-----	5.0
Biochemical Oxygen Demand (BOD)	-----5210(B)-----	2
Carbonate Alk, as HCO <sub>3</sub>	-----2320B-----	5.0
Chemical Oxygen Demand (COD)	----- 5220(D)-----	3
Chloride	-----4500-Cl(C)-----	1.0
Dissolved Oxygen (DO)	----- 4500-O(C)-----	0.1
Fecal Coliform Bacteria	----- 9222(D)-----	2/100ml
Nitrate Nitrogen	----- 4500-NO <sub>3</sub> (E)-----	0.005
Phenolics	-----5530(D) <sub>3</sub> -----	0.005
Phosphorus	----- 4500 P(E)-----	0.005
Sulfate	-----4500-SO <sub>4</sub> (F)-----	1.0
Total Dissolved Solids	----- 2540(C) <sub>4</sub> -----	20
Total Organic Carbon (TOC)	----- 5310C-----	0.2

Groundwater samples for metals analysis should be filtered preferably in the field, prior to preservation. See Method 3030B

Method numbers listed are for "Standard Methods for the Examination of Water and Wastes", 17th Edition 1989.

If the level of detection can be maintained other analytical references and methods may be used, if prior approval is obtained from the District Supervisor, Waste Management Division .

ATTACHMENT D

**= SCAN 1 - PURGEABLE HALOCARBONS**

<u>COMPOUND</u>	<u>DETECTION LIMIT (ug/1)</u>	<u>COMPOUND</u>	<u>DETECTION LIMIT (ug/1)</u>
Vinyl Chloride	5.0	1, 2-Dichloroethane*	1.0
Bromomethane*	5.0	Trichloroethene	1.0
Chloroethane*	5.0	1, 2-Dichloropropane*	1.0
Trichlorofluoromethane*	5.0	Bromodichloromethane*	1.0
1, 1-Dichloroethene	1.0	cis-1, 3-Dichloropropene*	1.0
Methylene chloride*	5.0	trans-1, 3-Dichloropropene	1.0
trans-1, 2-Dichloroethene	1.0	Tetrachloroethene	1.0
1, 1-Dichloroethane	1.0	1, 1, 2-Trichloroethane*	1.0
cis-1, 2-Dichloroethene	1.0	Tetrachloroethene	1.0
Chloroform*	1.0	Dibromochloromethane*	1.0
1, 1, 1-Trichloroethane*	1.0	Chlorobenzene	1.0
Carbon tetrachloride*	1.0	Bromoform*	1.0
		1, 1, 2, 2-Tetrachloroethane*	1.0

\* Compound not confirmed by second independent technique.

**= SCAN 2 - PURGEABLE AROMATIC HYDROCARBONS =**

<u>COMPOUND</u>	<u>DETECTION LIMIT (ug/1)</u>	<u>COMPOUND</u>	<u>DETECTION LIMIT (ug/1)</u>
Benzene	1.0	Ethylbenzene	1.0
Toluene	1.0	Xylene isomers	1.0

**ANALYTICAL METHODS**

Federal Register, Vol. 49, No 209, Friday, October 26, 1984  
 Scan 1 - Method 601 - Purgeable Halocarbons, pp, 29-39  
 Scan 2 - Method 602 - Purgeable Aromatics, pp. 40-48

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846 (third edition, 1986),

Scan 1 - Method 5030, Purge and Trap Method 8010, Halogenated Volatile Organics.

Scan 2 - Method 5030, Purge and Trap and Method 8020, Aromatic Volatile Organics

NOTE: SW-846 Method 8240 is not appropriate for analyzing groundwater samples due to high detection limits.

## ATTACHMENT D

## SCAN 3 - CHLORINATED HYDROCARBONS, PCBs &amp; ORGANOCHLORINE PESTICIDES

<u>COMPOUND</u>	<u>DETECTION LIMIT (ug/l)</u>
1,3-Dichlorobenzene	0.10
1,4-Dichlorobenzene	0.10
1,2-Dichlorobenzene	0.10
Hexachloroethane	0.01
1,3,5-Trichlorobenzene	0.01
1,2,4-Trichlorobenzene	0.01
1,2,3-Trichlorobenzene	0.01
Hexachlorobutadiene	0.01
1,2,4,5-Tetrachlorobenzene	0.01
Hexachlorocyclopentadiene	0.01
2-Chloronaphthalene	0.20
1,2,3,4-Tetrachlorobenzene	0.01
Pentachlorobenzene	0.01
a-BHC	0.01
Hexachlorobenzene	0.01
Pentachloronitrobenzene	0.01
Heptachlor	0.01
Aldrin	0.01
Heptachlor epoxide	0.01
g-Chlordane	0.01
Endosulfan I	0.05
a-Chlordane	0.01
4,4'-DDE	0.01
Endrin	0.05
Dieldrin	0.05
4,4'-DDD	0.01
1,4'-DDT	0.01
4,4'-DDT	0.01
Hexabromobenzene	0.01
Methoxychlor	0.01
Mirex	0.01
b-BHC	0.01
d-BHC	0.01
g-BHC (lindane)	0.01
Aroclor 1242 (PCB)	0.05
Aroclor 1254 (PCB)	0.05
Aroclor 1260 (PCB)	0.05
Aroclor 1016 (PCB)*	0.05
Aroclor 1221 (PCB)*	0.05
Aroclor 1232 (PCB)*	0.05
Aroclor 1248 (PCB)*	0.05
Aroclor 1262 (PCB)*	0.05
Aroclor 1268 (PCB)*	0.05
BP-6 (PBB)*	0.01
Toxaphene *	0.10

\* Seldomly encountered, reported semi-quantitatively

Analytical Method - Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, Method 608: "Pesticides and PCBs", Method 612: "Chlorinated Hydrocarbons", and Appendix A: "Definition and Procedure for the Determination of the Method Detection Limit", U.S. EPA - 600/4-82-057, July 1982.

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846 (third edition, 1986), Method 3510 or 3520 for sample preparation and Method 8080, Organochlorine Pesticides and PCBs, and Method 8120, Chlorinated Hydrocarbons.

**SCAN 8 - PHENOLS**

<u>COMPOUND</u>	<u>DETECTION LIMIT (ug/l)</u>	<u>COMPOUND</u>	<u>DETECTION LIMIT (ug/</u>
Phenol	10.0	2,4,6-Trichlorophenol	10.0
2-Chlorophenol	10.0	2,4,5-Trichlorophenol	10.0
2-Nitrophenol	10.0	2,4-Dinitrophenol	40.0
2,4-Dimethylphenol	40.0	4-Nitrophenol	40.0
2,4-Dichlorophenol	10.0	2-Methyl-4,6-dinitrophenol	40.0
4-Chloro-3-methylphenol	10.0	Pentachlorophenol	40.0
3-Phenylpropionic acid*	40.0		

\* Seldomly encountered, reported semi-quantitatively

Analytical Method - Federal Register 40 CFR, Part 136, EPA, Friday, October 26, 1984, pp 23-35, 58-66, 198-210.

Manual of Analytical Quality Control. EPA 600/2-81-059, April 1981, pp 285-311.

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846 (third edition, 1986), Method 3510 or 3520 for sample preparation and Method 8040, Phenols.

ATTACHMENT E  
 TOLERANCE FACTORS (K) FOR ONE-SIDED NORMAL TOLERANCE  
 INTERVALS WITH PROBABILITY LEVEL (CONFIDENCE FACTOR)  
 $\gamma = 0.95$  AND COVERAGE  $P = 95\%$

n	K	n	K
3	7.655	75	1.972
4	5.145	100	1.924
5	4.202	125	1.891
6	3.707	150	1.868
7	3.399	175	1.850
8	3.188	200	1.836
9	3.031	225	1.824
10	2.911	250	1.814
11	2.815	275	1.806
12	2.736	300	1.799
13	2.670	325	1.792
14	2.614	350	1.787
15	2.566	375	1.782
16	2.523	400	1.777
17	2.486	425	1.773
18	2.543	450	1.769
19	2.423	475	1.766
20	2.396	500	1.763
21	2.371	525	1.760
22	2.350	550	1.757
23	2.329	575	1.754
24	2.309	600	1.752
25	2.292	625	1.750
30	2.220	650	1.748
35	2.166	675	1.746
40	2.126	700	1.744
45	2.092	725	1.742
50	2.065	750	1.740
55	2.036	775	1.739
60	2.017	800	1.737
65	2.000	825	0.736
70	1.986	850	1.734
		875	1.733
		900	1.732
		925	1.731
		950	1.729
		975	1.728
		1000	1.727

SOURCE: (a) for sample sizes  $\leq 50$ : Lieberman, Gerald F. 1958. "Tables for One-sided Statistical Tolerance Limits." *Industrial Quality Control*. Vol. XIV, No. 10. (b) for sample sizes  $\geq 50$ : K values were calculated from large sample approximation.