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TECHNICAL MEMORANDUM NO. 1
INFLUENT CHARACTERIZATION TASK FT
GROUNDWATER AND LEACHATE
SAMPLING AND DATA
ANALYSIS, NORTHSIDE SANITARY
LANDFILL/ENVIROCHEM CORPORATION
SITE PREDESIGN INVESTIGATION

GLT718/45

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MEMORANDUM

TO: Karen Vendl/U.S. EPA Region V

FROM: Al Sloan/CH2M HILL

PREPARED BY: Chung Kim
Janelle Williams

DATE: August 5, 1988

RE: Technical Memorandum No. 1
Influent Characterization Task FT
Groundwater and Leachate Sampling and Data Analysis
Northside Sanitary Landfill/Envirochem Site Predesign Investigation

PROJECT: GLO64641.FT
GLO63582.FT

INTRODUCTION

Groundwater monitoring well and leachate collection tank samples were collected from August 24 through August 28, 1987, at the Northside Sanitary Landfill/Environmental Chemical and Conservation Corporation (NSL/ECC) site near Zionsville, Indiana. Sampling was performed by CH2M HILL with assistance from Black and Veatch and Planning Research Corporation (PRC). The work was performed in partial satisfaction of Contract No. 68-01-6692, Work Assignment Nos. WA28-5 LH2.0 and WA77-5L30.1.

Monitoring well installation and groundwater sampling was also conducted in the spring of 1988 during supplemental predesign investigations. The details of that sampling effort and analytical results are contained in Technical Memorandum No. 2. The analytical results of that effort are also presented in this influent characterization Technical Memorandum.

PURPOSE

The objective of the site sampling program was to acquire data for characterizing site leachate and groundwater. The data will then be used to design bench- and pilot-scale treatability studies for removal of inorganic and organic contaminants. Treatment process definition and sizing will

be developed from the data and treatability studies and used in treatment plant design for the NSL/ECC site.

SCOPE

The scope of the August 1987 groundwater monitoring well and leachate tank sampling effort consisted of:

- Twenty-two groundwater monitoring and observation well samples from five wells
- Six groundwater duplicate samples
- Four groundwater field blanks
- Fifteen leachate tank samples from three tanks
- Two leachate tank duplicate samples
- Two leachate field blanks

Samples were taken daily from the three leachate tanks for 5 consecutive days. Two monitoring wells were sampled daily for 5 consecutive days, and two monitoring wells and one observation well (piezometer) were sampled daily for 4 consecutive days.

PERSONNEL

Jeff Keiser/CH2M HILL was the sampling team leader. Al Sloan/CH2M HILL was the site manager and assisted in the sampling. Jerry Bills/CH2M HILL, Denise Storey/PRC and Ray Mastrolonardo/PRC were members of the sampling team. The site safety coordinator was Marshall Claxton/Black and Veatch. Denise Storey was responsible for sample documentation.

GROUNDWATER MONITORING WELL SAMPLING PROCEDURE

MONITORING WELL SELECTION

CH2M HILL selected monitoring well and observation well (piezometer) locations. The four existing monitoring wells and the observation well that were selected are along the south-southwest perimeter of the site, which lies along the general alignment of the groundwater collection system proposed in the Feasibility Study. Two of the monitoring wells

(NSLMW09S and NSLMW10S) initially selected did not recharge adequately, so they were not sampled. The bailer in the observation well (NSLSBP65) became wedged on the first day, so no sample was obtained. Two other existing monitoring wells (NSLMW13 and ECCMW3A) and another observation well (NSLSBP61) were selected in place of the wells not used.

Alt and Witzig Engineering, Inc. installed three monitoring wells (NSLMW8SA, NSLMW12, and NSLMW13) in 1984 and 1985. Mateco Drilling Company drilled well ECCMW3A in 1983. Atec Associates installed observation well NSLSBP61 in 1982. See Figure 1 for locations and Table 1 for descriptions. Details of well construction can be found in the NSL and ECC Remedial Investigation reports.

WELL SAMPLING EQUIPMENT

A 4-foot-long, 2-inch-diameter stainless steel bailer was used to obtain samples of volatile organic compounds from each well. A peristaltic pump, a diaphragm pump, or a 2-inch stainless steel bailer was used to purge and obtain samples for analysis for conventional water pollutants (BOD_5, COD, total suspended solids, ammonia, etc.), metals, and acid and base/neutral extractable organics. The bottom 5 feet of dedicated Teflon tubing was joined to the flexible tygon tubing attached to the pumps to avoid contamination of water in the wells.

The groundwater level was measured every day before purging the monitoring wells using a "popper" attached to measuring tape. All measurements were made from the top of the well casing.

WELL PURGING

Immediately before sampling, each well was purged using the stainless steel bailer, peristaltic pump, or diaphragm pump. The volume of water in each well was calculated from the total depth of the well and the depth to water surface in the well. At least five well volumes were removed before sampling. Water purged from the shallow wells was spilled onsite as no HNu or OVA readings were above background.

Table 1
GROUNDWATER WELL DESCRIPTIONS
NSL/ECC SITE

Well Number	Depth of Well (ft)	Diameter of Well (in)	Construction Material	Length of Screen (ft)	Primary Screened Unit	Date Installed
NSLMW12	23.0	2	PVC	20	Sand and gravel	12/18/84
NSLMW13	13.5	2	PVC	10	Sand and gravel	12/17/84
NSLMW8SA	18.0	2	PVC	10	Glacial till	03/26/85
ECCMW3A	15.0	2	PVC	5	Sand and gravel	06/14/83
NSLSBP61	25.0	Unknown	Unknown	Unknown	Glacial till	08/13/82

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WELL SAMPLING

Field measurements of pH, temperature, and specific conductance were made for each sample (see Table B-3). A spot test for sulfides conducted in the field to determine the cyanide preservation method was negative for all samples. HNu or OVA organic vapor concentration and HCN vapor were measured in the breathing zone of sampling locations for the safety of the sampling personnel. Samples for VOCs were collected only with the stainless steel bailer. Acid and base/neutral extractable organics, metals, and conventional water pollutants were collected using the stainless steel bailer, peristaltic pump, or diaphragm pump.

All samples were immediately placed on ice to be kept at approximately 4°C. One sample fraction for metal analysis was filtered through a 0.45 um filter. A second sample fraction for metal analysis was not filtered. Sample fractions for metal analysis were preserved with nitric acid to a pH of less than 2 and for cyanide analysis with sodium hydroxide to a pH of more than 12. Sample fractions for COD, TOC, nitrates, TKN, NH_3 and phosphorus were preserved to a pH of less than 2 with sulfuric acid.

DECONTAMINATION

Decontamination procedures included steps to avoid contamination of either the sample or the well and to minimize carryover of contaminants from one well to another. A stainless steel bailer was dedicated to each well to prevent cross contamination. The outside of all sampling equipment used in the wells was decontaminated after each well sampling. Equipment was scrubbed with a trisodium phosphate solution followed by a rinse with 10 percent reagent grade methanol solution mixed with distilled water. The equipment was triple rinsed with distilled water and laid on clean plastic to air dry before reuse.

The peristaltic and diaphragm pumps were decontaminated by running the sequence of decontamination solutions through them after each well sampling.

LEACHATE TANK SAMPLING PROCEDURE

LEACHATE TANK CIRCULATION

Continuous circulation of the leachate tank contents was maintained through a circulation loop. A submersible pump located in the tank below the water surface was used to pump tank contents through flexible tygon tubing. The tubing from the pump exited the tank from the observation/pumpout port of the tank and reentered the tank through the tank vent. The discharge tubing was weighted to keep it submerged. The circulation rate was about 1 gallon per minute (gpm).

LEACHATE TANK GAUGING

The buried leachate tanks were initially emptied the week before sampling to determine approximate fill rate. Each tank was gauged during the week to determine the water level. Because tank dimensions were unknown, the daily infiltration rate was assumed using water level measurements.

LEACHATE TANK SAMPLING EQUIPMENT

A submersible pump (bilge pump type) equipped with tygon flexible tubing was dedicated to each tank and used for recirculation. Samples from leachate tank No. 2 were obtained from the circulation system through a coupling (Teflon T-valve) on the discharge tubing outside the tank. A peristaltic pump equipped with flexible tygon tubing was used to boost samples from leachate tanks Nos. 1 and 3 because opening of the valve caused contents of the circulating line to siphon back into the tank. The pump was connected to the coupling with tygon tubing.

LEACHATE TANK SAMPLING

Field measurements of pH, temperature and specific conductance were made for each sample (see Table B-3). HNu or OVA organic vapor concentration and HCN vapor were measured for the safety of the sampling personnel. Samples from leachate tank No. 2 for organic compounds, metals, and conventional water pollutants were collected by filling the bottles directly from the coupling connected to the discharge tubing outside the tank. Samples from leachate tanks Nos. 1 and 3 were taken at the coupling through the tygon tubing boosted by the peristaltic pump.

All samples were immediately placed on ice. A sample fraction for metal analysis was filtered through a 0.45 um filter; a second was not filtered. Sample fractions for metal analysis were preserved with nitric acid to a pH of less than 2 and for cyanide analysis with sodium hydroxide to a pH of more than 12. Sample fractions for COD, TOC, nitrate, TKN, NH_3 and phosphorus were preserved to a pH of less than 2 with sulfuric acid.

DECONTAMINATION

Decontamination procedures included steps to avoid contamination of either the sample or the tank and to minimize carryover of contaminants from one tank to another. Equipment used for sampling was decontaminated after each tank sampling. Equipment was scrubbed with a trisodium phosphate solution followed by a rinse with a solution of 10 percent reagent grade methanol mixed with distilled water. The equipment was triple rinsed with distilled water and laid on clean plastic to dry before reuse.

A submersible pump and tubing was dedicated to each leachate tank to prevent carryover of contaminants from one tank to another. The peristaltic pumps used to boost samples from leachate tanks Nos. 1 and 3 were decontaminated by running the sequence of decontamination solutions through them after each tank sampling.

SAMPLING CHRONOLOGY

MONDAY, AUGUST 24

Weather Conditions: Calm, sunny, temperature about 80°F.

Sampling Team: Sloan, Keiser, Bills, Storey, Mastrolonardo.

Sample Preparation: Storey.

Site Safety Coordinator: Claxton.

Groundwater Samples Obtained		Leachate Tank Samples Obtained	
Well Number	Sample Number	Tank Number	Sample Number
NSLMW09S	--	1	LT01-01
NSLMW10S	--	2	LT02-01
NSLMW12	MWNSL12-01	3	LT03-01
NSLMW8SA	MWNSL8SA-01		
NSLSBP65	--		

Comments: Monitoring wells NSLMW10S and NSLMW09S did not recharge so they were not sampled. The bailer was wedged in observation well NSLSBP65, so no sample was obtained. All wells and tanks were sampled in level "D" safety attire. No OVA readings above background were detected in the breathing zone.

TUESDAY, AUGUST 25

Weather Conditions: Cloudy skies, rain after 8:15 a.m., temperature in upper 70s.

Sampling Team: Keiser, Bills, Storey, Mastrolonardo.

Sample Preparation: Storey.

Site Safety Coordinator: Claxton.

Groundwater Samples Obtained		Leachate Tank Samples Obtained	
Well Number	Sample Number	Tank Number	Sample Number
NSLMW12	MWNSL12-02	1	LT01-02
NSLMW13	MWNSL13-02	2	LT02-02
NSLMW8SA	MWNSL8SA-02	3	LT03-02
ECCMW3A	MWECC3A-02		
NSLSBP61	MWSBP61-02		

Comments: Wells NSLMW13, ECCMW3A, and NSLSBP61 replaced the wells originally selected. All wells were sampled in level "D" safety attire. No HNu readings (10.2 eV lamp) above background were detected in the breathing zone.

WEDNESDAY, AUGUST 26

Weather Conditions: Humid, drizzle, temperature in upper 70s.

Sampling Team: Sloan, Keiser, Bills, Mastrolonardo.

Sample Preparation: Storey.

Site Safety Coordinator: Claxton.

Groundwater Samples Obtained		Leachate Tank Samples Obtained	
Well Number	Sample Number	Tank Number	Sample Number
NSLMW12	MWNSL12-03	1	LT01-03
NSLMW13	MWNSL13-03	2	LT02-03
NSLMW8SA	MWNSL8SA-03	3	NT03-03
ECCMW3A	MWECC3A-03		
NSLSBP61	MWSBP61-03		

Comments: All wells and tanks were sampled in level "D" safety attire. No HNu readings (10.2 eV lamp) above background were detected in the breathing zone.

THURSDAY, AUGUST 27

Weather Conditions: Cloudy, gusty, temperature in 70s.

Groundwater Sampling Team: Bills, Mastrolonardo.

Leachate Sampling Team: Sloan, Keiser.

Sample Preparation: Storey.

Site Safety Coordinator: Claxton.

Groundwater Samples Obtained		Leachate Tank Samples Obtained	
Well Number	Sample Number	Tank Number	Sample Number
NSLMW12	MWNSL12-04	1	LT01-04
NSLMW13	MWNSL13-04	2	LT02-04
NSLMW8SA	MWNSL8SA-04	3	LT02-04
ECCMW3A	MWECC3A-04		
NSLSBP61	MWSBP61-04		

Comments: All wells and tanks were sampled in level "D" safety attire. No HNu readings (10.2 eV lamp) above background were detected in the breathing zone.

FRIDAY, AUGUST 28

Weather Conditions: Cloudy, drizzle, slight winds, temperature in upper 70s.

Groundwater Sampling Team: Bills, Mastrolonardo.

Leachate Sampling Team: Sloan, Keiser.

Sample Preparation: Storey.

Site Safety Coordinator: Claxton.

Groundwater Samples Obtained		Leachate Tank Samples Obtained	
Well Number	Sample Number	Tank Number	Sample Number
NSLMW12	MWNSL12-05	1	LT01-05
NSLMW13	MWNSL13-05	2	LT02-05
NSLMW8SA	MWNSL8SA-05	3	LT03-05
ECCMW3A	MWECC3A-05		
NSLSBP61	MWSBP61-05		

Comments: All wells and tanks were sampled with level "D" safety attire. No HNu readings (10.2 eV lamp) above background were detected in the breathing zone.

GROUNDWATER AND LEACHATE TANK LEVEL MEASUREMENTS

Groundwater elevations for the monitoring wells are presented in Table 2. Well locations are shown in Figure 1. The dimensions of the three buried leachate tanks are unknown, but according to the landfill owner each tank has a reported capacity of 1,000 gallons.

On Monday, August 24, leachate tank No. 1 was approximately one-quarter full. On Wednesday, August 26, the tank was full and the liquid level was at the bottom of the access pipe. Leachate tank No. 2 was full on August 24, and the liquid level was 1.5 feet above the ground surface in the access pipe. Leachate tank No. 3 was about one-quarter full on August 24. On August 26, the tank was approximately half full. It was still half full on Friday, August 28.

SAMPLE DOCUMENTATION

Samples were packed according to EPA Contract Laboratory Program (CLP) protocol. The chain of custody documentation for samples is summarized in Table A-1. The assigned case number was 7959.

Samples for inorganic analysis were shipped to Rocky Mountain Analytical Laboratory, Inc. (RMAL) in Denver. Samples for conventional pollutant analyses were sent to Indiana State Board of Health (ISBH) in Indianapolis. Samples for organic analysis were shipped to Environmental Monitoring and Services, Inc. (EMSI) laboratory in Camarillo, California. They were either shipped by Federal Express to the assigned contract laboratory on the day of sampling or the next day.

ANALYTICAL RESULTS AND FIELD MEASUREMENTS

Target Compound List (TCL) compounds and their detection limits are listed in Table A-2 and analytical results for groundwater and leachate samples are presented in Appendix B as follows:

- Metals (Table B-1)
- Organic Compounds (Table B-2)
- Conventional pollutants (Table B-3)

For organic compounds, only Target Compound List (TCL) substances that were identified as being present in the samples are listed on the data sheets.

Table 2
GROUNDWATER ELEVATIONS
NSL/ECC SITE

Well Number	Ground Surface Elevation[a] (ft msl)	Groundwater Elevation (ft msl)	Date Recorded
NSLMW12	873.59	871.24	8/24/87
		870.98	8/25/87
		871.06	8/26/87
		871.16	8/27/87
		871.08	8/28/87
NSLMW13	876.05	871.77	8/25/87
		872.00	8/26/87
		871.73	8/27/87
		872.00	8/28/87
NSLMW8SA	881.44	874.37	8/24/87
		874.62	8/26/87
		874.60	8/27/87
		874.51	8/28/87
ECCMW3A	876.47	871.99	8/25/87
		872.20	8/26/87
		872.40	8/27/87
		872.14	8/28/87
NSLSBP61	875.39	870.50	8/25/87
		870.72	8/26/87
		870.74	8/27/87
		870.76	8/28/87

[a]NSL final RI, March 27, 1986, Volume 2 of 2, Technical Memorandum No. 4, Table 3.

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Table B-3 also lists field measurements of pH, temperature, and specific conductance.

SUPPLEMENTAL INVESTIGATION AREA

From April 25 to May 2, 1988, groundwater samples were collected in the area south of the ECC site and southwest of the landfill (Figure 1). Sampling rationale and methodology are presented in Technical Memorandum No. 2. All thirteen of the recently installed wells were sampled as well as one background well (ECC MW1A) and the sump barrel on the ECC concrete pad for metals, volatile organics, acid and base/neutral organics and COD, TDS, TSS, Alkalinity, NH_3 and chloride. Sampling locations are shown in Figure 2. Analytical results for groundwater are presented in Appendix D as follows:

- Metals (Table D-1)
- Organic Compounds (Table D-2)
- Conventional Pollutants (Table D-3)

CHARACTERIZATION OF LEACHATE AND GROUNDWATER

Physical and chemical characteristics of the leachate and groundwater were defined using data in Appendix B and D analyzed by the CLP laboratories and the ISBH laboratory.

For each wastewater stream, maximum, minimum, and average concentrations of TCL metals, organic compounds, and conventional pollutants were calculated using the data obtained from the monitoring wells and leachate tanks. The concentrations given in Appendix C are the highest, lowest, and average concentrations of compounds to be found in the influent of the treatment system. Average concentrations were calculated only when two or more samples of the total number of samples were quantified. In calculation of average concentration, nondetected results at a sampling location (designated as "--") were assumed to be one-half the instrument detection limits (for metals and conventional pollutants) or one-half the CLP contract required detection limits (for organics) where at least two samples of the total and at least one sample from the sampling location showed detection for the element, compound or parameter.

The maximum, minimum, and average concentrations of TCL metals and organic compounds were compared with the effluent dis-

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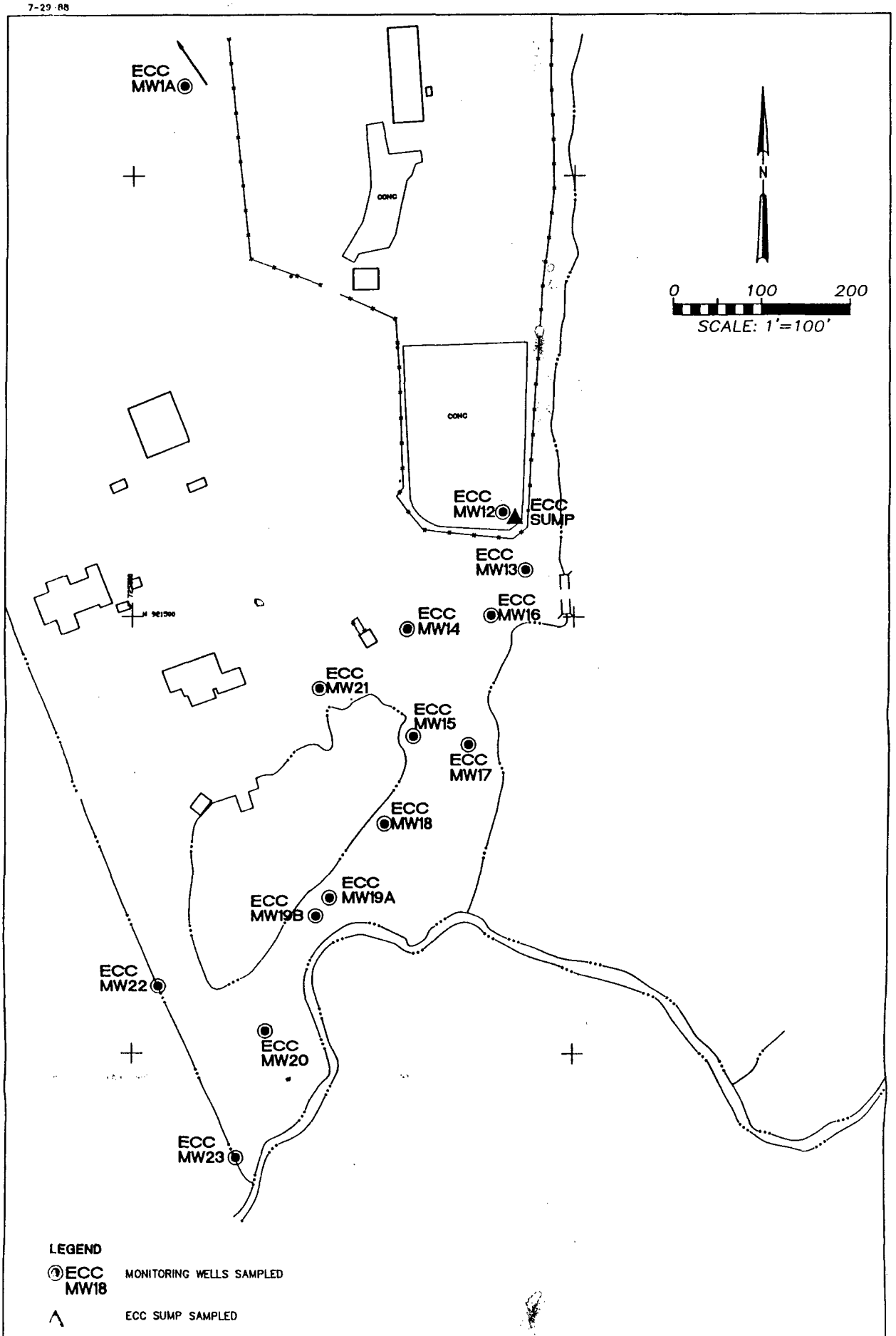

FIGURE 2
SUPPLEMENTAL INVESTIGATION AREA GROUNDWATER SAMPLING LOCATIONS (APRIL, MAY 1988)
NSL/ECC TECH MEMO NO. 1

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charge limits in the proposed State of Indiana Northside Sanitary Landfill National Pollution Discharge Elimination System (NPDES) permit (Appendix E) to define water characteristics and treatment requirements for leachate and groundwater. Since cyanide was not detected above the quantification limit, it is not discussed further.

Conventional pollutant data were compared with the concentration ranges of leachate and untreated domestic wastewater reported in the literature and with discharge limits of the proposed State of Indiana NSL NPDES permit.

The monitoring wells NSLMW12, NSLMW13 and ECCMW3A, NSLSBP61 and NSLMW8SA were selected as representative of groundwater. These wells are located along the general alignment of the groundwater collection system proposed in the Feasibility Study. NSLLT1 and NSLLT2 and NSLLT3 were selected as representative of leachate. For the supplemental investigation area, monitoring wells, ECCMW13, 14, 15, 16, 17, 18, 19A, 19B, 20, 21, 22 and 23 were selected as representatives of groundwater in the area south of ECC. ECCMW12 and ECCSUMP which were also sampled are located in the ECC source area under the concrete pad and not representative of actual groundwater concentrations. ECCMW1A was a background (upgradient) well.

TCL METALS IN LEACHATE AND GROUNDWATER

Metal concentrations are generally lower in the filtered samples with some exceptions. The difference is attributable to the removal of metals associated with suspended solids through filtration, and the digestion of unfiltered samples at a low pH that dissolves metals associated with suspended solids. Data for TCL metals in the leachate and groundwater are presented in Tables B-1 and D-1.

Metal concentrations in leachate and groundwater were compared with proposed NPDES discharge limits (Appendix C). Table 3 lists the concentrations of metals which exceeded the proposed NPDES discharge limits.

In the leachate, six metals (arsenic, chromium, copper, iron, lead, and zinc) were detected above the proposed NPDES criteria in unfiltered samples and four metals in filtered samples (arsenic, chromium, iron, and zinc). In unfiltered groundwater, six metals (arsenic, chromium, copper, iron,

Table 3
METAL CONCENTRATIONS EXCEEDING PROPOSED NPDES PERMIT LIMITS

	Element	NPDES Permit (ug/l) Maximum	NPDES Permit (ug/l) Average	Concentration (ug/l) Maximum	Concentration (ug/l) Minimum	Concentration (ug/l) Average	No. of Samples Detected/Total
UNFILTERED							
LEACHATE[a]							
	Arsenic	0.3	0.2	13	--	7	10/17
	Chromium	18	8	29	6	15	17/17
	Copper	48	21	88	--	18	9/17
	Iron	1,600	710	30,300	12,400	23,127	17/17
	Lead	20	9	27	--	18	16/17
	Zinc	429	184	2,660	62	598	17/17
GROUNDWATER[b]							
	Arsenic	0.3	0.2	45	--	19	21/27
	Chromium	18	8	185	--	46	23/27
	Copper	48	21	486	--	94	19/27
	Iron	1,600	710	286,000	1,330	61,870	27/27
	Lead	20	9	210	--	49	18/27
	Zinc	429	184	2,160	--	401	26/27
GROUNDWATER[c]							
	Arsenic	0.3	0.2	32	--	12	12/15
	Chromium	18	8	286	--	68	14/15
	Copper	48	21	1,660	--	351	14/15
	Iron	1,600	710	944,000	2,950	152,261	15/15
	Lead	20	9	723	--	132	14/15
	Zinc	429	184	2,770	3	582	15/15
FILTERED							
LEACHATE[d]	Arsenic	0.3	0.2	11	--	--	1/17
	Chromium	18	8	25	9	17	17/17
	Iron	1,600	710	11,700	136	4,029	17/17
	Zinc	429	184	1,480	20	221	17/17
GROUNDWATER[e]							
	Arsenic	0.3	0.2	19	--	8	11/27
	Chromium	18	8	14	--	9	26/27
	Iron	1,600	710	13,000	53	2,760	27/27
GROUNDWATER[f]							
	Arsenic	0.3	0.2	24	--	5	9/15
	Chromium	18	8	13	5	9	15/15
	Iron	1,600	710	12,500	172	3,184	14/14

[a]Unfiltered NSLLT1 + NSLLT2 + NSLLT3.
[b]Unfiltered NSLMW12 + NSLMW13 + ECCMW3A + NSLSBP61 + NSLMW8SA.
[c]Unfiltered ECCMW13, 14, 15, 16, 17, 18, 19A, 19B, 20, 21, 22, 23.
[d]Filtered NSLLT1 + NSLLT2 + NSLLT3.
[e]Filtered NSLMW12 + NSLMW13 + ECCMW3A + NSLSBP61 + NSLMW8SA.
[f]Filtered ECCMW13, 14, 15, 16, 17, 18, 19A, 19B, 20, 21, 22, 23

-- Not detected above instrument detection limits.

Maximum (Minimum) = Observed highest (lowest) concentration.

Average values (where there are at least two samples quantified) are calculated assuming nondetected ("---") values in other samples are one-half the instrument detection limits.

NPDES Permit-Proposed State of Indiana NPDES NSL Permit Limits.

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lead, and zinc) were found in concentrations above proposed NPDES discharge limits. In the filtered groundwater arsenic, chromium, and iron exceeded proposed discharge limits. In unfiltered groundwater samples from the supplemental investigation area, arsenic, chromium, copper, iron, lead and zinc exceeded proposed NPDES discharge limits. In the filtered groundwater samples, three metals exceed proposed limits, arsenic, chromium, and iron.

In leachate and groundwater, six metals (arsenic, chromium, copper, iron, lead, and zinc) are assumed to need treatment to meet the proposed discharge limits. The same metals had been identified previously as requiring treatment (see Table 2-4 of NSL/ECC Combined Alternative Analysis Report, December 5, 1986).

TCL ORGANIC COMPOUNDS IN LEACHATE AND GROUNDWATER

Data for TCL organic compounds in the leachate and groundwater are presented in Tables B-2 and D-2. Calculated maximum, minimum, and average concentrations of compounds in leachate and groundwater are tabulated in Table C-2 and compared with proposed NPDES permit discharge limits. Organic compounds in leachate and groundwater requiring treatment are listed in Table 4.

In leachate, two volatile organic compounds and one semi-volatile organic compound were found above the proposed NPDES criteria. They are methylene chloride, benzene, and 4-chloro-3-methylphenol. In groundwater, one volatile organic compounds--vinyl chloride, exceeded the proposed NPDES criteria. In groundwater from the supplemental investigation area, four volatile organic compounds exceed the proposed NPDES criteria--chloroethane, methylene chloride, trichlorothene, and tetrachloroethene.

Target organic compounds to be removed from leachate and groundwater are primarily VOCs: vinyl chloride, chloroethane, methylene chloride, benzene, trichloroethene, and tetrachloroethene and one semi-volatile organic compound 4-chloro-3-methylphenol. Although the frequency of detection of trichloroethene, tetrachloroethene and 4-chloro-3-methylphenol was low (less than 20 percent), they are considered for treatment as they were detected in previous remedial investigations and considered in the NSL/ECC Combined Alternative Analysis Report; December 5, 1986.

Table 4
ORGANIC CONCENTRATIONS EXCEEDING PROPOSED NPDES PERMIT LIMITS

	Compound	NPDES Permit (ug/l) Maximum	NPDES Permit (ug/l) Average	Concentration (ug/l Max.	Concentration (ug/l Min.	Concentration (ug/l Avg.	No. of Samples Detected/ Total
LEACHATE[a]							
Volatiles	Methylene Chloride	89	40	110	--	25	5/17
	Benzene	136	37	270	--	68	7/17
BNAs	4-Chloro-3-Methylphenol	4.4	2.2	15	--	3	3/17
GROUNDWATER[b]							
Volatiles	Vinyl Chloride	268	104	360	--	80	12/24
GROUNDWATER[c]							
Volatiles	Chloroethane	268	104	3,800	--	290	4/16
	Methylene Chloride	89	40	109	--	--	1/16
	Trichloroethene	54	21	11,000	--	1,061	3/16
	Tetrachloroethene	56	22	1,200	--	112	2/16

[a]Unfiltered NSLLT1 + NSLLT2 + NSLLT3.
[b]Unfiltered NSLMW12 + NSLMW13 + ECCMW3A + NSLSBP61 + NSLMW8SA.
[c]Unfiltered ECCMW13, 14, 15, 16, 17, 18, 19A, 19B, 20, 21, 22, and 23.

-- Not detected above method detection limits.

Maximum (Minimum) = Observed highest (lowest) concentration.

Average values (where there are at least two samples quantified) are calculated assuming nondetected ("---") values in other samples are equal to one-half the quantification limits.

NPDES Permit--Proposed State of Indiana NPDES NSL Permit Limits.

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1,1-dichloroethane and 1,2-dichloroethene (total) were also detected in more than 50 percent of the groundwater samples (Table C-2). Average concentrations of these VOCs were in the range of 200 ug/l. Di-n-Butylphthalate was detected in more than 50 percent of the groundwater samples. Bis(2-ethylhexyl) phthalate was also detected in groundwater from the supplemental investigation area. Acetone, 2-butanone, toluene, xylene (total), naphthalene, Di-n-Butylphthalate, and bis-(2-ethylhexyl) phthalate were also found in leachate in more than 40 percent of the samples. These compounds were eliminated from consideration because their proposed NPDES effluent limits have not been determined. If new criteria are applied in the future, treatment of these compounds must be evaluated.

CONVENTIONAL POLLUTANTS

Conventional water quality parameters (including field measurements) of leachate and groundwater were analyzed as follows:

- BOD_5, COD, TOC, TSS, VSS, TDS, TKN, NH_3-N, NO_3 and NO_2-N, total phosphorus, alkalinity, chloride, and sulfate

- pH, temperature, and specific conductance (field parameters)

The data are listed in Table B-3 and D-3. Maximum, minimum, and average concentrations of these constituents in leachate and groundwater are listed in Table C-3. The leachate and groundwater data were compared with 1) the proposed NPDES discharge limits of the State of Indiana, and 2) concentration ranges of conventional pollutants in leachate and untreated domestic wastewater in the literature. Conventional pollutant concentrations exceeding NPDES discharge limits are presented in Table 5.

Since the untreated domestic wastewater generally requires conventional primary (physical-chemical) and secondary (biological) treatment to meet proposed NPDES discharge limits, the comparison with literature value may be used to determine the design of the leachate and groundwater treatment system. The characteristics of leachate and groundwater and their treatment considerations are summarized in Table C-3.

Table 5
CONVENTIONAL WATER POLLUTANT CONCENTRATIONS
EXCEEDING PROPOSED NPDES PERMIT LIMITS

	Parameter	NPDES Permit (mg/l) Maximum	NPDES Permit (mg/l) Average	Concentration (mg/l) Maximum	Concentration (mg/l) Minimum	Concentration (mg/l) Average
LEACHATE[a]						
	BOD_5	20	10	68	10	39
	TSS	24	12	94	34	65
	NH_3-N	3.0	1.5	300	12	203
	Chlorides	373	160	1,280	375	953
GROUNDWATER[b]						
	BOD_5	20	10	46	1.6	20
	TSS	24	12	9,640	4	2,239
	NH_3-N	3.0	1.5	69	1	39
	TP		1.0	6	--	1.2
	Chlorides	373	160	960	4	584
GROUNDWATER[c]						
	TSS	24	12	28,940	27	6,275

[a]Unfiltered NSLLT1 + NSLLT2 + NSLLT3.
[b]Unfiltered NSLMW12 + NSLMW13 + ECCMW3A + NSLSBP61 + NSLMW8SA.
[c]Unfiltered ECCMW12, 13, 14, 15, 16, 17, 18, 19A, 19B, 20, 21, 22, 23.

Maximum (Minimum) = Observed highest (lowest) concentration.

Average values (where there are at least two samples quantified) are calculated assuming nondetected ("___") values in other samples are one-half the instrument detection limits.

-- Not detected above instrument detection limits.

NPDES Permit-Proposed State of Indiana NPDES NSL Permit Limits.

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Leachate

Leachate is in the neutral pH range (pH between 6 and 8 s.u.). Comparison of leachate concentrations with literature values indicates that the NSL landfill leachate is weak compared with other landfill leachates.

Leachate BOD_5 concentration is low compared with untreated domestic wastewater but must still be reduced for discharge. The BOD_5 measurement may be biased low because an acclimated culture was not used for the BOD_5 measurement. The BOD_5 is less than 10 percent of COD and 40 percent of TOC. In typical domestic wastewater, BOD_5 is 40 to 80 percent of COD and 100 to 160 percent of TOC. The low ratios of BOD_5/COD and BOD_5/TOC indicate that the leachate has high concentrations of organic compounds that are not easily biodegraded by standard microbial cultures. Compounds which are relatively resistant to biodegradation are termed refractory compounds.

The leachate is relatively low in TSS and VSS concentrations compared to domestic wastewater but high in TDS. High concentrations of TDS usually correspond to high ion concentrations of metals, chlorides, and sulfates (Tables C-1 and C-3). High TDS level is also correlated to a high specific conductance measurement in the field.

The leachate is high in total Kjeldahl nitrogen (TKN) and ammonia. Since the NH_3 values are similar to the TKN values, it can be concluded that the TKN is mostly ammonia. Ammonia may be a product of anaerobic decomposition of sludge or waste disposed of in the landfill as follows:

$$C\ H\ O\ N + H_2O \xrightarrow[\text{bacteria}]{\text{anaerobic}} CH_4 + CO_2 + NH_3$$

Particular attention must be paid to removal of ammonia from leachate because of its high concentration and stringent proposed NPDES discharge limits (1.5 mg/l).

In situ nitrification of NH_3 to NO_2 and NO_3 in the landfill or groundwater is not occurring because the concentration of NO_2 and NO_3 is very low. If it were occurring, there would be substantial amounts of NO_3 resulting from nitrification of ammonia. This is not unexpected in an anaerobic landfill environment.

High alkalinity (as $CaCO_3$) of the leachate may be partly the result of dissolved carbon dioxide that originated from the general decomposition of waste in the landfill, as shown in the above formula.

Total phosphorus concentration in the leachate is low, suggesting that the supplement of phosphorus as a nutrient for bacterial growth may be necessary to remove organic compounds by biological treatment. However, the proposed NPDES discharge limit for phosphorus (1 mg/l) must be met if phosphorus is added.

Conventional pollutants that must be treated before discharge are BOD_5, TSS, chloride and ammonia (Table 5). Recent proposed NPDES permit limits (Appendix E) will require chloride removal prior to effluent discharge. Chloride removal was not previously considered based on previously proposed discharge limits (memorandum from Brad Gavin to John Buck, April 10, 1987, Appendix E).

Groundwater

Conventional pollutant concentrations in groundwater are lower than in leachate (Table C-3 and 5). The low BOD_5 concentration in the groundwater is less than 10 percent of COD and 40 percent of TOC based on average concentrations. As in the case of leachate, the groundwater appears to be high in refractory organic compounds that are not biodegraded during the 5-day BOD measurement. As previously stated, the BOD_5 measurement may be low as an acclimated culture was not used in the BOD_5 measurement.

The unusually high TSS and VSS concentrations should be verified before treatment facilities are designed because they might have been caused by improper well development.

Average TKN and ammonia concentrations ranged from 40 to 60 mg/l. As in leachate, ammonia is the major fraction of TKN. Ammonia was not nitrified to NO_2 and NO_3. The maximum phosphorus concentration in groundwater is higher than that in leachate and exceeds the discharge limit. Phosphorus and chloride removal will be required to meet the discharge limit.

TREATMENT CONSIDERATIONS OF LEACHATE AND GROUNDWATER

Leachate and groundwater must be treated to meet the effluent discharge limits set in the proposed State of Indiana NPDES

permit for discharge to Finley Creek. The initial combined flow rate from the leachate and groundwater collection system was estimated to be 100 gpm, with 40 gpm from the leachate collection system. The impermeable cap over the landfill will reduce infiltration so that within 5 years, the flow is expected to decrease to about 65 gpm due to a reduction in leachate generation to 5 gpm. The ROD selected an onsite treatment system, consisting primarily of a metal precipitation and a powdered activated carbon treatment (PACT®) system, as the remedial action for leachate and groundwater (Figure 3). The actual treatment system will be developed through bench- and pilot-scale testing during the predesign investigations for the final remedial action.

A conceptual treatment process train was developed to plan bench- and pilot-scale testings and to discuss the future actual treatment plant design. The processes to be considered for leachate and groundwater treatment at the NSL/ECC site are summarized in Table 6. Bench-scale precipitation tests (jar tests) are proposed for metals and pilot-scale tests are proposed for TCL organic compounds and conventional water pollutants. Treatment systems, including the PACT system, will be reevaluated based on the metal precipitation data. Following reevaluation, the system for pilot testing will be designed and implemented at the site.

TCL METALS

Target compounds in leachate and groundwater requiring treatment to meet the discharge limits are arsenic (As), chromium (Cr), copper (Cu), iron (Fe), lead (Pb), and zinc (Zn). These heavy metals can be removed from wastewater through chemical precipitation, coagulation/flocculation, complexation, ion exchange, and membrane operations (reverse osmosis and ultrafiltration). The most widely used process is chemical precipitation using hydroxide, carbonate, or sulfide ions. Hydroxide precipitation using lime is most widely used because it is relatively simple and inexpensive. However, it is slow and incomplete for lead, and the solubility of some metals (such as zinc) is too high to meet stringent proposed discharge limits.

Sulfide precipitation is an effective alternative to hydroxide precipitation. Two processes exist for sulfide precipitation for heavy metals: insoluble sulfide precipitation (ISP), and soluble sulfide precipitation (SSP). The difference between the two lies in how the sulfide is introduced

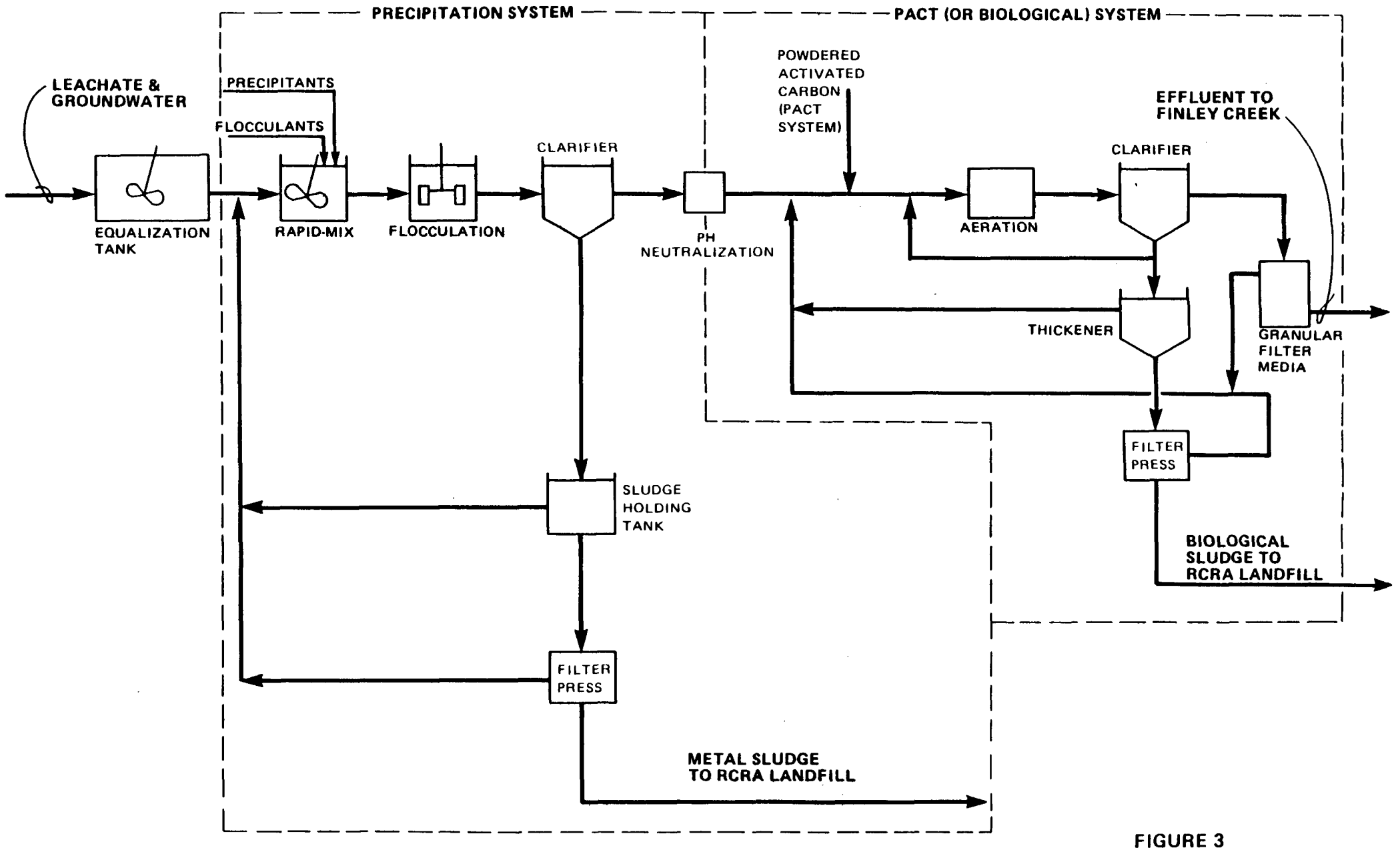

FIGURE 3
ONSITE WASTEWATER TREATMENT SYSTEM
NSL/ECC TECH MEMO NO. 1

Table 6
REMEDIAL TECHNOLOGIES FOR LEACHATE AND GROUNDWATER TREATMENT

Compounds	Applicable Technologies	Technologies Under Consideration
METALS		
Arsenic, Copper, Chromium, Iron, Lead, Zinc	Chemical precipitation (hydroxide, carbonate, sulfide) Coagulation/flocculation Complexation Activated carbon adsorption Ion exchange Reverse osmosis Ultrafiltration	Hydroxide precipitation by lime addition/coagulation/flocculation Sulfide precipitation by ferrous sulfide addition/coagulation/flocculation Co-precipitation by hydroxide and sulfide precipitation/coagulation/flocculation
ORGANIC COMPOUNDS		
Chloroethane, Methylene chloride, Benzene, Trichloroethene, Vinyl chloride, Tetrachloroethene, 4-chloro-3-methyl-phenol	Air stripping Steam stripping Carbon adsorption Ozonation Biological treatment PACT system	Air stripping PACT system Biological treatment Activated carbon adsorption
CONVENTIONAL POLLUTANTS		
BOD_5	Activated carbon adsorption Activated sludge Aerated lagoon Trickling filter RBC, PACT system, SBR, Digester Anaerobic treatment Thermal destruction	PACT system Activated sludge Aerated lagoon Activated carbon adsorption
TSS	Chemical precipitation Coagulation Filtration Floatation Biological treatment with clarification	TSS removal depends on the technologies of metal and BOD_5 removal.
Ammonia	Biological treatment Ion exchange Air stripping	Biological treatment Air stripping Ion exchange
Chlorides	Reverse osmosis Ion exchange	Reverse osmosis Ion exchange

Note: Precipitation processes include sedimentation.

PACT--Powdered Activated Carbon Treatment
RBC--Rotating Biological Contactor
SBR--Sequential Batch Reactor

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into the wastewater. In the ISP process, a slightly soluble ferrous sulfide (FeS) slurry is added to the wastewater to supply the sulfide ions for precipitation. In the SSP process, sulfide is added in the form of a water soluble sulfide reagent, such as sodium sulfide (Na_2S) or sodium hydrosulfide (NaHS).

An advantage of sulfide precipitation is the high degree of metal removal, even at low pH (pH 2 to 3). The ISP process also removes hexavalent chromium by reducing it to the trivalent form. A disadvantage of sulfide precipitation is the potential for generation of H_2S gas, although H_2S generation can be minimized in the ISP process.

The following precipitation techniques are proposed for removal of metals from leachate and groundwater:

- Hydroxide precipitation by lime addition, coagulation and flocculation
- Sulfide precipitation using ferrous sulfide, coagulation and flocculation
- Co-precipitation using hydroxide and sulfide, coagulation and flocculation

The ISP process is recommended because it would minimize generation of hydrogen sulfide gas. Co-precipitation by hydroxide and sulfide precipitation is being considered for concurrent removal of low-level metals by sulfide and hydroxide precipitation of high-concentration metals. Expected removals from the literature with hydroxide precipitation for As, Cr, Cu, Fe, Pb and Zn range from 49 to >99 percent. With sulfide precipitation, expected removals for these metals range from >98 to >99 percent. Percent removal is dependent on the pH of the wastewater as well as the valence form of the ion.

Coagulation and flocculation, which pertain to charge neutralization and agglomeration of the destabilized particles, are techniques for better separation of the precipitate. The insoluble fractions of certain metals can be captured in sludge by sequential coagulation and flocculation. Alum is frequently used as a coagulant, and a polymer is used as a flocculant aid. Coagulation and flocculation also simultaneously remove BOD_5, suspended solids, and total phosphorus

from the wastewater when metal reduction occurs. The technology best applicable to the site will be selected following completion of bench-scale testing for the proposed techniques, as well as determination of percent removal of the various metals.

Complex formation between metals and inorganic or organic compounds may occur in leachate and groundwater. For example, copper and ammonia may form amine copper complexes such as $Cu(NH_3)^{2+} \cdots Cu(NH_3)_5^{2+}$. Complexes modify metal species in solution, generally reducing the free metal ion concentration so that effects and properties that depend on free metal ion concentration are altered. The metal concentrations of leachate and groundwater from the CLP are total concentrations in which complexation has not been considered. Although chelation of metals by ammonia or organics makes metal precipitation difficult or impossible, all metal concentrations have been assumed to be free metals. Bench-scale precipitation tests will examine the effect of complexation. If the effect of complexation is a significant factor in precipitation, different metal precipitants or treatment process options or systems will be considered.

TCL ORGANIC COMPOUNDS

Target organic compounds requiring treatment in leachate and groundwater are primarily VOCs: chloroethane, vinyl chloride, methylene chloride, benzene, trichloroethene and tetrachloroethene, and one semivolatile compound, 4-chloro-3-methylphenol. Treatment options for removing organic compounds include:

- Air stripping
- Carbon adsorption
- Biological treatment
- PACT biological system

Air stripping is a well-established process in which large volumes of air are mixed with contaminated water in a packed tower. Since the process is effective and cost-effective and the equipment is durable, it is recommended for leachate and groundwater treatment. Depending on the concentration of VOCs in the discharge air, additional treatment with carbon scrubbers may be required to clean the off-gas.

Carbon adsorption is a separation technique for removing dissolved organic compounds from leachate and contaminated

groundwater. Leachate passes through beds of granular activated carbon and contaminants adsorbed from the leachate onto the carbon surface are held by physical/chemical forces. Because the adsorption forces are relatively weak, the carbon surface can be regenerated.

Biological treatment systems, such as the activated sludge process, have successfully treated such volatile chlorinated organic compounds as methylene chloride. The performance of the system in removing organic compounds is related to the degree of acclimation of the biomass.

The patented PACT process (Zimpro, Inc.) involves the controlled addition of powdered activated carbon to the aeration tank of a conventional activated sludge system. Organic compounds are removed through a combination of biological oxidation/assimilation and physical adsorption. The PACT process has been shown to remove up to 93-99 percent of the volatile organics such as benzene, methylene chloride, chloroethane, trichloroethene and tetrachloroethene. A greater than 99 percent removal has been shown for total phenols. The percent removal of the organic compounds will be determined in the pilot studies.

CONVENTIONAL POLLUTANTS

The leachate and groundwater characteristics and their treatment considerations are discussed in terms of the conventional water quality parameters in Table C-3. BOD_5, TSS, ammonia, chloride and total phosphorus levels must be reduced before the treatment system effluent can be discharged to Finley Creek (see Table 5). Since total phosphorus is detected in relatively low concentrations in groundwater and can be removed simultaneously by precipitation, its removal is not considered further.

Organic compounds in leachate and groundwater were measured by BOD_5, COD, and TOC. Although the BOD_5 concentration is relatively low, the leachate and groundwater require treatment to a low concentration (10 mg/l). Low ratios of BOD_5/COD and BOD_5/TOC indicate that easily biodegradable organics measured in BOD_5 make up a small portion of the total organics. Most of the organics are refractory and could not be measured as BOD during the 5-day incubation period because an acclimated culture was not used in the BOD_5 test. To

enhance the biological removal of refractory organic compounds, an acclimated culture capable of degrading these compounds will be required.

There are many well-established physical-chemical and biological technologies for BOD removal in wastewater (see Table 7). The ROD selected the PACT system as a potentially feasible treatment technology for leachate and groundwater. The system was considered to be effective for influent that is low in BOD_5 concentration and high in refractory organic compounds.

Use of the PACT system will be reconsidered because the system was selected initially on the basis of Remedial Investigation data only. More data are now available for defining influent characteristics and treatment options for leachate and groundwater from the predesign investigations performed during August 1987 and in April and May 1988. Parameters such as ammonia were not considered during the selection of the treatment system in the Feasibility Study because data was not available. Other systems (activated carbon, activated sludge, aerated lagoon) need to be evaluated for their effectiveness in reducing both BOD_5 and ammonia.

If a biological system is used, it must be supplemented with such nutrients as phosphorus, potassium, or trace metals for balanced biological growth in the system. Ammonia is not required because of its high concentration in the influent.

The metal precipitation method will affect the selection of the subsequent treatment system for conventional pollutants. Precipitation followed by sedimentation may remove up to 25 percent of the BOD_5 and 40 to 70 percent of suspended solids, as well as metals.

Total suspended solids will be removed through the metal precipitation and downstream processes. Filtration may be necessary before discharge to surface water if the effluent cannot reliably meet the discharge limits of the proposed NPDES permit for TSS (12 mg/l). The unusually high TSS concentrations in the groundwater should be verified before the treatment plant is designed because the high concentration may have been the result of improper well development.

The stringent ammonia discharge limits (1.5 mg/l) will require the careful selection of a treatment process. Ammonia can

be removed by nitrification in the biological system, ion exchange, or air stripping.

If ammonia is removed by nitrification, the processes of carbon oxidation and nitrification may be separated or combined into a single process. A high concentration of alkalinity in the leachate and groundwater may be beneficial for nitrification because it is consumed in the oxidation of ammonia to nitrate (8 to 9 mg of alkalinity is required to oxidize 1 mg of ammonia).

Ion exchange processes using resins such as clinoptilolite can treat ammonia to low levels. Because of its high operating cost, ion exchange is generally used only as a polishing step when treated wastewater does not meet discharge limits.

Air stripping removes the ammonia from the wastewater and discharges it to the air. The air stripping tower would be installed ahead of the biological treatment system because it alone cannot treat ammonia to the discharge limit. Residual ammonia escaping from the air stripping process would be removed by nitrification in the subsequent biological treatment. The air stripping tower would remove organics from the wastewater simultaneously with ammonia.

As a final step, it may be necessary to remove chloride before discharge with an exchange process or by reverse osmosis. Dilution with chloride free water may also be used to reduce final effluent chloride concentrations.

CONCLUSIONS

The elements and compounds which need to be treated to meet the proposed NPDES permit discharge limits are arsenic, chromium, copper, iron, lead, zinc, methylene chloride, vinyl chloride, benzene, 4-chloro-3 methylphenol, chloroethane, trichlorethene, and tetrachlorothene. BOD_5, TSS, ammonia, phosphorus, and chloride levels will also need to be reduced to meet the proposed NPDES discharge limits. Bench scale studies for metal precipitation which will be developed will clarify further the conceptual treatment process train proposed in the feasibility study. For example, the percent removal of BOD_5, TSS and phosphorus in the metal precipitation step will determine the following necessary treatment process. Also, the effect of complexation of metals will be examined.

Ammonia and chloride removal, which were not considered in the feasibility study also need to be evaluated. Nitrification of ammonia in the biological system may not reduce ammonia to the necessary effluent discharge limits. An air stripper or ion exchange system may be necessary to reduce ammonia to the proposed NPDES discharge limits. Chloride removal by ion exchange or reverse osmosis may be required.

At present, the proposed biological PACT process appears to be viable treatment process for organic and BOD_5 reduction. It is possible that an standard activated sludge system may be sufficient. Treatment systems, including the PACT system will be reevaluated based on the bench scale precipitation studies. Following reevaluation, pilot studies will be defined.

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Appendix A
SAMPLE IDENTIFICATION MATRIX AND TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTIFICATION LIMITS

Table A-1--Groundwater and Leachate Sample Identification Matrix

Table A-2--Target Compound List (TCL) and Contract Required Quantification Limits (CRQL)

TABLE A-1. GROUNDWATER AND LEACHATE SAMPLE IDENTIFICATION MATRIX
NSL/ECC SITE

SAMPLE NUMBER	DATE SAMPLED	DATE SHIPPED	LAB SERVICE	AIRBILL NUMBER	ITR UNFILTERED	ITR FILTERED	OTR	CONTROL NUMBER	CHAIN OF CUSTODY
NSL-MWNSL12-01	08/24/87	08/25/87	RMAL	4969054252	MEB290				509073
		08/26/87	RMAL	4969054263		MEI704			509078
		08/25/87	EMSI	4969054285			EL502		509076
		08/25/87	ISBH					C2606	
NSL-MWNSL12-02	08/25/87	08/25/87	RMAL	4969054252	MEB301				509073
		08/26/87	RMAL	4969054263		MEI712			509078
		08/25/87	EMSI	4969054285			EL513		509075
		08/25/87	ISBH					C2611	
NSL-MWNSL12-03	08/26/87	08/26/87	RMAL	4969054226	MEC780	MEI730			509077
			EMSI	4969054230			EL538		509081
			ISBH					C2624	504832
NSL-MWNSL12-04	08/27/87	08/27/87	RMAL	4969054204	MEC791	MEG984			504906
			EMSI	4969054145			EL549		509082
			ISBH					C2635	
NSL-DMWNSL12-04	08/27/87	08/27/87	RMAL	4969054204	MEK337	MEG989			504906
			EMSI	4969054145			EL520		509082
			ISBH					C2637	
NSL-MWNSL12-05	08/28/87	08/28/87	RMAL	4969054171	MEK343	MEG994			509085
			EMSI	4969054182			EL526		509086
			ISBH					C2653	
NSL-MWNSL13-02	08/25/87	08/25/87	RMAL	4969054252	MEB299				509074
		08/26/87	RMAL	4969054263		MEI713			509078
		08/25/87	EMSI	4969054274			EL511		509083
		08/25/87	ISBH					C2619	
NSL-DMWNSL13-02	08/25/87	08/25/87	RMAL	4969054252	MEB306				509074
		08/26/87	RMAL	4969054263		MEI714			509078
		08/25/87	EMSI	4969054274			EL532		509083
		08/25/87	ISBH					C2620	
NSL-MWNSL13-03	08/26/87	08/26/87	RMAL	4969054226	MEC779	MEI729			509077
			EMSI	4969054230			EL537		
			ISBH					C2623	504832
NSL-DMWNSL13-03	08/26/87	08/26/87	RMAL	4969054226	MEC785	MEI728			509077
			ISBH					C2629	504832
NSL-MWNSL13-04	08/27/87	08/27/87	RMAL	4969054204	MEC789	MEG982			504906
			EMSI	4969054134			EL547		509088
			ISBH					C2634	
NSL-MWNSL13-05	08/28/87	08/28/87	RMAL	4969054171	MEK342	MEG993			509085
			EMSI	4969054182			EL525		509086
			ISBH					C2652	
NSL-MWECC3A-02	08/25/87	08/25/87	RMAL	4969054252	MEB300				509073
		08/26/87	RMAL	4969054263		MEI711			509078
		08/25/87	EMSI	4969054274			EL512		509083
		08/25/87	ISBH					C2617	
NSL-MWECC3A-03	08/26/87	08/26/87	RMAL	4969054226	MEB310	MEI727			509077
			EMSI	4969054230			EL556		
			ISBH					C2622	504832
NSL-MWECC3A-04	08/27/87	08/27/87	RMAL	4969054204	MEC790	MEG983			504906
			EMSI	4969054134			EL548		509088
			ISBH					C2633	

TABLE A-1. GROUNDWATER AND LEACHATE SAMPLE IDENTIFICATION MATRIX
NSL/ECC SITE

SAMPLE NUMBER	DATE SAMPLED	DATE SHIPPED	LAB SERVICE	AIRBILL NUMBER	ITR UNFILTERED	ITR FILTERED	OTR	CONTROL NUMBER	CHAIN OF CUSTODY
NSL-MWECC3A-05	08/28/87	08/28/87	RMAL	4969054171	MEK341	MEG992			509085
			EMSI	4969054193			EL524		509087
			ISBH					C2651	
NSL-MWSBP61-02	08/25/87	08/25/87	RMAL	4969054252	MEB302				509073
		08/26/87	RMAL	4969054263		MEI715			509078
		08/25/87	EMSI	4969054274			EL514		509083
		08/25/87	ISBH					C2612	
NSL-DMWSBP61-02	08/25/87	08/25/87	EMSI	4969054274			EL554		
NSL-MWSBP61-03	08/26/87	08/26/87	RMAL	4969054226	MEC781	MEI731			509077
			EMSI	4969054241			EL539		509081
			ISBH					C2625	504832
NSL-MWSBP61-04	08/27/87	08/27/87	RMAL	4969054204	MEB311	MEG985			504906
			EMSI	4969054145			EL516		509082
			ISBH					C2636	
NSL-MWSBP61-05	08/28/87	08/28/87	RMAL	4969054171	MEK344	MEG968			509085
			EMSI	4969054193			EL527		509087
			ISBH					C2664	
NSL-DMWSBP61-05	08/28/87	08/28/87	RMAL	4969054171	MEG967	MEG995			509085
			EMSI	4969054193			EL551		509087
			ISBH					C2668	
NSL-MWNSL8SA-01	08/24/87	08/25/87	RMAL	4969054252	MEB286				509073
		08/26/87	RMAL	4969054263		MEI701			509078
		08/25/87	EMSI	4969054285			EL499		509076
		08/25/87	ISBH					C2604	
NSL-DMWNSL8SA-01	08/24/87	08/25/87	RMAL	4969054252	MEB295				509073
		08/26/87	RMAL	4969054263		MEI703			509078
		08/25/87	EMSI	4969054285			EL553		509076
NSL-MWNSL8SA-02	08/25/87	08/25/87	RMAL	4969054252	MEB298				509074
		08/26/87	RMAL	4969054263		MEI710			509078
		08/25/87	EMSI	4969054285			EL510		509075
		08/25/87	ISBH					C2618	
NSL-DMWNSL8SA-02	08/25/87	08/25/87	EMSI	4969054285			EL555		509075
NSL-MWNSL8SA-03	08/26/87	08/26/87	RMAL	4969054226	MEB309	MEI726			509077
			EMSI	4969054241			EL535		509081
			ISBH					C2621	504832
NSL-MWNSL8SA-04	08/27/87	08/27/87	RMAL	4969054204	MEC788	MEG981			504906
			EMSI	4969054134			EL546		509088
			ISBH					C2632	
NSL-MWNSL8SA-05	08/28/87	08/28/87	RMAL	4969054171	MEK340	MEG991			509085
			EMSI	4969054193			EL523		509087
			ISBH					C2650	
NSL-FBMW99-01	08/24/87	08/25/87	RMAL	4969054252	MEB296				509073
		08/26/87	RMAL	4969054263		MEI709			509078
		08/25/87	EMSI	4969054285			EL508		509075
		08/25/87	ISBH					C2609	
NSL-FBMW99-02	08/25/87	08/25/87	RMAL	4969054252	MEB307				509074
		08/26/87	RMAL	4969054263		MEI720			509079
		08/25/87	EMSI	4969504285			EL533		509075
		08/25/87	ISBH					C2610	

TABLE A-1. GROUNDWATER AND LEACHATE SAMPLE IDENTIFICATION MATRIX
NSL/ECC SITE

SAMPLE NUMBER	DATE SAMPLED	DATE SHIPPED	LAB SERVICE	AIRBILL NUMBER	ITR UNFILTERED	ITR FILTERED	OTR	CONTROL NUMBER	CHAIN OF CUSTODY
NSL-FBMW99-03	08/26/87	08/26/87	RMAL	4969054226	MEI732	MEG966			509077
			EMSI	4969054241			EL544		509081
			ISBH					C2631	504832
NSL-FBMW99-04	08/27/87	08/27/87	RMAL	4969054204	MEK338	MEG980			504906
			EMSI	4969054145			EL521		509082
			ISBH					C2638	
NSL-LT01-01	08/24/87	08/25/87	RMAL	4969054252	MEB292				509073
		08/26/87	RMAL	4969054263		MEI705			509078
		08/25/87	EMSI	4969054285			EL504		509076
		08/25/87	ISBH					C2607	
NSL-DLT01-01	08/24/87	08/25/87	RMAL	4969054252	MEB297				509073
		08/26/87	RMAL	4969054263		MEI706			509078
		08/25/87	EMSI	4969054285			EL509		509076
NSL-LT01-02	08/25/87	08/25/87	RMAL	4969054252	MEB303				509073
		08/26/87	RMAL	4969054263		MEI716			509078
		08/25/87	EMSI	4969054274			EL515		509083
		08/25/87	ISBH					C2615	
NSL-LT01-03	08/26/87	08/26/87	RMAL	4969054226	MEC782	MEI723			509077
			EMSI	4969054241			EL540		509081
			ISBH					C2626	504832
NSL-LT01-04	08/27/87	08/27/87	RMAL	4969054204	MEB312	MEG986			504906
			EMSI	4969054215			EL517		509089
			ISBH					C2640	
NSL-LT01-05	08/28/87	08/28/87	RMAL	4969054171	MEK345	MEG996			509085
			EMSI	4969054182			EL528		509086
			ISBH					C2665	
NSL-LT02-01	08/24/87	08/25/87	RMAL	4969054252	MEB293				509073
		08/26/87	RMAL	4969054263		MEI707			509078
		08/25/87	EMSI	4969054285			EL505		509076
		08/25/87	ISBH					C2605	
NSL-LT02-02	08/25/87	08/25/87	RMAL	4969054252	MEB304				509073
		08/26/87	RMAL	4969054263		MEI717			509079
		08/25/87	EMSI	4969054285			EL530		509075
		08/25/87	ISBH					C2614	
NSL-LT02-03	08/26/87	08/26/87	RMAL	4969054226	MEC783	MEI722			509077
			EMSI	4969054230			EL541		
			ISBH					C2627	504832
NSL-DLT02-03	08/26/87	08/26/87	RMAL	4969054226	MEC787	MEI725			509077
			EMSI	4969054230			EL545		
			ISBH					C2630	504832
NSL-LT02-04	08/27/87	08/27/87	RMAL	4969054204	MEB313	MEG987			504906
			EMSI	4969054215			EL518		509089
			ISBH					C2641	
NSL-LT02-05	08/28/87	08/28/87	RMAL	4969054171	MEK472	MEG997			509085
			EMSI	4969054182			EL529		509086
			ISBH					C2666	

TABLE A-1. GROUNDWATER AND LEACHATE SAMPLE IDENTIFICATION MATRIX
NSL/ECC SITE

SAMPLE NUMBER	DATE SAMPLED	DATE SHIPPED	LAB SERVICE	AIRBILL NUMBER	ITR UNFILTERED	ITR FILTERED	OTR	CONTROL NUMBER	CHAIN OF CUSTODY
NSL-LT03-01	08/24/87	08/25/87	RMAL	4969054252	MEB294				509073
		08/26/87	RMAL	4969054263		MEI708			509078
		08/25/87	EMSI	4969054285			EL506		509075
		08/25/87	ISBH					C2613	
NSL-LT03-02	08/25/87	08/25/87	RMAL	4969054252	MEB305				509073
		08/26/87	RMAL	4969054263		MEI718			509079
		08/25/87	EMSI	4969054274			EL531		509083
		08/25/87	ISBH					C2616	
NSL-LT03-03	08/26/87	08/26/87	RMAL	4969054226	MEC784	MEI724			509077
			EMSI	4969054230			EL542		509081
			ISBH					C2628	504832
NSL-LT03-04	08/27/87	08/27/87	RMAL	4969054204	MEB314	MEG988			504906
			EMSI	4969054215			EL519		509089
			ISBH					C2642	
NSL-LT03-05	08/28/87	08/28/87	RMAL	4969054171	MEK473	MEG998			509085
			EMSI	4969054182			EL550		509086
			ISBH					C2667	
NSL-FBLT99-01	08/24/87	08/25/87	ISBH					C2608	
NSL-FBLT99-02	08/25/87	08/25/87	RMAL	4969054252	MEB308				509074
		08/26/87	RMAL	4969054263		MEI719			509079
		08/25/87	EMSI	4969054285			EL534		509075
NSL-FBLT99-03	08/27/87	08/27/87	RMAL	4969054204	MEK339	MEG990			504906
			EMSI	4969054215			EL522		509089
			ISBH					C2639	

OTR = ORGANIC TRAFFIC REPORT
ITR = INORGANIC TRAFFIC REPORT
RMAL = ROCKY MOUNTAIN ANALYTICAL LABORATORY
EMSI = ENVIRONMENTAL MONITORING AND SERVICES, INC.
ISBH = INDIANA STATE BOARD OF HEALTH

Appendix A-2

TARGET COMPOUND LIST AND
CONTRACT REQUIRED QUANTIFICATION LIMITS (Page 1 of 4)

Volatiles	CAS Number	Quantification Limits Low Concentration Analysis[a] Water (ug/l)	Soil/Sediment[b] (ug/kg)
1. Chloromethane	74-87-3	10	10
2. Bromomethane	74-83-9	10	10
3. Vinyl Chloride	75-01-4	10	10
4. Chloroethane	75-00-3	10	10
5. Methylene Chloride	75-09-2	5	5
6. Acetone	67-64-1	10	10
7. Carbon Disulfide	75-15-0	5	5
8. 1,1-Dichloroethene	75-34-4	5	5
9. 1,1-Dichloroethane	75-35-3	5	5
10. 1,2-Dichloroethene (total)	540-59-0	5	5
11. Chloroform	67-66-3	5	5
12. 1,2-Dichloroethane	107-06-2	5	5
13. 2-Butanone	78-93-2	10	10
14. 1,1,1-Trichloroethane	71-55-6	5	5
15. Carbon Tetrachloride	56-23-5	5	5
16. Vinyl Acetate	108-05-4	10	10
17. Bromodichloromethane	75-27-4	5	5
18. 1,1,2,2-Tetrachloroethane	79-34-5	5	5
19. 1,2-Dichloropropane	78-87-5	5	5
20. Cis-1,3-Dichloropropene	10061-02-5	5	5
21. Trichloroethene	79-01-6	5	5
22. Dibromochloromethane	124-48-1	5	5
23. 1,1,2-Trichloroethane	79-00-5	5	5
24. Benzene	71-43-2	5	5
25. Trans-1,3-Dichloropropene	10061-01-6	5	5
26. Bromoform	75-25-2	5	5
27. 2-Hexanone	591-78-6	10	10
28. 4-Methyl-2-pentanone	108-10-1	10	10
39. Tetrachloroethene	127-18-4	5	5
30. Toluene	108-88-3	5	5
31. Chlorobenzene	108-90-7	5	5
32. Ethyl Benzene	100-41-4	5	5
33. Styrene	100-42-5	5	5
34. Xylenes (total)	133-02-7	5	5
Semivolatiles			
35. Phenol	108-95-2	10	330
36. bis(2-Chloroethyl)ether	111-44-4	10	330
37. 2-Chlorophenol	95-57-8	10	330
38. 1,3-Dichlorobenzene	541-73-1	10	330
39. 1,4-Dichlorobenzene	106-46-7	10	330
40. Benzyl Alcohol	100-51-6	10	330
41. 1,2-Dichlorobenzene	95-50-1	10	330
42. 2-Methylphenol	95-48-7	10	330
43. bis(2-Chloroisopropyl)ether	39638-32-9	10	330

Note: Specific quantification limits are highly matrix dependent. The quantification limits listed herein are provided for guidance and may not always be achievable.

[a]Quantification limits listed for soil/sediment are based on wet weight. The quantification limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

[b]Medium Soil/Sediment Contract Required Quantification Limits (CRQL) for Volatile TCL Compounds are 100 times the individual Low Soil/Sediment CRQL; for semivolatile TCL compounds they are 60 times the individual Low Soil/Sediment CRQL.

Semivolatiles (Continued)	CAS Number	Quantification Limits Low Concentration Analysis[a] Water (ug/l)	Soil/Sediment[b] (ug/kg)
44. 4-Methylphenol	106-44-5	10	330
45. N-Nitroso-Dipropylamine	621-64-7	10	330
46. Hexachloroethane	67-72-1	10	330
47. Nitrobenzene	98-95-3	10	330
48. Isophorone	78-59-1	10	330
49. 2-Nitrophenol	88-75-5	10	330
50. 2,4-Dimethylphenol	105-67-9	10	330
51. Benzoic Acid	65-85-0	50	1,600
52. bis(2-Chloroethoxy)methane	111-91-1	10	330
53. 2,4-Dichlorophenol	120-83-2	10	330
54. 1,2,4-Trichlorobenzene	120-82-1	10	330
55. Naphthalene	91-20-3	10	330
56. 4-Chloroaniline	106-47-8	10	330
57. Hexachlorobutadiene	87-68-3	10	330
58. 4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10	330
59. 2-Methylnaphthalene	91-57-6	10	330
60. Hexachlorocyclopentadiene	77-47-4	10	330
61. 2,4,6-Trichlorophenol	88-06-2	10	330
62. 2,4,5-Trichlorophenol	95-95-4	50	1,600
63. 2-Chloroanapthalene	91-58-7	10	330
64. 2-Nitroaniline	88-74-4	50	1,600
65. Dimethyl Phthalate	131-11-3	10	330
66. Acenaphthylene	208-96-8	10	330
67. 2,6-Dinitrotoluene	606-20-2	10	330
68. 3-Nitroaniline	99-09-2	50	1,600
69. Acenaphthene	83-32-9	10	330
70. 2,4-Dinitrophenol	51-28-5	50	1,600
71. 4-Nitrophenol	100-02-7	50	1,600
72. Dibenzofuran	132-64-9	10	330
73. 2,4-Dinitrotoluene	121-14-2	10	330
74. Diethylphthalate	84-66-2	10	330
75. 4-Chlorophenyl Phenyl ether	7005-72-3	10	330
76. Fluorene	86-73-7	10	330
77. 4-Nitroaniline	100-01-6	50	1,600
78. 4,6-Dinitro-2-methylphenol	534-52-1	50	1,600
79. N-nitrosodiphenylamine	86-30-6	10	330
80. 4-Bromophenyl Phenyl ether	101-55-3	10	330
81. Hexachlorobenzene	118-74-1	10	330
82. Pentachlorophenol	87-86-5	50	1,600
83. Phenanthrene	85-01-8	10	330
84. Anthracene	120-12-7	10	330
85. Di-n-butylphthalate	84-74-2	10	330
86. Fluoranthene	206-44-0	10	330
87. Pyrene	129-00-0	10	330
88. Butyl Benzyl Phthalate	85-68-7	10	330

Note: Specific quantification limits are highly matrix dependent. The quantification limits listed herein are provided for guidance and may not always be achievable.

[a]Quantification limits listed for soil/sediment are based on wet weight. The quantification limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

[b]Medium Soil/Sediment Contract Required Quantification Limits (CRQL) for Semivolatile TCL Compounds are 60 times the individual Low Soil/Sediment CRQL.

Semivolatiles (Continued)	CAS Number	Quantification Limits Low Concentration Analysis[a] Water (ug/l)	Soil/Sediment (ug/kg)
89. 3,3'-Dichlorobenzidine	91-94-1	20	660
90. Benzo(a)anthracene	56-55-3	10	330
91. Chrysene	218-01-9	10	330
92. bis(2-ethylhexyl)phthalate	117-81-7	10	330
93. Di-n-octyl Phthalate	117-84-0	10	330
94. Benzo(b)fluoranthene	205-99-2	10	330
95. Benzo(k)fluoranthene	207-08-9	10	330
96. Benzo(a)pyrene	50-32-8	10	330
97. Indeno(1,2,3-cd)pyrene	193-39-5	10	330
98. Dibenz(a,h)anthracene	53-70-3	10	330
99. Benzo(g,h,i)perylene	191-24-2	10	330

Note: Specific quantification limits are highly matrix dependent. The quantification limits listed herein are provided for guidance and may not always be achievable.

[a]Quantification limits listed for soil/sediment are based on wet weight. The quantification limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

[b]Medium Soil/Sediment Contract Required Quantification Limits (CRQL) for Semivolatile TCL Compounds are 60 times the individual Low Soil/Sediment CRQL; for Pesticide/PCB TCL compounds they are 15 times the individual Low Soil/Sediment CRQL.

Inorganic Target Analyte	Quantification Limit Low Concentration Analysis[a] (ug/l)
Aluminum	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5,000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	5
Magnesium	5,000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5,000
Selenium	5
Silver	10
Sodium	5,000
Thallium	10
Vanadium	50
Zinc	20
Cyanide	10

[a]The quantification limits for samples may be considerably higher depending on the sample matrix.

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Appendix B
ANALYTICAL DATA--LEACHATE AND GROUNDWATER

Table B-1: Leachate and Groundwater Metal Analytical Results

Table B-2: Leachate and Groundwater Organic Analytical Results

Table B-3: Leachate and Groundwater Conventional Pollutants Analytical Results

TABLE B-1. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - METALS

UNFILTERED

Sample Number:	LT01-01	DLT01-01	LT01-02	LT01-03	LT01-04	LT01-05
Sample Location:	NSLLT 1	NSLDLT 1	NSLLT 1	NSLLT 1	NSLLT 1	NSLLT 1
Date Sampled:	8-24-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87
ITR Number:	MEB292	MEB297	MEB303	MEC782	MEB312	MEK345
INORGANICS UG/L						
Aluminum	---	---	---	[67]	[56]	[62]
Antimony	---	---	---	---	---	---
Arsenic	11	12	[10]	---	---	11
Barium	541	549	553	545	543	518
Beryllium	---	---	---	---	---	---
Cadmium	---	---	---	---	---	---
Calcium	124000	126000	127000	126000	126000	118000
Chromium	16 BJ	14 BJ	15 BJ	16 BJ	18 BJ	29 BJ
Cobalt	---	---	---	---	---	---
Copper	[6.1] B	[6.2] B	---	---	---	---
Iron	22000	22200	22700	22500 J	22600 J	21500
Lead	16 BSJ	17 BSJ	20 BSJ	27 BSJ	26 BJS	17 BSJ
Magnesium	177000	179000	181000	175000	176000	168000
Manganese	87	86	88	89	91	87
Mercury	---	---	---	---	---	---
Nickel	74	78	82	74	70	76
Potassium	403000	406000	409000	404000	402000	369000
Selenium	---	---	---	---	---	---
Silver	---	---	---	---	---	---
Sodium	691000	697000	706000	686000	687000	638000
Thallium	---	---	---	---	---	---
Tin	---	---	---	---	---	---
Vanadium	---	---	---	---	---	---
Zinc	62	62	101	108	143	162
Cyanide	---	---	---	---	---	---

FILTERED

Sample Number:	LT01-01	DLT01-01	LT01-02	LT01-03	LT01-04	LT01-05
Sample Location:	NSLLT 1	NSLDLT 1	NSLLT 1	NSLLT 1	NSLLT 1	NSLLT 1
Date Sampled:	8-24-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87
ITR Number:	MEI705	MEI706	MEI716	MEI723	MEG986	MEG996
INORGANICS UG/L						
Aluminum	[56]	[56]	[66]	[49]	[45]	[39]
Antimony	71	---	---	---	---	---
Arsenic	---	---	---	---	---	---
Barium	398	404	404	394	386	410
Beryllium	---	---	---	---	---	---
Cadmium	[4.2]	---	---	---	---	---
Calcium	124000	124000	124000	118000	116000	120000
Chromium	22 BJ	21 BJ	20 BJ	19 BJ	17 BJ	20 BJ
Cobalt	[11]	---	---	[11]	[11]	---
Copper	[7.4] B	[6.6] B	---	---	---	---
Iron	2920 J	3130 J	2880 J	2420	2450	4070
Lead	9.1 BSJ	10 BSJ	12 BSJ	8.4 BSJ	9 BSJ	---
Magnesium	178000	179000	180000	173000	172000	174000
Manganese	85	85	89	76	75	79
Mercury	---	---	---	---	---	---
Nickel	77	81	81	78	78	74
Potassium	391000	392000	393000	397000	395000	403000
Selenium	---	8 SJ	---	---	---	---
Silver	---	---	---	---	---	---
Sodium	695000	697000	702000	684000	679000	693000
Thallium	---	---	---	---	---	---
Tin	192 BJ	---	---	---	---	---
Vanadium	[12]	---	---	---	---	---
Zinc	42	44	64	66	96	102
Cyanide	NA	NA	NA	NA	NA	NA

UNFILTERED

Sample Number:	LT02-01	LT02-02	LT02-03	DLT02-03	LT02-04	LT02-05
Sample Location:	NSLLT 2	NSLLT 2	NSLLT 2	NSLDLT 2	NSLLT 2	NSLLT 2
Date Sampled:	8-24-87	8-25-87	8-26-87	8-26-87	8-27-87	8-28-87
ITR Number:	MEB293	MEB304	MEC783	MEC787	MEB313	MEK472
INORGANICS UG/L						
Aluminum	[90]	[73]	[150]	[135]	[143]	[140]
Antimony	---	---	---	---	---	---
Arsenic	12 S	12	11	12	12	13
Barium	235	239	242	234	235	233
Beryllium	---	---	---	---	---	---
Cadmium	---	---	---	---	---	---
Calcium	200000	205000	205000	200000	200000	197000
Chromium	15 BJ	17 BJ	21 BJ	21 BJ	18 BJ	19 BJ
Cobalt	---	---	---	---	---	---
Copper	[7] B	---	---	---	---	[8.3] B
Iron	29700	30300	30100 J	29500 J	29400 J	29100
Lead	15 BSJ	18 BSJ	25 BSJ	22 BSJ	22 BJS	14 BJS
Magnesium	181000	185000	182000	177000	178000	179000
Manganese	241	247	248	241	243	243
Mercury	---	---	---	---	---	---
Nickel	92	95	92	89	90	91
Potassium	306000	312000	311000	301000	302000	294000
Selenium	---	---	---	---	---	---
Silver	---	---	---	---	---	---
Sodium	603000	619000	611000	592000	595000	587000
Thallium	---	---	---	---	---	---
Tin	---	---	---	---	---	---
Vanadium	---	---	[7.4]	---	---	[8.1]
Zinc	73	81	119	118	129	155
Cyanide	---	---	---	---	---	---

FILTERED

Sample Number:	LT02-01	LT02-02	LT02-03	DLT02-03	LT02-04	LT02-05
Sample Location:	NSLLT 2	NSLLT 2	NSLLT 2	NSLDLT 2	NSLLT 2	NSLLT 2
Date Sampled:	8-24-87	8-25-87	8-26-87	8-26-87	8-27-87	8-28-87
ITR Number:	MEI707	MEI717	MEI722	MEI725	MEG987	MEG997
INORGANICS UG/L						
Aluminum	[58]	[52]	[47]	[46]	[66]	[40]
Antimony	---	---	---	---	---	---
Arsenic	---	---	---	11	---	---
Barium	[158]	[172]	[175]	[175]	[174]	[173]
Beryllium	---	---	---	---	---	---
Cadmium	---	---	---	---	---	---
Calcium	200000	196000	190000	188000	188000	194000
Chromium	17 BJ	20 BJ	25 BJ	24 BJ	22 BJ	24 BJ
Cobalt	---	---	---	---	---	---
Copper	---	---	---	---	---	---
Iron	3280 J	9590 J	10100	9980	11700	9620
Lead	16 BSJ	6.5 BSJ	9.9 BSJ	9.5 BSJ	8.5 BSJ	---
Magnesium	189000	182000	178000	173000	176000	179000
Manganese	234	236	220	221	218	221
Mercury	---	---	---	---	---	---
Nickel	98	86	91	92	92	90
Potassium	309000	294000	304000	298000	301000	309000
Selenium	---	---	---	---	---	---
Silver	---	---	---	---	---	---
Sodium	634000	608000	603000	594000	602000	617000
Thallium	---	---	---	---	---	---
Tin	---	[26] B	---	---	---	---
Vanadium	---	---	---	---	---	---
Zinc	25 B	[20] B	24 B	28 B	31 B	24 B
Cyanide	NA	NA	NA	NA	NA	NA

NOTE: B: Analyte has been found in the laboratory or field blank as well as the sample. Indicates probable/possible contamination.
[ ]: Positive values less than the contract required detection limit.
S: Value is determined by standard addition.
J: An estimated value.
NA: Not analyzed.
NS: Not sampled.
---: Not detected.

TABLE B-1. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - METALS

	UNFILTERED					FILTERED				
Sample Number:	LT03-01	LT03-02	LT03-03	LT03-04	LT03-05	LT03-01	LT03-02	LT03-03	LT03-04	LT03-05
Sample Location:	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3
Date Sampled:	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87
ITR Number:	MEB294	MEB305	MEC784	MEB314	MEK473	MEI708	MEI718	MEI724	MEG988	MEG998
INORGANICS UG/L										
Aluminum	---	---	[60]	[41]	[17]	[40]	[34]	[38]	[26]	[17]
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	---	---	---	---	---	---
Barium	[144]	[62]	[180]	431	[145]	[43]	[30]	[37]	[126]	[100]
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	---	---	---	---	---	---
Calcium	161000	159000	153000	153000	147000	160000	147000	128000	138000	140000
Chromium	[6.2] B	[7.2] B	10 BJ	[9.2] B	[7.8] B	11 BJ	13 BJ	12 BJ	11 BJ	[9.2] B
Cobalt	---	---	---	---	---	---	---	---	[9.6]	---
Copper	[10] B	[14] B	88	57 B	51	---	[6] B	[10] B	---	29
Iron	24200	14400	18200 J	18000 J	12400	613 J	262 J	150 B	202 B	136 B
Lead	7.1 BSJ	7.1 BSJ	25 BSJ	23 BSJ	---	5.9 BSJ	---	---	7.5 BSJ	---
Magnesium	95100	93100	94600	96800	95600	97700	94200	93500	93700	92000
Manganese	184	169	161	169	162	163	142	98	138	147
Mercury	---	---	---	---	---	---	---	---	---	---
Nickel	[22]	[19]	[19]	[28]	[20]	[17]	[24]	[27]	[24]	[24]
Potassium	148000	148000	151000	152000	147000	148000	142000	148000	149000	149000
Selenium	---	---	---	---	---	---	---	---	---	---
Silver	---	---	---	---	---	---	---	---	---	---
Sodium	249000	249000	250000	255000	247000	264000	250000	255000	254000	251000
Thallium	---	---	---	---	---	---	---	---	---	---
Tin	---	---	---	---	---	---	---	---	---	---
Vanadium	---	---	---	---	---	---	---	---	---	---
Zinc	281	1250	1640	2010	2660	60	313	196	769	1480
Cyanide	---	---	---	---	---	NA	NA	NA	NA	NA

	UNFILTERED						FILTERED					
Sample Number:	MWNSL12-01	MWNSL12-02	MWNSL12-03	MWNSL12-04	DMWNSL12-04	MWNSL12-05	MWNSL12-01	MWNSL12-02	MWNSL12-03	MWNSL12-04	DMWNSL12-04	MWNSL12-05
Sample Location:	NSLMW 12	NSLMW 12	NSLMW 12	NSLMW 12	DNSLMW 12	NSLMW 12	NSLMW 12	NSLMW 12	NSLMW 12	NSLMW 12	DNSLMW 12	NSLMW 12
Date Sampled:	8-24-87	8-25-87	8-26-87	8-27-87	8-27-87	8-28-87	8-24-87	8-25-87	8-26-87	8-27-87	8-27-87	8-28-87
ITR Number:	MEB290	MEB301	MEC780	MEC791	MEK337	MEK343	MEI704	MEI712	MEI730	MEG984	MEG989	MEG994
INORGANICS UG/L												
Aluminum	36100	14700	31200	13200	18100	77300	[33]	[19]	[30]	[32]	[48]	[22]
Antimony	---	---	---	---	---	---	---	---	---	---	---	---
Arsenic	29	19	18	20	18 S	32	---	---	---	---	10	10
Barium	1500	1200	1350	1270	1210	1700	1020	260	968	980	997	988
Beryllium	[1.7]	---	[1.9]	[2]	[1.2]	5.3	---	---	---	---	---	---
Cadmium	8 J	[4.5] J	5.5 J	---	---	5.7 J	---	---	---	---	---	---
Calcium	322000	207000	380000	324000	202000	723000	74100	61000	69800	70400	71900	71900
Chromium	95	42 BJ	94	40 BJ	51 BJ	185	[9.9] B	[4.1] B	11 BJ	[6.1] B	11 BJ	[8.6] B
Cobalt	[35]	[18]	[34]	[28]	[24]	80	[9.1]	---	---	---	---	---
Copper	204	87	178	131	110	486	[9.9] B	---	---	---	---	---
Iron	132000	56800	119000 J	30500	74100 J	286000	[67] BJ	251 J	[58] BJ	390	374 J	472
Lead	66 J	38 SJ	122 SJ	51 J	53 SJ	210 SJ	9.2 BSJ	---	6.8 BSJ	12 BSJ	---	8 BSJ
Magnesium	211000	174000	232000	209000	175000	354000	129000	29600	125000	128000	129000	127000
Manganese	1470	789	1560	1210	873	3440	144	24 B	131	135	137	127
Mercury	---	---	---	---	---	0.3	---	---	---	---	---	---
Nickel	213	130	192	142	148	358	82	---	76	78	80	78
Potassium	98100	93800	99400	90600	94800	97600	88800	[1610]	89000	91000	86800	92000
Selenium	---	---	---	---	---	---	---	---	---	---	---	---
Silver	---	---	---	---	---	---	---	---	---	---	---	---
Sodium	382000	388000	393000	380000	393000	359000	392000	31300	384000	394000	392000	403000
Thallium	---	---	---	---	---	---	---	---	---	---	---	---
Tin	---	---	---	---	---	---	---	---	---	---	---	---
Vanadium	107	[44]	100	[39]	60	233	---	---	---	---	---	---
Zinc	764	620	1400	973	441	2160	25 B	[4.5] B	55	50	41	[9.9] B
Cyanide	---	---	---	---	---	---	NA	NA	NA	NA	NA	NA

12-Jul-88

TABLE B-1. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - METALS

UNFILTERED

Sample Number:	MWNSL13-01	MWNSL13-02	DMWNSL13-02	MWNSL13-03	DMWNSL13-03	MWNSL13-04	MWNSL13-05
Sample Location:	NSLMW 13	NSLMW 13	DNSLMW 13	NSLMW 13	DNSLMW 13	NSLMW 13	NSLMW 13
Date Sampled:	8-24-87	8-25-87	8-25-87	8-26-87	8-26-87	8-27-87	8-28-87
ITR Number:		MEB299	MEB306	MEC779	MEC785	MEC789	MEK342
INORGANICS UG/L							
Aluminum	NS	[41]	---	[166]	[180]	447	10900
Antimony	NS	---	---	---	---	---	---
Arsenic	NS	18	17	15 S	14 S	12	14
Barium	NS	457	446	451	461	451	485
Beryllium	NS	---	---	---	---	---	---
Cadmium	NS	---	---	---	---	---	6.4 J
Calcium	NS	96300	95300	91800	93000	92600	189000
Chromium	NS	---	[4.5] B	[6.7] B	[5] B	[4.6] B	49 BJ
Cobalt	NS	---	---	---	---	---	[15]
Copper	NS	---	---	[6.8] B	---	---	44
Iron	NS	6580	6190	6110 J	6520 J	6500 J	33900
Lead	NS	---	---	---	---	10 BSJ	45 SJ
Magnesium	NS	52400	51700	50900	50500	51300	89300
Manganese	NS	525	516	454	462	504	1070
Mercury	NS	---	---	---	---	---	---
Nickel	NS	[25]	[24]	[20]	[21]	[25]	76
Potassium	NS	30100	29700	31600	30500	28800	28800
Selenium	NS	---	---	---	---	---	---
Silver	NS	---	---	---	---	---	---
Sodium	NS	104000	102000	97700	97000	94400	92200
Thallium	NS	---	---	---	---	---	---
Tin	NS	---	---	---	---	---	---
Vanadium	NS	---	---	---	---	---	[32]
Zinc	NS	[3.2] B	---	[9.1] B	[8.2] B	[14] B	255
Cyanide	NS	---	---	---	---	---	---

FILTERED

Sample Number:	MWNSL13-01	MWNSL13-02	DMWNSL13-02	MWNSL13-03	DMWNSL13-03	MWNSL13-04	MWNSL13-05
Sample Location:	NSLMW 13	NSLMW 13	DNSLMW 13	NSLMW 13	DNSLMW 13	NSLMW 13	NSLMW 13
Date Sampled:	8-24-87	8-25-87	8-25-87	8-26-87	8-26-87	8-27-87	8-28-87
ITR Number:		MEI713	MEI714	MEI729	MEI728	MEG982	MEG993
INORGANICS UG/L							
Aluminum	NS	[16]	[18]	[17]	[23]	[18]	---
Antimony	NS	---	---	---	---	---	---
Arsenic	NS	16	14	---	---	18 S	12
Barium	NS	440	435	366	371	998	425
Beryllium	NS	---	---	---	---	---	---
Cadmium	NS	---	---	---	---	---	---
Calcium	NS	96900	95800	77900	79200	99200	86800
Chromium	NS	[8.6] B	[9.4] B	[7.4] B	[8.1] B	10 BJ	[4.5] B
Cobalt	NS	---	---	---	---	---	---
Copper	NS	[6.3] B	---	---	---	---	---
Iron	NS	3800 J	4000 J	1370 J	523 J	1320	2710
Lead	NS	---	---	---	5.8 BSJ	9.2 BSJ	---
Magnesium	NS	52900	52400	44500	45100	114000	47400
Manganese	NS	529	522	382	386	86	400
Mercury	NS	---	---	---	---	---	---
Nickel	NS	[24]	[27]	[20]	[24]	68	[17]
Potassium	NS	29500	29100	27000	27400	93900	27500
Selenium	NS	---	---	---	---	---	---
Silver	NS	---	---	---	---	---	---
Sodium	NS	109000	108000	89800	91600	413000	88800
Thallium	NS	---	---	---	---	---	---
Tin	NS	---	---	---	---	---	---
Vanadium	NS	---	---	---	---	---	---
Zinc	NS	[9.2] B	[4.7] B	[7.3] B	[13] B	55	[9.9] B
Cyanide	NS	NA	NA	NA	NA	NA	NA

UNFILTERED

Sample Number:	MWNSL8SA-01	DMWNSL8SA-01	MWNSL8SA-02	MWNSL8SA-03	MWNSL8SA-04	MWNSL8SA-05
Sample Location:	NSLMW 8SA	DNSLMW 8SA	NSLMW 8SA	NSLMW 8SA	NSLMW 8SA	NSLMW 8SA
Date Sampled:	8-24-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87
ITR Number:	MEB286	MEB295	MEB298	MEB309	MEC788	MEK340
INORGANICS UG/L						
Aluminum	528	469	[26]	1490	546	717
Antimony	---	---	---	---	---	---
Arsenic	---	---	---	---	---	---
Barium	256	262	279	289	286	286
Beryllium	---	---	---	---	---	---
Cadmium	---	---	---	---	---	---
Calcium	58700	60600	60800	67000	63300	65400
Chromium	---	[4.2] B	---	[5.9] B	[5.8] B	---
Cobalt	---	---	---	---	---	---
Copper	---	[7.2] B	---	---	[7.2] B	---
Iron	2330	2370	1330	3710	1690 J	2640
Lead	---	---	6.5 BJ	---	---	---
Magnesium	28400	28700	28700	30300	30000	30600
Manganese	55	52	34	85	56	84
Mercury	---	---	---	---	---	---
Nickel	---	---	---	---	---	---
Potassium	[1630]	[1570]	[1450]	[2030]	[1650]	[1920]
Selenium	---	---	---	---	---	---
Silver	---	---	---	---	---	---
Sodium	27100	27000	25700	27300	27200	26600
Thallium	---	---	---	---	---	---
Tin	---	---	---	---	---	---
Vanadium	---	---	---	---	---	---
Zinc	[9] B	[17] B	[3.2] B	[19] B	23 B	28 B
Cyanide	---	---	---	---	---	---

FILTERED

Sample Number:	MWNSL8SA-01	DMWNSL8SA-01	MWNSL8SA-02	MWNSL8SA-03	MWNSL8SA-04	MWNSL8SA-05
Sample Location:	NSLMW 8SA	DNSLMW 8SA	NSLMW 8SA	NSLMW 8SA	NSLMW 8SA	NSLMW 8SA
Date Sampled:	8-24-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87
ITR Number:	MEI701	MEI703	MEI710	MEI726	MEG981	MEG991
INORGANICS UG/L						
Aluminum	[74]	[67]	[71]	---	---	---
Antimony	---	---	---	---	---	---
Arsenic	---	---	11	---	---	---
Barium	238	241	983	229	238	237
Beryllium	---	---	---	---	---	---
Cadmium	---	---	---	---	---	---
Calcium	54000	55600	72300	56800	56500	56500
Chromium	[5.6] B	[5.3] B	[5.6] B	[7.8] B	[8.9] B	---
Cobalt	---	---	---	---	---	---
Copper	[8.5] B	[11] B	---	---	---	---
Iron	1500 J	1570 J	1320 J	[53] B	[53] B	139
Lead	---	13 BJ	5.7 BSJ	---	---	5.6 BJ
Magnesium	26400	27300	127000	28200	27600	27400
Manganese	41	53	144	28 B	29 B	45
Mercury	---	---	---	---	---	---
Nickel	---	---	79	---	---	---
Potassium	[1400]	[1480]	86100	[1910]	[1640]	[1760]
Selenium	---	---	---	---	---	---
Silver	---	---	---	---	---	---
Sodium	25000	27700	384000	34100	32300	31200
Thallium	---	---	---	---	---	---
Tin	---	---	---	---	---	---
Vanadium	---	---	---	---	---	---
Zinc	[10] B	[16] B	32 B	[6.3] B	[4.3] B	[5.5] B
Cyanide	NA	NA	NA	NA	NA	NA

TABLE B-1. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - METALS

		UNFILTERED					FILTERED				
Sample Number:		MWECC3A-01	MWECC3A-02	MWECC3A-03	MWECC3A-04	MWECC3A-05	MWECC3A-01	MWECC3A-02	MWECC3A-03	MWECC3A-04	MWECC3A-05
Sample Location:		ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A
Date Sampled:		8-24-87	8-25-87	8-26-87	8-27-87	8-28-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87
ITR Number:			MEB300	MEB310	MEC790	MEK341		MEI711	MEI727	MEG983	MEG992
INORGANICS UG/L											
Aluminum	NS		19000	5960	1150	23200	NS	[73]	[52]	---	[37]
Antimony	NS		---	---	---	---	NS	---	---	---	---
Arsenic	NS		20	21	26	29 S	NS	19	16 S	13 S	17
Barium	NS		1240	1180	1170	1180	NS	1390	963	403	1020
Beryllium	NS		---	---	---	[2]	NS	---	---	---	---
Cadmium	NS		---	---	---	---	NS	---	---	---	---
Calcium	NS		316000	233000	274000	298000	NS	124000	98600	89100	101000
Chromium	NS		38 BJ	20 BJ	[6.2] B	49 BJ	NS	11 BJ	12 BJ	[8.4] B	[9.9] B
Cobalt	NS		[18]	[11]	---	[24]	NS	---	---	---	---
Copper	NS		152	57	44	172	NS	---	---	---	---
Iron	NS		82100	38800 J	12800 J	93900	NS	4460 J	1230	2480	2350
Lead	NS		57 SJ	24 BJS	25 BSJ	54 SJ	NS	---	---	---	---
Magnesium	NS		194000	166000	176000	181000	NS	124000	114000	49800	115000
Manganese	NS		1420	825	1160	1500	NS	91	84	457	89
Mercury	NS		---	---	---	---	NS	---	---	---	---
Nickel	NS		140	95	74	148	NS	70	68	[23]	70
Potassium	NS		99000	98000	95200	92400	NS	90800	93700	29200	95800
Selenium	NS		---	---	---	---	NS	---	---	---	---
Silver	NS		---	---	---	---	NS	---	---	---	---
Sodium	NS		415000	418000	419000	383000	NS	426000	412000	98900	424000
Thallium	NS		---	---	---	---	NS	---	---	---	---
Tin	NS		---	---	---	---	NS	---	---	---	---
Vanadium	NS		55	[23]	---	71	NS	---	---	---	---
Zinc	NS		280	306	196	602	NS	[6.3] B	126	[6.5] B	28 B
Cyanide	NS		---	---	---	---	NS	NA	NA	NA	NA

		UNFILTERED						FILTERED					
Sample Number:		MWSBP61-01	MWSBP61-02	MWSBP61-03	MWSBP61-04	MWSBP61-05	DMWSBP61-05	MWSBP61-01	MWSBP61-02	MWSBP61-03	MWSBP61-04	MWSBP61-05	DMWSBP61-05
Sample Location:		NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLDSBP 61	NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLDSBP 61
Date Sampled:		8-24-87	8-25-87	8-26-87	8-27-87	8-28-87	8-28-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87	8-28-87
ITR Number:			MEB302	MEC781	MEB311	MEK344	MEG967		MEI715	MEI731	MEG985	MEG968	MEG995
INORGANICS UG/L													
Aluminum	NS		92000	36300	38000	20800	13000	NS	376	[17]	---	---	[15]
Antimony	NS		---	---	---	---	---	NS	---	---	---	---	---
Arsenic	NS		45	32	33	20	14	NS	---	---	---	---	---
Barium	NS		4120	3960	4080	3920	3920	NS	3640	3420	3570	3830	3760
Beryllium	NS		[3.5]	[1.9]	[2.2]	[1.5]	[1]	NS	---	---	---	---	---
Cadmium	NS		5.1 J	---	---	---	---	NS	---	---	---	---	---
Calcium	NS		917000	568000	610000	376000	329000	NS	260000	250000	254000	261000	258000
Chromium	NS		154	87 B	73	56 BJ	44 BJ	NS	14 BJ	12 BJ	12 BJ	[7.9] B	[9.6] B
Cobalt	NS		74	[30]	[37]	[19]	[15]	NS	---	---	---	---	---
Copper	NS		259	108	116	60	36	NS	---	---	---	---	---
Iron	NS		195000	90800 J	96700 J	55600	40300	NS	13000 J	6950	4050	8870	7790
Lead	NS		186 SJ	62 SJ	75 SJ	27 JS	18 SJ	NS	6.1 BSJ	5.4 BSJ	---	---	---
Magnesium	NS		338000	234000	259000	185000	170000	NS	150000	146000	151000	155000	153000
Manganese	NS		3960	1700	1870	847	534	NS	77	58	49	48	46
Mercury	NS		0.3	---	---	---	---	NS	---	---	---	---	---
Nickel	NS		265	135	138	93	76	NS	43	[38]	46	42	[38]
Potassium	NS		79200	78800	79100	75900	73500	NS	66600	68100	72800	79600	78900
Selenium	NS		---	---	---	---	---	NS	---	---	---	---	---
Silver	NS		---	---	---	---	---	NS	---	---	---	---	---
Sodium	NS		398000	432000	433000	421000	419000	NS	421000	421000	439000	457000	452000
Thallium	NS		---	---	---	---	---	NS	---	---	---	---	---
Tin	NS		---	---	---	---	---	NS	---	---	---	---	---
Vanadium	NS		187	82	88	[48]	[33]	NS	---	---	---	---	---
Zinc	NS		780	456	344	224	133	NS	[9.6] B	40	65	51	33 B
Cyanide	NS		---	---	---	---	---	NS	NA	NA	NA	NA	NA

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TABLE B-1. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - METALS

	UNFILTERED					FILTERED				
Sample Number:	LTFB-01	LTFB-02	LTFB-03	LTFB-04	LTFB-05	LTFB-01	LTFB-02	LTFB-03	LTFB-04	LTFB-05
Sample Location:	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB
Date Sampled:	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87
ITR Number:		MEB308		MEK339			MEI719		MEG990	
INORGANICS UG/L										
Aluminum	NS	---	NS	---	NS	NS	---	NS	---	NS
Antimony	NS	---	NS	---	NS	NS	---	NS	---	NS
Arsenic	NS	---	NS	---	NS	NS	---	NS	---	NS
Barium	NS	---	NS	---	NS	NS	---	NS	---	NS
Beryllium	NS	---	NS	---	NS	NS	---	NS	---	NS
Cadmium	NS	---	NS	---	NS	NS	---	NS	---	NS
Calcium	NS	---	NS	---	NS	NS	---	NS	---	NS
Chromium	NS	---	NS	[4.4]	NS	NS	[7.6]	NS	[4.9]	NS
Cobalt	NS	---	NS	---	NS	NS	---	NS	---	NS
Copper	NS	---	NS	---	NS	NS	---	NS	---	NS
Iron	NS	---	NS	---	NS	NS	---	NS	---	NS
Lead	NS	---	NS	---	NS	NS	---	NS	6.1 J	NS
Magnesium	NS	---	NS	---	NS	NS	---	NS	---	NS
Manganese	NS	---	NS	---	NS	NS	---	NS	---	NS
Mercury	NS	---	NS	---	NS	NS	---	NS	---	NS
Nickel	NS	---	NS	---	NS	NS	---	NS	---	NS
Potassium	NS	---	NS	---	NS	NS	---	NS	---	NS
Selenium	NS	---	NS	---	NS	NS	---	NS	---	NS
Silver	NS	---	NS	---	NS	NS	[7.5]	NS	---	NS
Sodium	NS	---	NS	---	NS	NS	---	NS	---	NS
Thallium	NS	---	NS	---	NS	NS	---	NS	---	NS
Tin	NS	---	NS	---	NS	NS	49	NS	---	NS
Vanadium	NS	---	NS	---	NS	NS	---	NS	---	NS
Zinc	NS	---	NS	[3.3] B	NS	NS	[3.3] B	NS	[4] B	NS
Cyanide	NS	---	NS	---	NS	NS	NA	NS	NA	NS

	UNFILTERED					FILTERED				
Sample Number:	MWFB-01	MWFB-02	MWFB-03	MWFB-04	MWFB-05	MWFB-01	MWFB-02	MWFB-03	MWFB-04	MWFB-05
Sample Location:	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB
Date Sampled:	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87
ITR Number:	MEB296	MEB307	MEI732	MEK338		MEI709	MEI720	MEG966	MEG980	
INORGANICS UG/L										
Aluminum	---	---	---	---	NS	---	---	---	---	NS
Antimony	---	---	---	---	NS	---	---	---	---	NS
Arsenic	---	---	---	---	NS	---	---	---	---	NS
Barium	---	---	---	---	NS	---	---	---	---	NS
Beryllium	---	---	---	---	NS	---	---	---	---	NS
Cadmium	---	---	---	---	NS	---	---	---	---	NS
Calcium	---	---	---	---	NS	---	---	---	---	NS
Chromium	[4.9]	---	14	---	NS	[4.9]	[7.6]	18	[6.5]	NS
Cobalt	---	---	---	---	NS	---	---	---	---	NS
Copper	---	---	[6] B	---	NS	---	---	---	---	NS
Iron	---	---	[45]	[54]	NS	---	---	---	---	NS
Lead	---	---	---	5.6	NS	5.4 J	---	---	---	NS
Magnesium	---	---	---	---	NS	---	---	---	---	NS
Manganese	---	---	---	---	NS	[4.7]	[4.8]	---	[6.7]	NS
Mercury	---	---	---	---	NS	---	---	---	---	NS
Nickel	---	---	---	---	NS	---	---	---	---	NS
Potassium	---	---	---	---	NS	---	---	---	---	NS
Selenium	---	---	---	---	NS	---	---	---	---	NS
Silver	---	---	---	---	NS	---	---	---	---	NS
Sodium	---	---	[2580]	---	NS	---	---	[2750]	[1320]	NS
Thallium	---	---	---	---	NS	---	---	---	---	NS
Tin	---	---	87	---	NS	---	---	---	---	NS
Vanadium	---	---	---	---	NS	---	---	---	---	NS
Zinc	---	[6]	[7.9] B	[4.1] B	NS	[7.2] B	---	[3.6] B	[4.7] B	NS
Cyanide	---	---	---	---	NS	NA	NA	NA	NA	NS

TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:	LT01-01	DLT01-01	LT01-02	LT01-03	LT01-04	LT01-05
Sample Location:	NSLLT 1	NSLDLT 1	NSLLT 1	NSLLT 1	NSLLT 1	NSLLT 1
Date Sampled:	8/24/87	8/24/87	8/25/87	8/26/87	8/27/87	8/28/87
OTR Number:	EL504	EL509	EL515	EL540	EL517	EL528
VOLATILE ORGANICS: ug/l						
Chloromethane	---	---	---	---	---	---
Bromomethane	---	---	---	---	---	---
Vinyl Chloride	---	---	---	---	---	---
Chloroethane	---	---	---	---	---	---
Methylene Chloride	---	---	---	---	100 J	100 J
Acetone	---	65 J	71 J	52 J	370 J	430 J
Carbon Disulfide	---	6 J	6 J	---	---	---
1,1-Dichloroethene	---	---	---	---	---	---
1,1-Dichloroethane	---	---	---	---	---	---
1,2-Dichloroethene (Total)	---	---	---	---	---	---
Chloroform	---	---	---	---	---	---
1,2-Dichloroethane	---	---	---	---	---	---
2-Butanone	300 J	200 J	240 J	--- R	180 J	--- R
1,1,1-Trichloroethane	---	---	---	---	---	---
Carbon Tetrachloride	---	---	---	---	---	---
Vinyl Acetate	---	---	---	---	---	---
Bromodichloromethane	---	---	---	---	---	---
1,2-Dichloropropane	---	---	---	---	---	---
cis-1,3-Dichloropropene	---	---	---	---	---	---
Trichloroethene	---	---	---	---	---	---
Dibromochloromethane	---	---	---	---	---	---
1,1,2-Trichloroethane	---	---	---	---	---	---
Benzene	---	---	---	16 J	---	---
cis-1,3-Dichloropropene	---	---	---	---	---	---
Trans-1,2-Dichloropropene	---	---	---	---	---	---
Bromoform	---	---	---	---	---	---
4-Methyl-2-Pentanone	---	---	---	---	---	---
2-Hexanone	---	---	---	---	---	---
Tetrachloroethene	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	---	---	---	---	---	---
Toluene	38 J	23 J	25 J	21 J	58 J	63 J
Chlorobenzene	---	---	---	---	---	---
Ethylbenzene	---	---	---	---	69 J	550 J
Styrene	---	---	---	---	---	---
Total Xylenes	450 J	190 J	1200 J	1900 J	6000 J	6500 J
SEMIVOLATILE ORGANICS						
Phenol	11 J	---	---	5 J	---	---
Benzyl Alcohol	---	---	---	2 J	---	---
1,2-Dichlorobenzene	---	---	---	---	---	---
4-Methylphenol	---	---	---	4 J	---	---
2,4-Dimethylphenol	---	---	---	36 J	---	---
Benzoic Acid	60 J	---	---	---	---	---
Naphthalene	---	15 J	17	---	5 J	12 J
4-Chloro-3-Methylphenol	---	13 J	---	14	---	15 J
2-Methylnaphthalene	---	---	---	---	---	---
Diethylphthalate	---	13 J	---	---	---	---
Di-n-Butylphthalate	---	3 JB	3 JB	2 JB	---	---
bis(2-Ethylhexyl) Phthalate	---	4 J	4 J	---	---	---
3-Nitroaniline	--- R	--- R	--- R	--- R	--- R	--- R
4-Nitroaniline	---	--- R	--- R	---	---	---

NOTE: B: Analyte has been found in the field blank as well as the sample. Indicates probable/possible contamination.
NS: Not sampled.
NR: Not reported.
---: Not detected.

S: Value is determined by standard addition.
J: An estimated value or the report value is less than the contract required quantification limit.
R: Unusable, indicates possible false negative.

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TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:	LT02-01	LT02-02	LT02-03	DLT02-03	LT02-04	LT02-05
Sample Location:	NSLLT 2	NSLLT 2	NSLLT 2	NSLDLT 2	NSLLT 2	NSLLT 2
Date Sampled:	8/24/87	8/25/87	8/26/87	8/26/87	8/27/87	8/28/87
QTR Number:	EL505	EL530	EL541	EL545	EL518	EL529
VOLATILE ORGANICS: ug/l						
Chloromethane	---	---	---	---	---	---
Bromomethane	---	---	---	---	---	---
Vinyl Chloride	---	---	---	57 J	---	---
Chloroethane	130 J	210 J	140 J	180 J	160 J	---
Methylene Chloride	---	18 J	---	---	24 J	110 J
Acetone	83 J	65 J	77 J	84 J	75 J	140 J
Carbon Disulfide	5 J	---	---	---	---	---
1,1-Dichloroethene	---	---	---	---	---	---
1,1-Dichloroethane	---	---	---	38 J	---	---
1,2-Dichloroethene (Total)	7 J	7 J	11 J	310 J	11 J	---
Chloroform	---	---	---	---	---	---
1,2-Dichloroethane	---	---	---	---	---	---
2-Butanone	220 J	160 J	--- R	--- R	35 J	--- R
1,1,1-Trichloroethane	---	---	---	---	---	---
Carbon Tetrachloride	---	---	---	---	---	---
Vinyl Acetate	---	---	---	---	---	---
Bromodichloromethane	---	---	---	---	---	---
1,2-Dichloropropane	---	---	---	---	---	---
cis-1,3-Dichloropropene	---	---	---	---	---	---
Trichloroethene	---	---	---	---	---	---
Dibromochloromethane	---	---	---	---	---	---
1,1,2-Trichloroethane	---	---	---	---	---	---
Benzene	120 J	130 J	210 J	230 J	250 J	270 J
cis-1,3-Dichloropropene	---	---	---	---	---	---
Trans-1,2-Dichloropropene	---	---	---	---	---	---
Bromoform	---	---	---	---	---	---
4-Methyl-2-Pentanone	11 J	---	---	---	---	---
2-Hexanone	37 J	---	36 J	36 J	---	---
Tetrachloroethene	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	---	---	---	---	---	---
Toluene	24 J	31 J	64 J	71 J	74 J	89 J
Chlorobenzene	---	---	---	---	9 J	---
Ethylbenzene	---	---	290 J	310 J	120 J	350 J
Styrene	---	---	---	---	---	---
Total Xylenes	390 J	400 J	630 J	700 J	2300 J	2500 J
SEMIVOLATILE ORGANICS						
Phenol	---	---	---	---	---	5 J
Benzyl Alcohol	---	---	---	---	---	---
1,2-Dichlorobenzene	14 J	15	13 J	21 J	12	8 J
4-Methylphenol	---	---	---	---	---	---
2,4-Dimethylphenol	---	91	---	---	---	18 J
Benzoic Acid	---	---	---	---	---	---
Naphthalene	8 J	8 J	---	10 J	6 J	4 J
4-Chloro-3-Methylphenol	---	---	---	---	---	---
2-Methylnaphthalene	---	---	---	---	---	---
Diethylphthalate	25 J	29 J	---	---	11 J	4 J
Di-n-Butylphthalate	2 BJ	3 BJ	---	---	---	---
bis(2-Ethylhexyl) Phthalate	8 J	8 J	---	---	---	---
3-Nitroaniline	--- R	--- R	--- R	--- R	--- R	--- R
4-Nitroaniline	--- R	--- R	---	---	---	---

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TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESUL
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:	LT03-01	LT03-02	LT03-03	LT03-04	LT03-05
Sample Location:	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3
Date Sampled:	8/24/87	8/25/87	8/26/87	8/27/87	8/28/87
QTR Number:	EL506	EL531	EL542	EL519	EL550
VOLATILE ORGANICS: ug/l					
Chloromethane	---	---	---	---	---
Bromomethane	---	---	---	---	---
Vinyl Chloride	---	---	---	---	13 J
Chloroethane	---	---	---	---	---
Methylene Chloride	---	---	---	---	---
Acetone	---	---	---	4 J	---
Carbon Disulfide	---	---	---	---	---
1,1-Dichloroethene	---	---	---	---	---
1,1-Dichloroethane	---	---	---	---	47 J
1,2-Dichloroethene (Total)	---	---	---	---	38 J
Chloroform	---	---	---	---	---
1,2-Dichloroethane	---	---	---	---	---
2-Butanone	--- R	--- R	--- R	--- R	--- R
1,1,1-Trichloroethane	---	---	---	---	---
Carbon Tetrachloride	---	---	---	---	---
Vinyl Acetate	---	---	---	---	---
Bromodichloromethane	---	---	---	---	---
1,2-Dichloropropane	---	---	---	---	---
cis-1,3-Dichloropropene	---	---	---	---	---
Trichloroethene	---	---	---	---	---
Dibromochloromethane	---	---	---	---	---
1,1,2-Trichloroethane	---	---	---	---	---
Benzene	---	---	---	---	---
cis-1,3-Dichloropropene	---	---	---	---	---
Trans-1,2-Dichloropropene	---	---	---	---	---
Bromoform	---	---	---	---	---
4-Methyl-2-Pentanone	---	---	---	---	---
2-Hexanone	---	---	---	---	---
Tetrachloroethene	---	---	---	---	---
1,1,2,2-Tetrachloroethane	---	---	---	---	---
Toluene	---	---	---	---	---
Chlorobenzene	---	---	---	---	---
Ethylbenzene	---	---	---	---	---
Styrene	---	---	---	---	---
Total Xylenes	---	---	---	4 J	---
SEMIVOLATILE ORGANICS					
Phenol	---	---	---	3 J	---
Benzyl Alcohol	---	---	---	---	---
1,2-Dichlorobenzene	---	---	---	---	---
4-Methylphenol	---	---	---	---	---
2,4-Dimethylphenol	---	---	---	---	---
Benzoic Acid	---	---	7 J	---	---
Naphthalene	---	---	---	---	---
4-Chloro-3-Methylphenol	---	---	---	---	---
2-Methylnaphthalene	---	---	---	---	---
Diethylphthalate	---	---	---	---	---
Di-n-Butylphthalate	2 BJ	---	2 JB	---	---
bis(2-Ethylhexyl) Phthalate	4 J	5 J	37	110	69
3-Nitroaniline	--- R	--- R	--- R	--- R	--- R
4-Nitroaniline	--- R	--- R	---	---	---

TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:	MWNSL12-01	MWNSL12-02	MWNSL12-03	MWNSL12-04	DMWNSL12-04	MWNSL12-05
Sample Location:	NSLMW 12	NSLMW 12	NSLMW 12	NSLMW 12	DNSLMW 12	NSLMW 12
Date Sampled:	8/24/87	8/25/87	8/26/87	8/27/87	8/27/87	8/28/87
OTR Number:	EL502	EL513	EL538	EL549	EL520	EL526
VOLATILE ORGANICS: ug/l						
Chloromethane	---	---	---	---	---	---
Bromomethane	---	---	---	---	---	---
Vinyl Chloride	14 J	17 J	20 J	21 J	20 J	18 J
Chloroethane	140 J	110 J	96 J	95 J	100 J	86 J
Methylene Chloride	---	---	---	---	---	---
Acetone	---	---	---	7 J	7 J	---
Carbon Disulfide	---	---	---	---	---	---
1,1-Dichloroethene	---	---	---	---	---	---
1,1-Dichloroethane	10 J	12 J	13 J	12 J	14 J	11 J
1,2-Dichloroethene (Total)	9 J	10 J	10 J	10 J	11 J	9 J
Chloroform	---	---	---	---	---	---
1,2-Dichloroethane	---	---	---	---	---	---
2-Butanone	--- R	--- R	--- R	--- R	--- R	--- R
1,1,1-Trichloroethane	---	---	---	---	---	---
Carbon Tetrachloride	---	---	---	---	---	---
Vinyl Acetate	---	---	---	---	---	---
Bromodichloromethane	---	---	---	---	---	---
1,2-Dichloropropane	---	---	---	---	---	---
cis-1,3-Dichloropropene	---	---	---	---	---	---
Trichloroethene	---	1 J	---	---	---	---
Dibromochloromethane	---	---	---	---	---	---
1,1,2-Trichloroethane	---	---	---	---	---	---
Benzene	---	---	---	---	---	---
cis-1,3-Dichloropropene	---	---	---	---	---	---
Trans-1,2-Dichloropropene	---	---	---	---	---	---
Bromoform	---	---	---	---	---	---
4-Methyl-2-Pentanone	---	4 J	---	---	---	---
2-Hexanone	---	---	---	---	---	---
Tetrachloroethene	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	---	---	---	---	---	---
Toluene	---	---	---	---	---	---
Chlorobenzene	---	---	---	---	---	---
Ethylbenzene	---	---	---	---	---	---
Styrene	---	---	---	---	---	---
Total Xylenes	---	---	---	---	---	---
SEMIVOLATILE ORGANICS						
Phenol	---	---	---	---	---	---
Benzyl Alcohol	---	---	---	---	---	---
1,2-Dichlorobenzene	---	---	---	---	---	---
4-Methylphenol	---	---	---	---	---	---
2,4-Dimethylphenol	---	---	---	---	---	---
Benzoic Acid	---	---	---	---	---	7 J
Naphthalene	---	---	---	---	---	---
4-Chloro-3-Methylphenol	---	---	---	---	---	---
2-Methylnaphthalene	---	---	---	---	---	---
Diethylphthalate	---	---	---	---	---	---
Di-n-Butylphthalate	3 BJ	3 BJ	2 BJ	---	---	3 BJ
bis(2-Ethylhexyl) Phthalate	8 J	3 J	---	---	---	---
3-Nitroaniline	--- R	--- R	--- R	--- R	--- R	--- R
4-Nitroaniline	--- R	--- R	---	---	---	---

TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:	MWNSL13-01	MWNSL13-02	DMWNSL13-02	MWNSL13-03	MWNSL13-04	MWNSL13-05
Sample Location:	NSLMW 13	NSLMW 13	DNSLMW 13	NSLMW 13	NSLMW 13	NSLMW 13
Date Sampled:		8/25/87	8/25/87	8/26/87	8/27/87	8/28/87
OTR Number:		EL511	EL532	EL537	EL547	EL525
VOLATILE ORGANICS: ug/l						
Chloromethane	NS	NR	---	---	---	---
Bromomethane	NS	NR	---	---	---	---
Vinyl Chloride	NS	NR	280 J	300 J	240 J	360 J
Chloroethane	NS	NR	150 J	---	230 J	---
Methylene Chloride	NS	NR	---	---	38 J	59 J
Acetone	NS	NR	---	49 J	71 J	160 J
Carbon Disulfide	NS	NR	---	---	---	---
1,1-Dichloroethene	NS	NR	---	---	---	---
1,1-Dichloroethane	NS	NR	820 J	850 J	770 J	1200 J
1,2-Dichloroethene (Total)	NS	NR	610 J	680 J	620 J	970 J
Chloroform	NS	NR	---	---	---	---
1,2-Dichloroethane	NS	NR	18 J	17 J	---	27 J
2-Butanone	NS	NR	--- R	--- R	38 J	--- R
1,1,1-Trichloroethane	NS	NR	---	---	---	---
Carbon Tetrachloride	NS	NR	---	---	---	---
Vinyl Acetate	NS	NR	---	---	---	---
Bromodichloromethane	NS	NR	---	---	---	---
1,2-Dichloropropane	NS	NR	---	---	---	---
cis-1,3-Dichloropropene	NS	NR	---	---	---	---
Trichloroethene	NS	NR	18 J	18 J	---	27 J
Dibromochloromethane	NS	NR	---	---	---	---
1,1,2-Trichloroethane	NS	NR	---	---	---	---
Benzene	NS	NR	---	---	---	---
cis-1,3-Dichloropropene	NS	NR	---	---	---	---
Trans-1,2-Dichloropropene	NS	NR	---	---	---	---
Bromoform	NS	NR	---	---	---	---
4-Methyl-2-Pentanone	NS	NR	---	---	---	---
2-Hexanone	NS	NR	---	---	---	---
Tetrachloroethene	NS	NR	---	---	---	---
1,1,2,2-Tetrachloroethane	NS	NR	---	---	---	---
Toluene	NS	NR	---	---	---	---
Chlorobenzene	NS	NR	---	---	---	---
Ethylbenzene	NS	NR	---	---	---	---
Styrene	NS	NR	---	---	---	---
Total Xylenes	NS	NR	---	---	---	---
SEMIVOLATILE ORGANICS						
Phenol	NS	---	NR	---	---	---
Benzyl Alcohol	NS	---	NR	---	---	---
1,2-Dichlorobenzene	NS	---	NR	---	---	---
4-Methylphenol	NS	---	NR	---	---	---
2,4-Dimethylphenol	NS	---	NR	---	---	---
Benzoic Acid	NS	---	NR	---	---	---
Naphthalene	NS	---	NR	---	---	---
4-Chloro-3-Methylphenol	NS	---	NR	---	---	---
2-Methylnaphthalene	NS	---	NR	---	---	---
Diethylphthalate	NS	---	NR	---	---	---
Di-n-Butylphthalate	NS	2 BJ	NR	2 BJ	2 BJ	---
bis(2-Ethylhexyl) Phthalate	NS	---	NR	---	---	---
3-Nitroaniline	NS	--- R	NR	--- R	--- R	--- R
4-Nitroaniline	NS	--- R	NR	---	---	--- R

TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:	MWNSL8SA-01	DMWNSL8SA-01	MWNSL8SA-02	DMWNSL8SA-02	MWNSL8SA-03	MWNSL8SA-04	MWNSL8SA-05
Sample Location:	NSLMW 8SA	DNSLMW 8SA	NSLMW 8SA	DNSLMW 8SA	NSLMW 8SA	NSLMW 8SA	NSLMW 8SA
Date Sampled:	8/24/87	8/24/87	8/25/87	8/25/87	8/26/87	8/27/87	8/28/87
OTR Number:	EL499	EL553	EL510	EL555	EL535	EL546	EL523
VOLATILE ORGANICS: ug/l							
Chloromethane	---	---	NR	---	---	---	---
Bromomethane	---	---	NR	---	---	---	---
Vinyl Chloride	---	---	NR	---	---	---	---
Chloroethane	---	---	NR	---	---	---	---
Methylene Chloride	---	---	NR	---	---	---	---
Acetone	---	---	NR	---	---	7 J	---
Carbon Disulfide	---	---	NR	---	---	---	---
1,1-Dichloroethene	---	---	NR	---	---	---	---
1,1-Dichloroethane	---	---	NR	---	---	2 J	---
1,2-Dichloroethene (Total)	---	---	NR	---	---	---	---
Chloroform	---	---	NR	---	---	---	---
1,2-Dichloroethane	---	---	NR	---	---	---	---
2-Butanone	--- R	--- R	NR	--- R	--- R	--- R	--- R
1,1,1-Trichloroethane	---	---	NR	---	---	---	---
Carbon Tetrachloride	---	---	NR	---	---	---	---
Vinyl Acetate	---	---	NR	---	---	---	---
Bromodichloromethane	---	---	NR	---	---	---	---
1,2-Dichloropropane	---	---	NR	---	---	---	---
cis-1,3-Dichloropropene	---	---	NR	---	---	---	---
Trichloroethene	---	---	NR	---	---	---	---
Dibromochloromethane	---	---	NR	---	---	---	---
1,1,2-Trichloroethane	---	---	NR	---	---	---	---
Benzene	---	---	NR	---	---	---	---
cis-1,3-Dichloropropene	---	---	NR	---	---	---	---
Trans-1,2-Dichloropropene	---	---	NR	---	---	---	---
Bromoform	---	---	NR	---	---	---	---
4-Methyl-2-Pentanone	---	---	NR	---	---	---	---
2-Hexanone	---	---	NR	---	---	---	---
Tetrachloroethene	---	---	NR	---	---	---	---
1,1,2,2-Tetrachloroethane	---	---	NR	---	---	---	---
Toluene	---	---	NR	---	---	---	---
Chlorobenzene	---	---	NR	---	---	---	---
Ethylbenzene	---	---	NR	---	---	---	---
Styrene	---	---	NR	---	---	---	---
Total Xylenes	1 J	---	NR	---	---	---	---
SEMIVOLATILE ORGANICS							
Phenol	---	---	---	---	---	---	---
Benzyl Alcohol	---	---	---	---	---	---	---
1,2-Dichlorobenzene	---	---	---	---	---	---	---
4-Methylphenol	---	---	---	---	---	---	---
2,4-Dimethylphenol	---	---	---	---	---	---	---
Benzoic Acid	---	---	---	---	---	---	---
Naphthalene	---	---	---	---	---	---	---
4-Chloro-3-Methylphenol	---	---	---	---	---	---	---
2-Methylnaphthalene	---	2 J	---	---	---	---	---
Diethylphthalate	---	---	---	---	---	---	---
Di-n-Butylphthalate	---	---	2 BJ	---	3 BJ	2 BJ	2 JB
bis(2-Ethylhexyl) Phthalate	---	---	2 J	6 J	---	---	---
3-Nitroaniline	--- R	--- R	--- R	--- R	--- R	--- R	--- R
4-Nitroaniline	---	--- R	--- R	--- R	---	---	---

TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:		MWECC3A-01	MWECC3A-02	MWECC3A-03	MWECC3A-04	MWECC3A-05
Sample Location:		ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A
Date Sampled:			8/25/87	8/26/87	8/27/87	8/28/87
OTR Number:			EL512	EL556	EL548	EL524
VOLATILE ORGANICS: ug/l						
Chloromethane		NS	NR	---	---	---
Bromomethane		NS	NR	---	---	---
Vinyl Chloride		NS	NR	---	130 J	130 J
Chloroethane		NS	NR	73 J	110 J	120 J
Methylene Chloride		NS	NR	---	---	33 J
Acetone		NS	NR	42 J	32 J	---
Carbon Disulfide		NS	NR	---	---	---
1,1-Dichloroethene		NS	NR	---	---	---
1,1-Dichloroethane		NS	NR	63 J	79 J	94 J
1,2-Dichloroethene (Total)		NS	NR	550 J	650 J	750 J
Chloroform		NS	NR	---	---	---
1,2-Dichloroethane		NS	NR	---	---	---
2-Butanone		NS	NR	--- R	--- R	28 J
1,1,1-Trichloroethane		NS	NR	---	---	---
Carbon Tetrachloride		NS	NR	---	---	---
Vinyl Acetate		NS	NR	---	---	---
Bromodichloromethane		NS	NR	---	---	---
1,2-Dichloropropane		NS	NR	---	---	---
cis-1,3-Dichloropropene		NS	NR	---	---	---
Trichloroethene		NS	NR	---	---	---
Dibromochloromethane		NS	NR	---	---	---
1,1,2-Trichloroethane		NS	NR	---	---	---
Benzene		NS	NR	---	---	---
cis-1,3-Dichloropropene		NS	NR	---	---	---
Trans-1,2-Dichloropropene		NS	NR	---	---	---
Bromoform		NS	NR	---	---	---
4-Methyl-2-Pentanone		NS	NR	---	---	---
2-Hexanone		NS	NR	---	---	---
Tetrachloroethene		NS	NR	---	---	---
1,1,2,2-Tetrachloroethane		NS	NR	---	---	---
Toluene		NS	NR	---	---	---
Chlorobenzene		NS	NR	---	---	---
Ethylbenzene		NS	NR	---	---	---
Styrene		NS	NR	---	---	---
Total Xylenes		NS	NR	---	---	---
SEMIVOLATILE ORGANICS						
Phenol		NS	---	---	---	---
Benzyl Alcohol		NS	---	---	---	---
1,2-Dichlorobenzene		NS	5 J	9 J	4 J	7 J
4-Methylphenol		NS	---	---	---	---
2,4-Dimethylphenol		NS	---	---	---	---
Benzoic Acid		NS	---	8 J	---	---
Naphthalene		NS	---	---	---	---
4-Chloro-3-Methylphenol		NS	---	---	---	---
2-Methylnaphthalene		NS	---	---	---	---
Diethylphthalate		NS	---	---	---	---
Di-n-Butylphthalate		NS	2 BJ	---	---	---
bis(2-Ethylhexyl) Phthalate		NS	2 J	---	---	---
3-Nitroaniline		NS	--- R	--- R	--- R	--- R
4-Nitroaniline		NS	--- R	---	---	---

12-Jul-88

TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:	MWSBP61-01	MWSBP61-02	DMWSBP61-02	MWSBP61-03	MWSBP61-04	MWSBP61-05	DMWSBP61-05
Sample Location:	NSLSBP 61	NSLSBP 61	NSLDSBP 61	NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLDSBP 61
Date Sampled:		8/25/87	8/25/87	8/26/87	8/27/87	8/28/87	8/28/87
QTR Number:		EL514	EL554	EL539	EL516	EL527	EL551
VOLATILE ORGANICS: ug/l							
Chloromethane	NS	NR	---	---	---	---	---
Bromomethane	NS	NR	---	---	---	---	---
Vinyl Chloride	NS	NR	---	---	---	---	---
Chloroethane	NS	NR	---	---	2 J	3 J	---
Methylene Chloride	NS	NR	---	---	---	---	---
Acetone	NS	NR	---	---	9 J	---	---
Carbon Disulfide	NS	NR	---	---	---	---	---
1,1-Dichloroethene	NS	NR	---	---	---	---	---
1,1-Dichloroethane	NS	NR	---	---	---	---	---
1,2-Dichloroethene (Total)	NS	NR	---	---	---	---	---
Chloroform	NS	NR	---	---	---	---	---
1,2-Dichloroethane	NS	NR	---	---	---	---	---
2-Butanone	NS	NR	--- R	--- R	5 J	--- R	--- R
1,1,1-Trichloroethane	NS	NR	---	---	---	---	---
Carbon Tetrachloride	NS	NR	---	---	---	---	---
Vinyl Acetate	NS	NR	---	---	---	---	---
Bromodichloromethane	NS	NR	---	---	---	---	---
1,2-Dichloropropane	NS	NR	---	---	---	---	---
cis-1,3-Dichloropropene	NS	NR	---	---	---	---	---
Trichloroethene	NS	NR	---	---	---	---	---
Dibromochloromethane	NS	NR	---	---	---	---	---
1,1,2-Trichloroethane	NS	NR	---	---	---	---	---
Benzene	NS	NR	---	---	---	---	---
cis-1,3-Dichloropropene	NS	NR	---	---	---	---	---
Trans-1,2-Dichloropropene	NS	NR	---	---	---	---	---
Bromoform	NS	NR	---	---	---	---	---
4-Methyl-2-Pentanone	NS	NR	---	---	---	---	---
2-Hexanone	NS	NR	---	---	---	---	---
Tetrachloroethene	NS	NR	---	---	---	---	---
1,1,2,2-Tetrachloroethane	NS	NR	---	---	---	---	---
Toluene	NS	NR	---	---	---	---	---
Chlorobenzene	NS	NR	---	---	---	---	---
Ethylbenzene	NS	NR	---	---	---	---	---
Styrene	NS	NR	---	---	---	---	---
Total Xylenes	NS	NR	---	---	---	---	---
SEMIVOLATILE ORGANICS							
Phenol	NS	NR	---	---	---	---	---
Benzyl Alcohol	NS	NR	---	---	---	---	---
1,2-Dichlorobenzene	NS	NR	---	---	---	---	---
4-Methylphenol	NS	NR	---	---	---	---	---
2,4-Dimethylphenol	NS	NR	---	---	---	---	---
Benzoic Acid	NS	NR	---	---	---	10 J	---
Naphthalene	NS	NR	---	---	---	---	---
4-Chloro-3-Methylphenol	NS	NR	---	---	---	---	---
2-Methylnaphthalene	NS	NR	---	---	---	---	---
Diethylphthalate	NS	NR	---	---	---	---	---
Di-n-Butylphthalate	NS	NR	2 BJ	3 BJ	3 BJ	---	---
bis(2-Ethylhexyl) Phthalate	NS	NR	---	---	---	---	---
3-Nitroaniline	NS	NR	--- R	--- R	--- R	--- R	--- R
4-Nitroaniline	NS	NR	--- R	---	---	---	---

TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:	LTFB-01	LTFB-02	LTFB-03	LTFB-04	LTFB-05
Sample Location:	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB
Date Sampled:		8/25/87		8/27/87	
OTR Number:		EL534		EL522	
VOLATILE ORGANICS: ug/l					
Chloromethane	NS	---	NS	---	NS
Bromomethane	NS	---	NS	---	NS
Vinyl Chloride	NS	---	NS	---	NS
Chloroethane	NS	---	NS	---	NS
Methylene Chloride	NS	---	NS	---	NS
Acetone	NS	---	NS	---	NS
Carbon Disulfide	NS	---	NS	---	NS
1,1-Dichloroethene	NS	---	NS	---	NS
1,1-Dichloroethane	NS	---	NS	---	NS
1,2-Dichloroethene (Total)	NS	---	NS	---	NS
Chloroform	NS	---	NS	---	NS
1,2-Dichloroethane	NS	---	NS	---	NS
2-Butanone	NS	7 J	NS	--- R	NS
1,1,1-Trichloroethane	NS	---	NS	---	NS
Carbon Tetrachloride	NS	---	NS	---	NS
Vinyl Acetate	NS	---	NS	---	NS
Bromodichloromethane	NS	---	NS	---	NS
1,2-Dichloropropane	NS	---	NS	---	NS
cis-1,3-Dichloropropene	NS	---	NS	---	NS
Trichloroethene	NS	---	NS	---	NS
Dibromochloromethane	NS	---	NS	---	NS
1,1,2-Trichloroethane	NS	---	NS	---	NS
Benzene	NS	---	NS	---	NS
cis-1,3-Dichloropropene	NS	---	NS	---	NS
Trans-1,2-Dichloropropene	NS	---	NS	---	NS
Bromoform	NS	---	NS	---	NS
4-Methyl-2-Pentanone	NS	---	NS	---	NS
2-Hexanone	NS	---	NS	---	NS
Tetrachloroethene	NS	---	NS	---	NS
1,1,2,2-Tetrachloroethane	NS	---	NS	---	NS
Toluene	NS	---	NS	---	NS
Chlorobenzene	NS	---	NS	---	NS
Ethylbenzene	NS	---	NS	---	NS
Styrene	NS	---	NS	---	NS
Total Xylenes	NS	---	NS	---	NS
SEMIVOLATILE ORGANICS					
Phenol	NS	---	NS	---	NS
Benzyl Alcohol	NS	---	NS	---	NS
1,2-Dichlorobenzene	NS	---	NS	---	NS
4-Methylphenol	NS	---	NS	---	NS
2,4-Dimethylphenol	NS	---	NS	---	NS
Benzoic Acid	NS	---	NS	---	NS
Naphthalene	NS	---	NS	---	NS
4-Chloro-3-Methylphenol	NS	---	NS	---	NS
2-Methylnaphthalene	NS	---	NS	---	NS
Diethylphthalate	NS	---	NS	---	NS
Di-n-Butylphthalate	NS	---	NS	2 J	NS
bis(2-Ethylhexyl) Phthalate	NS	---	NS	---	NS
3-Nitroaniline	NS	--- R	NS	--- R	NS
4-Nitroaniline	NS	--- R	NS	---	NS

Appendix E
PROPOSED DISCHARGE LIMITS

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

OFFICE MEMORANDUM

DATE: April 10, 1987

TO: John Buck

THRU: Joseph Krieger JEK
Larry Kane
Joseph Stallsmith
Jane Magee
Glenn Pratt

FROM: Brad Gavin BG

SUBJECT: Proposed Design and NPDES Permit Limits for the North Side Landfill

Attached are some design and permit limits for the North Side Landfill. The limits for the parameters copper, lead, zinc, hexavalent chromium, and cyanide, were determined using EPA criteria for toxicity to aquatic life. The limits for the parameters arsenic, tetrachloroethylene, trichloroethylene, methylene chloride, benzene, and phenanthrene were determined using EPA criteria for protection of human health from the carcinogenic effects of these compounds at the 10^{-6} risk level for people consuming aquatic organisms only. The limit for 4-chloro-3-methylphenol is one-tenth the 96-hour LC50 for the compound. The limits for TSS, oil & grease, chloride, and iron were determined using available toxicity data for the compounds and best professional judgment. The flow used to determine all of the limits was the $Q_{7,10}$ flow of Finley Creek, which, given the limited drainage area is assumed to be 0.0 cfs.

Northside Landfill
Proposed Permit Limits
4/09/87

Parameter	Discharge Limits Monthly Average	Discharge Limits Daily Maximum	Monitoring Requirements Frequency	Monitoring Requirements Type	Design Limits Long Term Average
	mg/l				mg/l
TSS	10	20	Twice Weekly	24-Hr. Comp.	--
Oil and Grease	--	10	Twice Weekly	Grab	--
Chloride	--	1,500	Twice Weekly	24-Hr. Comp.	--
Total Recoverable Copper	0.015	0.023	Twice Weekly	24-Hr. Comp.	0.011
Total Recoverable Lead	0.009	0.014	Twice Weekly	24-Hr. Comp.	0.0066
Total Recoverable Zinc	0.098	0.17	Twice Weekly	24-Hr. Comp.	0.0658
Total Recoverable Hexavalent Chromium	0.006	0.009	Twice Weekly	24-Hr. Comp.	0.0042
Total Cyanide	0.006	0.01	Twice Weekly	24-Hr. Comp.	0.0047
Total Iron	--	1.00	Twice Weekly	24-Hr. Comp.	--
Total Arsenic*	0.0000175	--	Twice Weekly	24-Hr. Comp.	--
4-Chloro-3-Methylphenol	--	0.001	Twice Monthly	Grab	--
Tetrachloroethylene	0.009	--	Twice Monthly	Grab	--
Trichloroethylene	0.081	--	Twice Monthly	Grab	--
Methylene Chloride	0.016	--	Twice Monthly	Grab	--
Benzene	0.04	--	Twice Monthly	Grab	--
Phenanthrene**	0.00003	--	Twice Monthly	24-Hr. Comp.	--
Chronic Toxicity***	Monitor Only		Quarterly	24-Hr. Comp.	--

*The detection level of arsenic is 0.001 mg/l while the monthly average limit is 0.0000175 mg/l. If the permittee never exceeds 0.001 mg/l of arsenic in their effluent the permittee will be in compliance with the permit.

**The detection level of phenanthrene is 0.0054 mg/l while the monthly average limit is 0.00003 mg/l. If the permittee never exceeds 0.0054 mg/l of phenanthrene in the effluent the permittee will be in compliance with the permit.

***The permittee shall monitor chronic toxicity of the effluent using the fathead minnow growth test and the ceriodaphnia life cycle test quarterly for a period of one year. If after that sampling has been completed and the effluent has been found not to be chronically toxic the permittee will be allowed to reduce the toxicity monitoring to yearly.

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: May 27, 1987

TO: John Buck

THRU: Joseph Krieger
Larry Kane
Joseph Stallsmith
Jane Magee
Glenn Pratt

FROM: Brad Gavin

SUBJECT: Additional NPDES Permit Requirements for the North Side Landfill

On April 10, 1987 I sent a memo regarding some proposed permit limits for the North Side Landfill. The memo never made it through channels and hasn't been located. Attached find a copy of that earlier memo and a list of proposed permit requirements for some additional pollutants. The limits for the parameters chloroform, and 1,1-dichloroethylene were determined using EPA criteria for protection of human health from the carcinogenic effects of these compounds at the 10^{-6} risk level for people consuming aquatic organisms only. These limits should adequately protect the people which receive their drinking water from the Eagle Creek Reservoir from the carcinogenic properties of these compounds. The limit for phenol is one-tenth the 96-hour LC50 for the compound. Monitoring for cis-1,2-dichloroethylene will be required since it has been frequently detected in the receiving stream downstream of the North Side Landfill. A GC/MS scan will be required quarterly to determine if unpermitted parameters are being discharged in harmful quantities. The flow used to determine all of the limits was the $Q_{7,10}$ flow of Finley Creek, which, given the limited drainage area is assumed to be 0.0 cfs.

Northside Landfill
Proposed Permit Limits
5/27/87

Parameter	Discharge Limits Monthly Average	Discharge Limits Daily Maximum	Monitoring Requirements Frequency	Monitoring Requirements Type
	mg/l			
Phenol	--	0.57	Twice Weekly	24-Hr. Comp.
1,1-Dichloroethylene	0.002	--	Twice Monthly	Grab
Chloroform	0.016	--	Twice Monthly	Grab
Cis-1,2-Dichloroethylene	Monitor Only		Twice Monthly	Grab
GC/MS Scan	Monitor Only		Quarterly	As required by test method

State Form 4336

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: June 7, 1988

TO: John Buck CPB 7/12/88
Office of Environmental Response

THRU: Joe Krieger JK
Lon Brumfield LDB 6/7
Joe Stallsmith JCS 7-1

FROM: Brad Gavin

SUBJECT: Northside/ECC Influent Characterization Study

I am sending you some revised limitations for the Northside landfill discharge. Also, as we discussed on the telephone, I am also sending a copy of the limitations to Al Lao of the Facility Planning Section to review the influent data and the proposed treatment system to verify that it will be able to meet the proposed NPDES Permit limits. We are asking that he comment to you directly through channels, with a copy sent to us, by June 30, 1988.

North Side Landfill

Parameter	Proposed Limits Average	Maximum
	mg/l	
Arsenic[1]	0.0002	0.0003
Hex. Chromium	0.008	0.018
Copper	0.021	0.048
Cyanide[1]	0.005	0.009
Iron	0.71	1.6
Lead	0.009	0.02
Zinc	0.184	0.429
Chloride	160	373
4-Chloro-3-Methylphenol[1]	0.0022	0.0044
Tetrachloroethene[2]	0.022	0.056
Trichloroethene[2]	0.021	0.054
Methylene Chloride[2]	0.04	0.089
Benzene[2]	0.037	0.136
Phenanthrene[1]	0.002	0.004
Phenol[2]	0.015	0.026
1,1-Dichloroethene	0.005	0.012
Chloroform[2]	0.021	0.046
Cis-1,2-Dichloroethylene	Monitor Only	
Vinyl Chloride[2]	0.104	0.268
Chloroethane[2]	0.104	0.268
$CBOD_5$	10	20
TSS	12	24
Phosphorus	1[3]	
Dissolved Oxygen	6.0 minimum daily average	
Ammonia[4]		
Summer	1.5	3.0
Winter	3.0	6.0

[1] The limitations for the above noted parameters are based on the quantification limits for those parameters. The limitations based on Water Quality Standards are given below. If more precise methods of analysis are approved the permit may be modified to recognize the lower detectable values.

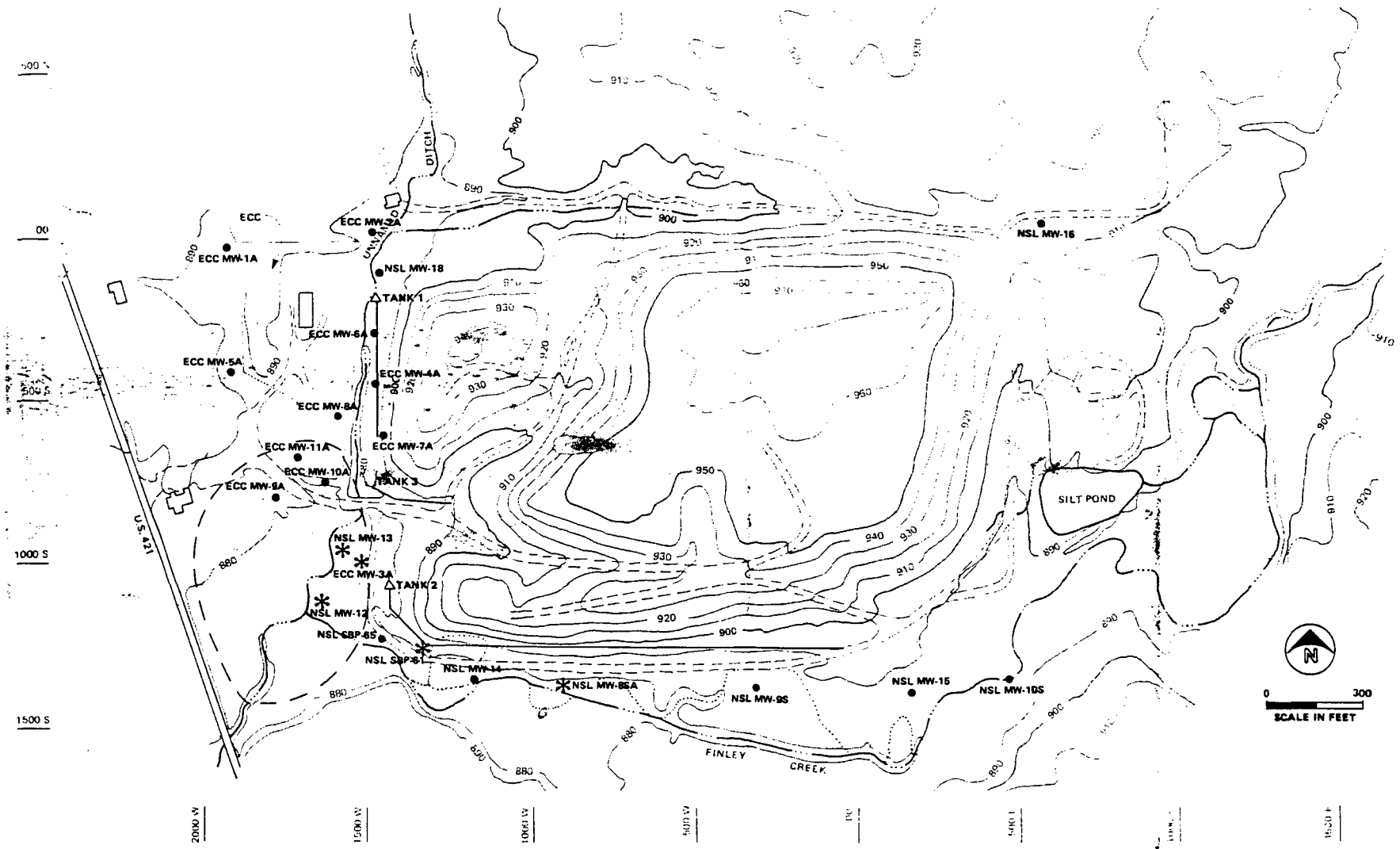
Arsenic	0.0001	0.0003
Cyanide	0.004	0.009
4-Chloro-3-Methylphenol	0.00005	0.00012
Phenanthrene	0.0002	0.0005

[2] The limitations for the above noted parameters are based on the Best Professional Judgement (BPJ) of BAT for this discharge.

[3] Or the percent removal required by 327 IAC 5-10, whichever is more stringent.

Phosphorus in Raw Sewage	Removal Required
Greater than or equal to 4	80%
less than 4, greater than or equal to 3	75%
less than 3, greater than or equal to 2	70%
less than 2, greater than or equal to 1	65%
less than 1	60%

[4] The limitations for ammonia above are based on the available treatment technology. The limitations protective of water quality are 1.1 mg/l monthly average and 2.3 mg/l daily maximum in the summer, and 1.6 mg/l monthly average and 3.3 mg/l daily maximum in the winter. If economically viable treatment technology becomes available to treat ammonia to lower levels this permit will be modified to reflect the new treatability limits.



LEGEND

- ● EXISTING MONITORING WELLS
- ✱ EXISTING MONITORING WELLS SAMPLED (AUGUST 1987)
- △ BURIED LEACHATE COLLECTION TANKS SAMPLED (AUGUST 1987)
- —— BURIED LEACHATE TILES (APPROXIMATE LOCATION)
- SUPPLEMENTAL INVESTIGATION AREA (SEE FIGURE 2)

FIGURE 1
SITE FEATURES
AND SAMPLING LOCATIONS
NSL/ECC TECH MEMO NO. 1

TABLE B-2. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - ORGANIC RESULTS

Sample Number:	MWFB-01	MWFB-02	MWFB-03	MWFB-04	MWFB-05
Sample Location:	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB
Date Sampled:	8/24/87	8/25/87	8/26/87	8/27/87	
OTR Number:	EL508	EL533	EL544	EL521	
VOLATILE ORGANICS: ug/l					
Chloromethane	---	---	---	---	NS
Bromomethane	---	---	---	---	NS
Vinyl Chloride	---	---	---	---	NS
Chloroethane	---	---	---	---	NS
Methylene Chloride	---	---	---	---	NS
Acetone	---	---	---	---	NS
Carbon Disulfide	---	---	---	---	NS
1,1-Dichloroethene	---	---	---	---	NS
1,1-Dichloroethane	---	---	---	---	NS
1,2-Dichloroethene (Total)	---	---	---	---	NS
Chloroform	---	---	---	---	NS
1,2-Dichloroethane	---	---	---	---	NS
2-Butanone	8 J	6 J	--- R	--- R	NS
1,1,1-Trichloroethane	---	---	---	---	NS
Carbon Tetrachloride	---	---	---	---	NS
Vinyl Acetate	---	---	---	---	NS
Bromodichloromethane	---	---	---	---	NS
1,2-Dichloropropane	---	---	---	---	NS
cis-1,3-Dichloropropene	---	---	---	---	NS
Trichloroethene	---	---	---	---	NS
Dibromochloromethane	---	---	---	---	NS
1,1,2-Trichloroethane	---	---	---	---	NS
Benzene	---	---	---	---	NS
cis-1,3-Dichloropropene	---	---	---	---	NS
Trans-1,2-Dichloropropene	---	---	---	---	NS
Bromoform	---	---	---	---	NS
4-Methyl-2-Pentanone	---	---	---	---	NS
2-Hexanone	---	---	---	---	NS
Tetrachloroethene	---	---	---	---	NS
1,1,2,2-Tetrachloroethane	---	---	---	---	NS
Toluene	---	---	---	---	NS
Chlorobenzene	---	---	---	---	NS
Ethylbenzene	---	---	---	---	NS
Styrene	---	---	---	---	NS
Total Xylenes	---	---	---	---	NS
SEMIVOLATILE ORGANICS					
Phenol	---	---	NR	---	NS
Benzyl Alcohol	---	---	NR	---	NS
1,2-Dichlorobenzene	---	---	NR	---	NS
4-Methylphenol	---	---	NR	---	NS
2,4-Dimethylphenol	---	---	NR	---	NS
Benzoic Acid	---	---	NR	---	NS
Naphthalene	---	---	NR	---	NS
4-Chloro-3-Methylphenol	---	---	NR	---	NS
2-Methylnaphthalene	---	---	NR	---	NS
Diethylphthalate	---	---	NR	---	NS
Di-n-Butylphthalate	---	---	NR	2 J	NS
bis(2-Ethylhexyl) Phthalate	---	---	NR	---	NS
3-Nitroaniline	--- R	--- R	NR	--- R	NS
4-Nitroaniline	--- R	--- R	NR	---	NS

TABLE B-3. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - CONVENTIONAL POLLUTANTS

Sample Number:	LT01-01	LT01-02	LT01-03	LT01-04	LT01-05	LT02-01	LT02-02	LT02-03	DLT02-03	LT02-04	LT02-05
Sample Location:	NSLLT 1	NSLLT 1	NSLLT 1	NSLLT 1	NSLLT 1	NSLLT 2	NSLLT 2	NSLLT 2	NSLLT 2	NSLLT 2	NSLLT 2
Date Sampled:	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87	8-24-87	8-25-87	8-26-87	8-26-87	8-27-87	8-28-87
Control Number:	C2607	C2615	C2626	C2640	C2665	C2605	C2614	C2627	C2630	C2641	C2666
Lab ID Number:	TC0120	TC0121	TC0142	TC0156	TC0165	TC0122	TC0123	TC0143	TC0146	TC0157	TC0166
PARAMETERS MG/L											
BOD5	34	36	39	35	36	67	68	66	68	66	67
COD	690	700	700	730	740	640	620	660	650	640	640
TOC	195.4	195.2	154.6	183.1	117.7	194.4	190.8	190.5	189.3	186.5	191.5
TSS	56	54	52	52	60	84	86	84	72	84	94
VSS	20	16	24	28	30	34	34	32	28	46	42
TDS	4030	4050	4020	3990	3970	3680	3670	3680	3650	3670	3660
TKN	220	240	240	250	250	300	300	310	300	320	310
NH3-N	230	240	240	230	230	290	290	300	300	290	290
NO3&NO2-N	---	---	---	---	---	---	---	---	---	---	---
TP	0.44	0.38	0.37	0.39	0.41	0.56	0.57	0.61	0.56	0.62	0.63
ALKALINITY AS (CaCO3)	2260	2240	2240	2260	2240	2340	2360	2340	2340	2330	2350
CL	1240	1240	1240	1280	1260	1220	1220	1220	1200	1240	1240
SO4	38	28	37	26	29	33	33	32	31	32	31
O&G	---	---	---	---	---	---	---	---	---	---	---
pH	NM	NM	6.9 ‡	7.0 ‡‡	7.0 ‡‡	NM	NM	5.7 ‡	NM	6.9 ‡‡	6.9 ‡‡
TEMPERTURE (degrees C)	18	22.5	27	21	19	18	22.5	28	28	21	20
CONDUCTIVITY (umhos/cm2)	4000	7000	7000	7000	7000	3650	6500	8000	8000	7000	7000

Sample Number:	LT03-01	LT03-02	LT03-03	LT03-04	LT03-05	MWNSL12-01	MWNSL12-02	MWNSL12-03	MWNSL12-04	DMWNSL12-04	MWNSL12-05
Sample Location:	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3	NSLLT 3	NSLMW 12	NSLMW 12	NSLMW 12	NSLMW 12	NSLMW 12	NSLMW 12
Date Sampled:	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87	8-24-87	8-25-87	8-26-87	8-26-87	8-27-87	8-28-87
Control Number:	C2613	C2616	C2628	C2642	C2667	C2606	C2611	C2624	C2635	C2637	C2653
Lab ID Number:	TC0124	TC0125	TC0144	TC0158	TC0167	TC0131	TC0132	TC0140	TC0151	TC0153	TC0163
PARAMETERS MG/L											
BOD5	12	11	12	17	10	33	35	31	46	34	40
COD	260	240	280	280	270	340	370	400	390	460	700
TOC	78.8	77.3	81	78.5	76.8	71.5	74.8	76.4	73.4	74.2	71.2
TSS	70	42	62	64	34	3160	3650	3900	3110	1000	8650
VSS	24	18	10	30	15	300	276	366	432	168	740
TDS	1860	1840	1820	1820	1880	2190	2160	2190	2180	2180	2220
TKN	120	120	61	130	130	58	60	64	66	70	78
NH3-N	120	12	58	120	110	55	56	57	57	58	58
NO3&NO2-N	0.2	---	---	---	0.1	---	---	---	---	---	---
TP	0.41	0.3	0.42	0.35	0.18	0.5	0.82	0.95	0.82	2	5.1
ALKALINITY AS (CaCO3)	1380	1380	1320	1340	1330	670	688	812	650	650	660
CL	390	375	375	375	390	860	900	920	920	920	960
SO4	27	34	41	41	39	16	12	13	15	15	16
O&G	---	---	10	---	---	---	---	---	---	---	---
pH	NM	NM	7.5 ‡	7.2 ‡‡	7.1 ‡‡	NM	NM	7.1 ‡	NM	7.2 ‡‡	7.2 ‡‡
TEMPERTURE (degrees C)	NM	22	27	21	20	18	23	28	28	20	18
CONDUCTIVITY (umhos/cm2)	NM	3500	3500	3300	3100	3200	2900	4000	4000	2200	3000

NOTE: NM: Not measured.
NS: Not sampled.
‡: pH measured in the field.
‡‡: pH measured in the laboratory.
"---" All parameters in all samples underwent analysis. If concentration is not listed, the parameter was not detected above instrument detection limit.

TABLE B-3. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - CONVENTIONAL POLLUTANTS

Sample Number:		MWNSL13-01	MWNSL13-02	DMWNSL13-02	MWNSL13-03	DMWNSL13-03	MWNSL13-04	MWNSL13-05	MWNSL8SA-01	MWNSL8SA-02	MWNSL8SA-03	MWNSL8SA-04	MWNSL8SA-05
Sample Location:		NSLMW 13	NSLMW 13	NSLMW 13	NSLMW 13	NSLMW 13	NSLMW 13	NSLMW 13	NSLMW 8SA	NSLMW 8SA	NSLMW 8SA	NSLMW 8SA	NSLMW 8SA
Date Sampled:			8-25-87	8-25-87	8-26-87	8-26-87	8-27-87	8-28-87	8-24-87	8-25-87	8-26-87	8-27-87	8-28-87
Control Number:			C2619	C2620	C2623	C2629	C2634	C2652	C2604	C2618	C2621	C2632	C2650
Lab ID Number:			TC0126	TC0127	TC0139	TC0145	TC0150	TC0162	TC0133	TC0134	TC0137	TC0148	TC0160
PARAMETERS MG/L													
BOD5	NS		9.3	7.3	7.3	8.8	6.7	12	1.6	2.5	2.5	5.5	2.1
COD	NS		57	57	58	84	49	100	15	7	15	7	12
TOC	NS		15.5	14.7	15.7	16.2	15.8	18.2	2.8	2.4	2.8	2.6	2.5
TSS	NS		16	16	22	24	24	168	42	4	123	105	92
VSS	NS		4	6	4	6	6	28	8	2	20	15	15
TDS	NS		826	837	790	810	778	764	334	338	328	328	406
TKN	NS		16	16	21	18	16	18	1.2	1.1	1.3	1.2	1.2
NH3-N	NS		16	16	16	16	15	15	1	1	1	1	1
NO3&NO2-N	NS		---	---	---	---	---	---	---	---	---	---	---
TP	NS		---	---	---	---	---	0.24	0.11	0.03	0.11	0.05	0.07
ALKALINITY AS (CaCO3)	NS		514	520	504	504	500	480	322	326	330	328	328
CL	NS		160	160	150	150	145	140	5	4	5	5	5
SO4	NS		36	34	34	34	36	38	6	6	6	7	10
O&G	NS		---	---	---	---	---	---	---	---	---	---	---
pH	NS		NM	NM	7.0 ‡	NM	6.9 ‡‡	7 ‡‡	NM	NM	6.3 ‡	7.3 ‡‡	7.4 ‡‡
TEMPERTURE (degrees C)	NS		22	22	27	27	21	18	18	23	28	21	22
CONDUCTIVITY (umhos/cm2)	NS		1300	1300	1400	1400	1300	1100	800	550	700	600	490

Sample Number:		MWECC3A-01	MWECC3A-02	MWECC3A-03	MWECC3A-04	MWECC3A-05	MWSBP61-01	MWSBP61-02	MWSBP61-03	MWSBP61-04	MWSBP61-05	DMWSBP061-05
Sample Location:		ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A	ECCMW 3A	NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLSBP 61	NSLSBP 61
Date Sampled:			8-25-87	8-26-87	8-27-87	8-28-87		8-25-87	8-26-87	8-27-87	8-28-87	8-28-87
Control Number:			C2617	C2622	C2633	C2651		C2612	C2625	C2636	C2664	C2668
Lab ID Number:			TC0128	TC0138	TC0149	TC0161		TC0136	TC0141	TC0152	TC0164	TC0168
PARAMETERS MG/L												
BOD5	NS		24	27	21	27	NS	29	31	23	25	27
COD	NS		350	340	360	370	NS	630	440	520	370	350
TOC	NS		77.2	77.2	75.2	78.8	NS	91	96	97	98.6	97
TSS	NS		2760	1310	840	2360	NS	9640	4470	5920	1520	1150
VSS	NS		228	172	138	344	NS	576	308	420	184	148
TDS	NS		2340	2260	2280	2410	NS	2630	2710	2790	2800	2830
TKN	NS		63	64	65	72	NS	74	77	76	83	80
NH3-N	NS		59	57	58	58	NS	57	63	66	69	68
NO3&NO2-N	NS		---	---	---	---	NS	---	---	---	---	---
TP	NS		1.2	0.7	1.2	1.3	NS	5.8	2.4	4	0.72	0.6
ALKALINITY AS (CaCO3)	NS		700	732	710	730	NS	1240	1300	1340	1380	1360
CL	NS		940	920	940	940	NS	880	920	920	960	940
SO4	NS		15	13	14	15	NS	14	24	17	15	28
O&G	NS		---	---	---	---	NS	---	---	---	---	---
pH	NS		NM	6.9 ‡	7.0 ‡‡	7.1 ‡‡	NS	NM	6.7 ‡	6.7 ‡‡	6.7 ‡‡	6.7 ‡‡
TEMPERTURE (degrees C)	NS		23	27	19	17	NS	22	25	20	18	NM
CONDUCTIVITY (umhos/cm2)	NS		3100	4000	3400	3400	NS	3500	4600	4200	4000	NM

NOTE: NM: Not measured.
NS: Not sampled.
‡: pH measured in the field.
‡‡: pH measured in the laboratory.
"---" All parameters in all samples underwent analysis. If concentration is not listed, the parameter was not detected above instrument detection limit.

TABLE B-3. NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
LEACHATE AND GROUNDWATER - CONVENTIONAL POLLUTANTS

Sample Number:	LTFB-01	LTFB-02	LTFB-03	LTFB-04	LTFB-05	MWFB-01	MWFB-02	MWFB-03	MWFB-04	MWFB-05
Sample Location:	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB	NSLLT FB	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB	NSLMW FB
Date Sampled:	8-24-87			8-27-87		8-24-87	8-25-87	8-26-87	8-27-87	
Control Number:	C2608			C2639		C2609	C2610	C2631	C2638	
Lab ID Number:	TC0135			TC0155		TC0129	TC0130	TC0147	TC0154	
PARAMETERS MG/L										
BOD5	---	NS	NS	---	NS	---	---	---	---	NS
COD	---	NS	NS	---	NS	---	---	---	---	NS
TOC	---	NS	NS	---	NS	---	---	---	---	NS
TSS	---	NS	NS	---	NS	---	---	---	---	NS
VSS	1	NS	NS	---	NS	---	---	1	1	NS
TDS	---	NS	NS	---	NS	---	---	---	---	NS
TKN	---	NS	NS	---	NS	---	---	---	---	NS
NH3-N	---	NS	NS	---	NS	---	---	---	---	NS
NO3&NO2-N	---	NS	NS	---	NS	---	---	---	---	NS
TP	---	NS	NS	---	NS	---	---	---	---	NS
ALKALINITY AS (CaCO3)	2	NS	NS	2	NS	2	2	2	2	NS
CL	---	NS	NS	---	NS	---	---	---	---	NS
SO4	---	NS	NS	---	NS	---	---	---	---	NS
O&G	---	NS	NS	---	NS	---	---	---	---	NS
pH	NM	NS	NS	8.5 ‡‡	NS	NM	NM	NM	8.5 ‡‡	NS
TEMPERTURE (degrees C)	NM	NS	NS	NM	NS	NM	NM	NM	NM	NS
CONDUCTIVITY (umhos/cm2)	NM	NS	NS	NM	NS	NM	NM	NM	NM	NS

NOTE: NM: Not measured.
NS: Not sampled.
‡: pH measured in the field.
‡‡: pH measured in the laboratory.
"---" All parameters in all samples underwent analysis. If concentration is not listed, the parameter was not detected above instrument detection limit.

Appendix C

MAXIMUM, MINIMUM, AND AVERAGE CONCENTRATIONS OF CHEMICAL CONSTITUENTS IN LEACHATE AND GROUNDWATER

Table C-1: Maximum, Minimum, and Average Concentrations of Metals in Leachate and Groundwater

Table C-2: Maximum, Minimum, and Average Concentrations of Organics in Leachate and Groundwater

Table C-3: Water Characteristics and Treatment Considerations of Leachate and Groundwater

TABLE C-1. NSL/ECC PREDESIGN INVESTIGATION
MAXIMUM, MINIMUM, AND AVERAGE CONCENTRATIONS OF METALS IN LEACHATE AND GROUNDWATER

NSLLT1 + NSLLT2 + NSLLT3

	NPDES PERMIT		Instrument	UNFILTERED				FILTERED			
	Max	Avg	Detection Limit	Max	Min	Avg	# of samples detected/total	Max	Min	Avg	# of samples detected/total
INORGANICS (ug/l)											
Aluminum			15	150.0	--	61.6	12/17	66.0	17.0	44.8	17/17
Antimony			25	--	--	--	0/17	71.0	--	--	1/17
Arsenic	0.3	0.2	10	13.0	--	6.9	10/17	11.0	--	--	1/17
Barium			3	553.0	62.0	323.1	17/17	410.0	30.0	212.2	17/17
Beryllium			1	--	--	--	0/17	--	--	--	0/17
Cadmium			4	--	--	--	0/17	4.2	--	--	1/17
Calcium			179	205000.0	118000.0	159966.7	17/17	200000.0	116000.0	152133.3	17/17
Chromium	18	8	4	29.0	6.2	14.9	17/17	25.0	9.2	17.4	17/17
Cobalt			9	--	--	--	0/17	11.0	--	4.6	4/17
Copper	48	21	6	88.0	--	17.5	9/17	29.0	--	4.7	5/17
Iron	1600	710	24	30300.0	12400.0	23126.7	17/17	11700.0	136.0	4029.2	17/17
Lead	20	9	5	27.0	--	17.6	16/17	16.0	--	7.2	12/17
Magnesium			153	185000.0	94600.0	150513.3	17/17	189000.0	92000.0	150073.3	17/17
Manganese			4	248.0	86.0	167.0	17/17	236.0	75.0	148.1	17/17
Mercury			0.2	--	--	--	0/17	--	--	--	0/17
Nickel			8	95.0	19.0	63.0	17/17	98.0	17.0	64.2	17/17
Potassium			175	409000.0	147000.0	283633.3	17/17	403000.0	142000.0	281966.7	17/17
Selenium			5	--	--	--	0/17	8.0	--	--	1/17
Sodium			1090	706000.0	247000.0	511100.0	17/17	702000.0	250000.0	519166.7	17/17
Tin			22	--	--	--	0/17	192.0	--	14.4	2/17
Vanadium			7	8.1	--	1.7	2/17	12.0	--	--	1/17
Zinc	429	184	3	2660.0	62.0	598.2	17/17	1480.0	20.0	221.0	17/17

NSLMW12 + NSLMW13 + ECCMW3A + NSLSBP61 + NSLMW8SA

	NPDES PERMIT		Instrument	UNFILTERED				FILTERED			
	Max	Avg	Detection Limit	Max	Min	Avg	# of samples detected/total	Max	Min	Avg	# of samples detected/total
INORGANICS (ug/l)											
Aluminum			15	92000.0	--	19331.8	26/27	376.0	--	44.7	20/27
Antimony			25	--	--	--	0/27	--	--	--	0/27
Arsenic	0.3	0.2	10	45.0	--	18.7	21/27	19.0	--	8.3	11/27
Barium			3	4120.0	256.0	1470.2	27/27	3830.0	229.0	1267.5	27/27
Beryllium			1	5.3	--	1.1	11/27	--	--	--	0/27
Cadmium			4	8.0	--	2.2	6/27	--	--	--	0/27
Calcium			179	917000.0	58700.0	290361.0	27/27	261000.0	54000.0	115649.0	27/27
Chromium	18	8	4	185.0	--	46.2	23/27	14.0	--	8.8	26/27
Cobalt			9	80.0	--	20.0	15/27	9.1	--	--	1/27
Copper	48	21	6	486.0	--	94.4	19/27	11.0	--	2.4	4/27
Iron	1600	710	24	286000.0	1330.0	61870.3	27/27	13000.0	53.0	2759.5	27/27
Lead	20	9	5	210.0	--	48.6	18/27	13.0	--	4.2	11/27
Magnesium			153	354000.0	28400.0	150888.5	27/27	155000.0	26400.0	94178.5	27/27
Manganese			4	3960.0	34.0	1128.4	27/27	529.0	24.0	151.6	27/27
Mercury			0.2	0.3	--	0.06	2/27	--	--	--	0/27
Nickel			8	358.0	--	102.8	21/27	82.0	--	43.1	21/27
Potassium			175	99400.0	1450.0	60357.5	27/27	95800.0	1400.0	56833.9	27/27
Selenium			5	--	--	--	0/27	--	--	--	0/27
Sodium			1090	433000.0	25700.0	266941.5	27/27	457000.0	25000.0	274320.0	27/27
Tin			22	--	--	--	0/27	--	--	--	0/27
Vanadium			7	233.0	--	51.1	15/27	--	--	--	0/27
Zinc	429	184	3	2160.0	--	400.6	26/27	126.0	4.3	28.3	27/27

Note: NPDES PERMIT -- Proposed State of Indiana NSL NPDES Permit Limits
Max (Min) -- Possible highest (lowest) concentration.
--; Not detected
1. Concentrations below quantification limits are estimated values.
2. Maximum, minimum, and average concentrations are calculated where at least two samples of the total number of samples is quantified.
3. Average values (where there are at least 2 samples quantified) are calculated assuming non-detected ("--") values in other samples are 1/2 the instrument detection limits.

TABLE C-1. NSL/ECC PREDESIGN INVESTIGATION
MAXIMUM, MINIMUM, AND AVERAGE CONCENTRATIONS OF METALS IN LEACHATE AND GROUNDWATER

NSLLT1 + NSLLT2 + NSLLT3 + NSLMW12 + NSLMW13 + ECCMW3A + NSLSBP61 + NSLMW8SA

	NPDES PERMIT		Instrument	UNFILTERED				FILTERED			
	Max	Avg	Detection Limit	Max	Min	Avg	# of samples detected/total	Max	Min	Avg	# of samples detected/total
INORGANICS (ug/l)											
Aluminum			15	92000.0	--	9696.7	38/44	376.0	--	44.7	37/44
Antimony			25	--	--	--	0/44	71.0	--	--	1/44
Arsenic	0.3	0.2	10	45.0	--	12.8	31/44	19.0	--	5.1	12/44
Barium			3	4120.0	62.0	896.7	44/44	3830.0	30.0	739.9	44/44
Beryllium			1	5.3	--	0.5	11/44	--	--	--	0/44
Cadmium			4	--	--	1.1	6/44	4.2	--	--	1/44
Calcium			179	917000.0	58700.0	225163.8	44/44	261000.0	54000.0	133891.2	44/44
Chromium	18	8	4	185.0	--	30.6	40/44	25.0	--	13.1	43/44
Cobalt			9	80.0	--	10.0	15/44	11.0	--	2.9	5/44
Copper	48	21	6	486.0	--	56.0	28/44	29.0	--	3.5	9/44
Iron	1600	710	24	286000.0	1330.0	42498.5	44/44	13000.0	53.0	3394.4	44/44
Lead	20	9	5	210.0	--	33.1	34/44	16.0	--	5.7	23/44
Magnesium			153	354000.0	28400.0	150700.9	44/44	189000.0	26400.0	122125.9	44/44
Manganese			4	3960.0	34.0	647.7	44/44	529.0	24.0	149.8	44/44
Mercury			0.2	0.3	--	0.03	2/44	--	--	--	0/44
Nickel			8	358.0	--	82.9	38/44	98.0	--	53.7	38/44
Potassium			175	409000.0	1450.0	171995.4	44/44	403000.0	1400.0	169400.3	44/44
Selenium			5	--	--	--	0/44	8.0	--	--	1/44
Sodium			1090	706000.0	25700.0	389020.8	44/44	702000.0	25000.0	396743.3	44/44
Tin			22	--	--	--	0/44	192.0	--	7.2	2/44
Vanadium			7	233.0	--	26.4	17/44	12.0	--	--	1/44
Zinc	429	184	3	2660.0	--	499.4	43/44	1480.0	4.3	124.7	44/44

TABLE C-1A. NSL/ECC PREDESIGN INVESTIGATION
MAXIMUM, MINIMUM, AND AVERAGE CONCENTRATIONS OF METALS IN
GROUNDWATER - SUPPLEMENTAL INVESTIGATION AREA

ECCMW13+ECCMW14+ECCMW15+ECCMW16+ECCMW17+ECCMW18+ECCMW19A+ECCMW19B+ECCMW20+ECCMW21+ECCMW22+ECCMW23

	NPDES PERMIT		Instrument	UNFILTERED				FILTERED			
	Max	Avg	Detection Limit	Max	Min	Avg	# of samples detected/total	Max	Min	Avg	# of samples detected/total
INORGANICS (ug/l)											
Aluminum			13	280000.0	138.0	51205.8	15/15	1970.0	21.0	226.2	15/15
Antimony			13	--	--	--	0/12	21.0	--	8.1	2/12
Arsenic	0.3	0.2	2	32.0	--	12.3	12/15	24.0	--	5.5	9/15
Barium			4.2	2430.0	337.0	906.5	15/15	570.0	279.0	414.0	15/15
Beryllium			2.5	12.6	--	3.1	5/15	--	--	--	0/15
Cadmium			1.8	36.9	--	8.9	12/15	3.1	--	1.3	4/15
Calcium			80	3365000.0	81200.0	690308.3	15/15	179000.0	80500.0	115320.8	15/15
Chromium	18	8	2.8	286.0	--	67.6	14/15	12.5	5.0	9.2	15/15
Cobalt			4.5	282.0	--	57.6	14/15	7.0	--	2.7	2/15
Copper	48	21	2.2	1660.0	--	351.4	14/15	21.2	--	5.8	14/15
Iron	1600	710	23	944000.0	2950.0	152260.8	15/15	12500.0	172.0	3184.0	14/14
Lead	20	9	3	723.0	--	132.4	14/15	19.0	--	5.0	10/15
Magnesium			21	995000.0	27400.0	190366.7	15/15	48700.0	27400.0	36195.8	15/15
Manganese			2.3	17900.0	79.0	3229.5	15/15	746.0	33.0	232.6	15/15
Mercury			0.2	0.9	--	0.2	6/15	0.2	--	0.1	2/15
Nickel			5.5	655.0	7.0	158.5	15/15	24.8	--	11.0	13/15
Potassium			78	40200.0	1410.0	10034.6	15/15	7060.0	1180.0	2480.8	15/15
Selenium			3	147.0	19.5	56.6	4/4	--	--	--	--
Silver			3.4	3.1	--	--	1/15	--	--	--	0/15
Sodium			31	77300.0	13200.0	28729.2	15/15	69900.0	12800.0	27945.8	15/15
Thallium			2	--	--	--	0/12	--	--	--	0/12
Vanadium			3.1	596.0	--	116.0	14/15	6.0	--	2.4	4/15
Zinc	429	184	2.3	2770.0	3.0	581.8	15/15	213.0	12.0	87.4	15/15

Note: NPDES PERMIT -- Proposed State of Indiana NSL NPDES Permit Limits
Max (Min) -- Possible highest (lowest) concentration.
--; Not detected
1. Concentrations below quantification limits are estimated values.
2. Maximum, minimum, and average concentrations are calculated where at least two samples of the total number of samples is quantified.
3. Average values (where there are at least 2 samples quantified) are calculated assuming non-detected ("--") values in other samples are 1/2 the instrument detection limits.

TABLE C-2. NSL/ECC PREDESIGN INVESTIGATION
MAXIMUM, MINIMUM, AND AVERAGE CONCENTRATIONS OF ORGANICS IN LEACHATE AND GROUNDWATER

	NPDES PERMIT		Quantification	NSLLT1 + NSLLT2 + NSLLT3				NSLMW12 + NSLMW13 + ECCMW3A + NSLSBP61 + NSLMW8SA			
	Max	Avg	Limits	Max	Min	Avg	# of samples Detected/Total	Max	Min	Avg	# of samples Detected/Total
VOLATILE ORGANICS: ug/l											
Chloromethane			10	--	--	--	0/17	--	--	--	0/24
Bromomethane			10	--	--	--	0/17	--	--	--	0/24
Vinyl Chloride	268	104	10	57.0	--	5.6	2/17	360.0	--	80.2	12/24
Chloroethane	268	104	10	210.0	--	44.7	5/17	230.0	--	61.7	13/24
Methylene Chloride	89	40	5	110.0	--	24.5	5/17	59.0	--	7.8	3/24
Acetone			10	430.0	--	95.0	12/17	160.0	--	22.9	9/24
Carbon Disulfide			5	6.0	--	2.4	3/17	--	--	--	0/24
1,1-Dichloroethene	12	5	5	--	--	--	0/17	--	--	--	0/24
1,1-Dichloroethane			5	47.0	--	6.1	2/17	1200.0	--	200.7	14/24
1,2-Dichloroethene (Total)			5	310.0	--	15.9	6/17	970.0	--	275.9	13/24
Chloroform	46	21	5	--	--	--	0/17	--	--	--	0/24
1,2-Dichloroethane			5	--	--	--	0/17	27.0	--	3.3	3/24
2-Butanone			10	300.0	--	75.7	7/17	38.0	--	6.2	3/24
1,1,1-Trichloroethane			5	--	--	--	0/17	--	--	--	0/24
Carbon Tetrachloride			5	--	--	--	0/17	--	--	--	0/24
Vinyl Acetate			10	--	--	--	0/17	--	--	--	0/24
Bromodichloromethane			5	--	--	--	0/17	--	--	--	0/24
1,2-Dichloropropane			5	--	--	--	0/17	--	--	--	0/24
cis-1,3-Dichloropropene			5	--	--	--	0/17	--	--	--	0/24
Trichloroethene	54	21	5	--	--	--	0/17	27.0	--	3.8	4/24
Dibromochloromethane			5	--	--	--	0/17	--	--	--	0/24
1,1,2-Trichloroethane			5	--	--	--	0/17	--	--	--	0/24
Benzene	136	37	5	270.0	--	67.9	7/17	--	--	--	0/24
cis-1,3-Dichloropropene			5	--	--	--	0/17	--	--	--	0/24
Trans-1,2-Dichloropropene			5	--	--	--	0/17	--	--	--	0/24
Bromoform			5	--	--	--	0/17	--	--	--	0/24
4-Methyl-2-Pentanone			10	11.0	--	--	1/17	4.0	--	--	1/24
2-Hexanone			10	37.0	--	5.9	3/17	--	--	--	0/24
Tetrachloroethene	56	22	5	--	--	--	0/17	--	--	--	0/24
1,1,2,2-Tetrachloroethane			5	--	--	--	0/17	--	--	--	0/24
Toluene			5	89.0	--	32.2	12/17	--	--	--	0/24
Chlorobenzene			5	9.0	--	--	1/17	--	--	--	0/24
Ethylbenzene			5	550.0	--	93.6	6/17	--	--	--	0/24
Styrene			5	--	--	--	0/17	--	--	--	0/24
Total Xylenes			5	6500.0	--	1479.4	13/17	1.0	--	--	1/24
SEMIVOLATILE ORGANICS											
Phenol	26	15	10	11.0	--	5.1	4/17	--	--	--	0/26
Benzyl Alcohol			10	2.0	--	--	1/17	--	--	--	0/26
1,2-Dichlorobenzene			10	21.0	--	4.4	6/17	9.0	--	1.3	4/26
4-Methylphenol			10	4.0	--	--	1/17	--	--	--	0/26
2,4-Dimethylphenol			10	91.0	--	12.0	3/17	--	--	--	0/26
Benzoic Acid			10	60.0	--	5.3	2/17	10.0	--	3.1	3/26
Naphthalene			10	17.0	--	5.5	9/17	--	--	--	0/26
4-Chloro-3-Methylphenol	4.4	2.2	10	15.0	--	3.2	3/17	--	--	--	0/26
2-Methylnaphthalene			10	--	--	--	0/17	2.0	--	--	1/26
Diethylphthalate			10	29.0	--	6.9	5/17	--	--	--	0/26
Di-n-Butylphthalate			10	3.0	--	3.9	8/17	3.0	--	3.3	15/26
bis(2-Ethylhexyl) Phthalate			10	110.0	--	18.7	9/17	8.0	--	2.9	5/26

Note: NPDES PERMIT -- Proposed State of Indiana NSL NPDES Permit limits
Quantification Limits -- CLP Contract Required Detection Limits (CRDL)
Max (Min) -- Possible highest (lowest) concentration.
--; Not detected
1. Concentrations below quantification limits are estimated values.
2. Maximum, minimum, and average concentrations are calculated where at least two samples of the total number of samples is quantified.
3. Average values (where there are at least 2 samples quantified) are calculated assuming non-detected ("--") values in other samples are 1/2 the quantification limits.

TABLE C-2. NSL/ECC PREDESIGN INVESTIGATION
MAXIMUM, MINIMUM, AND AVERAGE CONCENTRATIONS OF ORGANICS IN LEACHATE AND GROUNDWATER

	NPDES PERMIT Max	NPDES PERMIT Avg	Quantification Limits	NSLLT1+NSLLT2+NSLLT3+NSLMW12+NSLMW13+ECCMW3A+NSLSBP61+MSLMW8SA Max	Min	Avg	# of samples Detected/Total
VOLATILE ORGANICS: ug/l							
Chloroethane			10	--	--	--	0/41
Bromoethane			10	--	--	--	0/41
Vinyl Chloride	268	104	10	360.0	--	42.9	14/41
Chloroethane	268	104	10	230.0	--	53.2	18/41
Methylene Chloride	89	40	5	110.0	--	16.1	8/41
Acetone			10	430.0	--	59.0	21/41
Carbon Disulfide			5	6.0	--	1.2	3/41
1,1-Dichloroethene	12	5	5	--	--	--	0/41
1,1-Dichloroethane			5	1200.0	--	103.4	16/41
1,2-Dichloroethene (Total)			5	970.0	--	145.9	19/41
Chloroform	46	21	5	--	--	--	0/41
1,2-Dichloroethane			5	27.0	--	1.6	3/41
2-Butanone			10	300.0	--	40.9	10/41
1,1,1-Trichloroethane			5	--	--	--	0/41
Carbon Tetrachloride			5	--	--	--	0/41
Vinyl Acetate			10	--	--	--	0/41
Bromodichloromethane			5	--	--	--	0/41
1,2-Dichloropropane			5	--	--	--	0/41
cis-1,3-Dichloropropene			5	--	--	--	0/41
Trichloroethene	54	21	5	27.0	--	1.9	4/41
Dibromochloromethane			5	--	--	--	0/41
1,1,2-Trichloroethane			5	--	--	--	0/41
Benzene	136	37	5	270.0	--	33.9	7/41
cis-1,3-Dichloropropene			5	--	--	--	0/41
Trans-1,2-Dichloropropene			5	--	--	--	0/41
Bromoform			5	--	--	--	0/41
4-Methyl-2-Pentanone			10	11.0	--	1.6	2/41
2-Hexanone			10	37.0	--	2.9	3/41
Tetrachloroethene	56	22	5	--	--	--	0/41
1,1,2,2-Tetrachloroethane			5	--	--	--	0/41
Toluene			5	89.0	--	16.1	12/41
Chlorobenzene			5	9.0	--	--	1/41
Ethylbenzene			5	550.0	--	46.8	6/41
Styrene			5	--	--	--	0/41
Total Xylenes			5	6500.0	--	739.7	14/41
SEMIVOLATILE ORGANICS							
Phenol	26	15	10	11.0	--	2.5	4/43
Benzyl Alcohol			10	2.0	--	--	1/43
1,2-Dichlorobenzene			10	21.0	--	2.8	10/43
4-Methylphenol			10	4.0	--	--	1/43
2,4-Dimethylphenol			10	91.0	--	6.0	3/43
Benzoic Acid			10	60.0	--	4.2	5/43
Naphthalene			10	17.0	--	2.8	9/43
4-Chloro-3-Methylphenol	4.4	2.2	10	15.0	--	1.6	3/43
2-Methylnaphthalene			10	2.0	--	--	1/43
Diethylphthalate			10	29.0	--	3.4	5/43
Di-n-Butylphthalate			10	3.0	--	3.6	23/43
bis(2-Ethylhexyl) Phthalate			10	110.0	--	10.8	14/43

TABLE C-2A. NSL/ECC PREDESIGN INVESTIGATION
MAXIMUM, MINIMUM, AND AVERAGE CONCENTRATIONS OF ORGANICS
IN GROUNDWATER - SUPPLEMENTAL INVESTIGATION AREA

	NPDES PERMIT Max	NPDES PERMIT Avg	Quantification Limits	ECCMW13+ECCMW14+ECCMW15+ECCMW16+ECCMW17+ECCMW18+ECCMW19A+ECCMW19B+ECCMW20+ECCMW21+ECCMW22+ECCMW23 Max	Min	Avg	# of samples Detected/Total
VOLATILE ORGANICS: ug/l							
Chloromethane			10	--	--	--	0/16
Bromomethane			10	--	--	--	0/16
Vinyl Chloride	268	104	10	100.0	--	--	1/16
Chloroethane	268	104	10	3800.0	--	289.8	4/16
Methylene Chloride	89	40	5	109.0	--	--	1/16
Acetone			10	210.0	--	--	1/16
Carbon Disulfide			5	--	--	--	0/16
1,1-Dichloroethene	12	5	5	--	--	--	0/16
1,1-Dichloroethane			5	220.0	--	28.1	5/16
1,2-Dichloroethene (Total)			5	35000.0	--	2965.6	3/16
Chloroform	46	21	5	--	--	--	0/16
1,2-Dichloroethane			5	--	--	--	0/16
2-Butanone			10	--	--	--	0/16
1,1,1-Trichloroethane			5	21000.0	--	1782.7	3/16
Carbon Tetrachloride			5	--	--	--	0/16
Vinyl Acetate			10	--	--	--	0/16
Bromodichloromethane			5	--	--	--	0/16
1,2-Dichloropropane			5	--	--	--	0/16
cis-1,3-Dichloropropene			5	--	--	--	0/16
Trichloroethene	54	21	5	11000.0	--	1060.8	3/16
Dibromochloromethane			5	--	--	--	0/16
1,1,2-Trichloroethane			5	--	--	--	0/16
Benzene	136	37	5	4.0	--	--	1/16
cis-1,3-Dichloropropene			5	--	--	--	0/16
Trans-1,2-Dichloropropene			5	--	--	--	0/16
Bromoform			5	--	--	--	0/16
4-Methyl-2-Pentanone			10	--	--	--	0/16
2-Hexanone			10	--	--	--	0/16
Tetrachloroethene	56	22	5	1200.0	--	111.7	2/16
1,1,2,2-Tetrachloroethane			5	--	--	--	0/16
Toluene			5	140.0	--	12.7	4/16
Chlorobenzene			5	--	--	--	0/16
Ethylbenzene			5	850.0	--	--	1/16
Styrene			5	--	--	--	0/16
Total Xylenes			5	2000.0	--	--	1/16
SEMIVOLATILE ORGANICS							
Phenol	26	15	10	6.0	--	5.1	2/16
1,2-Dichlorobenzene			10	310.0	--	35.5	2/16
1,4-Dichlorobenzene			10	65.0	--	--	1/16
2-Methylphenol			10	21.0	--	--	1/16
4-Methylphenol			10	--	--	--	0/16
2,4-Dimethylphenol			10	10.0	--	5.3	3/16
Isophorone			10	--	--	--	0/16
Naphthalene			10	--	--	--	0/16
2-Methylnaphthalene			10	6.0	--	--	1/16
Diethylphthalate			10	19.0	--	5.4	4/16
Di-n-Butylphthalate			10	5.0	--	4.7	5/16
bis(2-Ethylhexyl) Phthalate			10	37.0	--	17.6	14/16
Dimethyl Phthalate			10	--	--	--	0/16
2-Nitroaniline			10	--	--	--	0/16
3-Nitroaniline			10	--	--	--	0/16
4-Nitroaniline			10	--	--	--	0/16
4,6-Dinitro-2-Methylphenol			10	--	--	--	0/16
N-Nitrosodiphenylamine			10	--	--	--	0/16

Note: NPDES PERMIT -- Proposed State of Indiana NSL NPDES Permit limits
Quantification Limits -- CLP Contract Required Detection Limits (CRDL)
Max (Min) -- Possible highest (lowest) concentration.
--; Not detected
1. Concentrations below quantification limits are estimated values.
2. Maximum, minimum, and average concentrations are calculated where at least two samples of the total number of samples is quantified.
3. Average values (where there are at least 2 samples quantified) are calculated assuming non-detected ("--") values in other samples

TABLE C-3. WATER CHARACTERISTICS AND TREATMENT CONSIDERATIONS OF LEACHATE AND GROUNDWATER

PARAMETER	NPDES PERMIT (mg/l) Avg	NPDES PERMIT (mg/l) Max	AVG LEACHATE CONCENTRATION RANGE (1) (mg/l)	UNTREATED DOMESTIC WASTEWATER (2) (mg/l) STRONG	WEAK	MEDIUM	NSLLT1+NSLLT2+NSLLT3 (mg/l) MAX	MIN	AVERAGE
BOD5	10	20	5-75,000	400.0	110.0	220.0	68.0	10.0	38.5
COD			50-90,000	1000.0	250.0	500.0	740.0	240.0	539.0
TOC			50-45,000	290.0	80.0	160.0	195.4	76.8	146.1
BOD5/COD				0.40	0.44	0.44	0.09	0.04	0.07
BOD5/TOC				1.40	1.40	1.40	0.35	0.13	0.26
TSS	12	24	10-45,000	350.0	100.0	220.0	94.0	34.0	64.8
VSS			27-750	275.0	80.0	165.0	46.0	10.0	26.7
TDS			725-55,000	850.0	250.0	500.0	4050.0	1820.0	3175.0
TKN			7-1,970	85.0	20.0	40.0	320.0	61.0	219.7
NH3-N	1.5*	3*	0.1-2,000	50.0	12.0	25.0	300.0	12.0	203.3
NO3&NO2-N			0.1-45	0.0	0.0	0.0	0.2	--	0.1
TP	1		0.1-150	15.0	4.0	8.0	0.6	0.2	0.4
ALKALINITY (as CaCO3)			0.1-20,350	200.0	50.0	100.0	2360.0	1320.0	1980.7
Cl	160	373	30-5,000	100.0	30.0	50.0	1280.0	375.0	953.0
SO4			25-500	--	--	--	41.0	26.0	33.4
O&G				150.0	50.0	100.0	10.0	--	--
pH			3.5-8.5				7.5	5.7	6.9
Temp.							28.0	18.0	22.0
Specific-Conductance (umho/cm)			960-16,300				8000.0	3100.0	5400.0

Reference: 1. U.S. EPA, EPA Subtitle D Study Phase I Report, EPA/536-SW-86-054, October 1986
2. Metcalf and Eddy, Wastewater Engineering, Treatment/Disposal/Reuse, 1972

Note: NPDES PERMIT - Proposed State of Indiana NSL NPDES Permit Limits
Max (Min) - Possible highest (lowest) concentration.
PACT - Powdered Activated Carbon Treatment.
* - Proposed discharge limits for summer months.
--; Not detected
1. Maximum, minimum, and average concentrations are calculated where at least two samples of the total number of samples is quantified.
2. Average values (where there are at least 2 samples quantified) are calculated assuming non-detected ("--") values in other samples are 1/2 the instrument detection limits.

WATER CHARACTERISTICS AND TREATMENT CONSIDERATIONS

WATER CHARACTERISTICS:

1. Organic concentration measured in COD and TOC is in the range of medium strength domestic wastewater concentration. BOD concentration is low requires treatment to reduce concentrations to meet discharge limits. Low ratios of BOD/COD and BOD/TOC indicate that most of organics are not easily biodegraded (refractory).
2. TSS and VSS are in low concentrations compared with domestic wastewater. High TDS value is related to the high concentrations of chloride and sulfate. High TDS is also correlated to high specific conductance.
3. TKN and ammonia are found at high concentrations (higher than in strong domestic wastewater). Unionized ammonia is a major portion of TKN. Low nitrate and nitrite concentrations suggest that ammonia is not being oxidized to nitrate and nitrite.
4. Total phosphorus concentration is low.
5. High alkalinity concentrations may originate from dissolved landfill materials or carbon dioxide produced by anaerobic decomposition of organics.
6. Chloride concentrations are higher than strong domestic wastewater and greater than effluent discharge limits.
7. Oil & grease concentration is low.

TREATMENT CONSIDERATIONS:

- Biological systems (PACT, activated sludge, lagoon, etc) are recommended. An acclimated culture obtained from the site may be necessary to biodegrade refractory organics.
- Ammonia removal by nitrification, ion exchange, or air stripping is necessary.
- Biological treatment system may need to be supplemented with phosphorus but effluent must meet discharge limits for phosphorus.
- Chloride removal by ion exchange or reverse osmosis or possibly dilution of final effluent is necessary to meet discharge limits.
- TSS removal by clarification and possibly filtration is necessary to meet discharge limits.
- Oil & grease is not of concern.

TABLE C-3. WATER CHARACTERISTICS AND TREATMENT CONSIDERATIONS
OF LEACHATE AND GROUNDWATER

PARAMETER	NPDES PERMIT (mg/l) Avg	NPDES PERMIT (mg/l) Max	AVG LEACHATE CONCENTRATION RANGE (1) (mg/l)	UNTREATED DOMESTIC WASTEWATER (2) (mg/l) STRONG	WEAK	MEDIUM	NSLMW12+NSLMW13+ECCMW3A+NSLSBP61+ NSLMW8SA (mg/l) MAX	MIN	AVERAGE
BOD5	10	20	5-75,000	400.0	110.0	220.0	46.0	1.6	20.0
COD			50-90,000	1000.0	250.0	500.0	700.0	7.0	269.9
TOC			50-45,000	290.0	80.0	160.0	97.8	2.4	53.0
BOD5/COD				0.40	0.44	0.44	0.07	0.23	0.07
BOD5/TOC				1.40	1.40	1.40	0.47	0.67	0.38
TSS	12	24	10-45,000	350.0	100.0	220.0	9640.0	4.0	2238.6
VSS			27-750	275.0	80.0	165.0	740.0	2.0	198.0
TDS			725-55,000	850.0	250.0	500.0	2815.0	328.0	1678.6
TKN			7-1,970	85.0	20.0	40.0	81.5	1.1	45.5
NH3-N	1.5*	3*	0.1-2,000	50.0	12.0	25.0	68.5	1.0	39.0
NO3&NO2-N			0.1-45	0.0	0.0	0.0	--	--	--
TP	1		0.1-150	15.0	4.0	8.0	5.8	--	1.2
ALKALINITY (as CaCO3)			0.1-20,350	200.0	50.0	100.0	1370.0	322.0	709.8
Cl	160	373	30-5,000	100.0	30.0	50.0	960.0	4.0	584.3
SO4			25-500	--	--	--	38.0	6.0	18.1
O&G				150.0	50.0	100.0	--	--	--
pH			3.5-8.5				7.4	6.3	7.0
Temp.							28.0	17.0	21.9
Specific-Conductance (umho/cm)			960-16,300				4600.0	490.0	2534.9

Reference:
1. U.S. EPA, EPA Subtitle D Study Phase I Report, EPA/536-SW-86-054, October 1986
2. Metcalf and Eddy, Wastewater Engineering, Treatment/Disposal/Reuse, 1972

Note:
NPDES PERMIT - Proposed State of Indiana NSL NPDES Permit Limits
Max (Min) - Possible highest (lowest) concentration.
PACT - Powdered Activated Carbon Treatment.
* - Proposed discharge limits for summer months.
--; Not detected
1. Maximum, minimum, and average concentrations are calculated where at least two samples of the total number of samples is quantified.
2. Average values (where there are at least 2 samples quantified) are calculated assuming non-detected ("--") values in other samples are 1/2 the instrument detection limits.

WATER CHARACTERISTICS AND TREATMENT CONSIDERATIONS

WATER CHARACTERISTICS:

1. Organic concentration measured in COD and TOC is in the range of weak strength domestic wastewater concentration. BOD concentration is low requires treatment to reduce concentrations to meet discharge limits. Low ratios of BOD/COD and BOD/TOC indicate that most of organics are not easily biodegraded (refractory).
2. TSS and VSS are in high concentrations compared with domestic wastewater. Improper well development may be responsible for high TSS. High TDS value is related to the high concentrations of chloride and sulfate. High TDS is also correlated to high specific conductance.
3. TKN and ammonia are found at high concentrations (in the range of medium to strong domestic wastewater). Unionized ammonia is a major portion of TKN. Low nitrate and nitrite concentrations suggest that ammonia is not being oxidized to nitrate and nitrite.
4. Total phosphorus concentration is low.
5. High alkalinity concentrations may originate from dissolved landfill materials or carbon dioxide produced by anaerobic decomposition of organics.
6. Chloride concentrations are higher than strong domestic wastewater and greater than effluent discharge limits.
7. Oil & grease concentration is low.

TREATMENT CONSIDERATIONS:

- Biological systems (PACT, activated sludge, lagoon, etc) are recommended. An acclimated culture obtained from the site may be necessary to biodegrade refractory organics.
- Ammonia removal by nitrification, ion exchange, or air stripping is necessary.
- Biological treatment system may need to be supplemented with phosphorus but effluent must meet discharge limits for phosphorus.
- Chloride removal by ion exchange or reverse osmosis or possibly dilution of final effluent is necessary to meet discharge limits.
- TSS removal by clarification and possibly filtration is necessary to meet discharge limits.
- Oil & grease is not of concern.

TABLE C-3. WATER CHARACTERISTICS AND TREATMENT CONSIDERATIONS OF LEACHATE AND GROUNDWATER

PARAMETER	NPDES PERMIT (mg/l) Avg	NPDES PERMIT (mg/l) Max	AVG LEACHATE CONCENTRATION RANGE (1) (mg/l)	UNTREATED DOMESTIC WASTEWATER (2) (mg/l) STRONG	WEAK	MEDIUM	NSLLT1+NSLLT2+NSLLT3+NSLMW12+NSLMW13+ECCMW3A+NSLSBP61+NSLMWBSA (mg/l) MAX	MIN	AVERAGE
BOD5	10	20	5-75,000	400.0	110.0	220.0	68.0	1.6	29.3
COD			50-90,000	1000.0	250.0	500.0	740.0	7.0	404.5
TOC			50-45,000	290.0	80.0	160.0	195.4	2.4	99.6
BOD5/COD				0.40	0.44	0.44	0.09	0.23	0.07
BOD5/TOC				1.40	1.40	1.40	0.35	0.67	0.29
TSS	12	24	10-45,000	350.0	100.0	220.0	9640.0	4.0	1151.7
VSS			27-750	275.0	80.0	165.0	740.0	2.0	112.4
TDS			725-55,000	850.0	250.0	500.0	4050.0	328.0	2426.8
TKN			7-1,970	85.0	20.0	40.0	320.0	1.1	132.6
NH3-N	1.5*	3*	0.1-2,000	50.0	12.0	25.0	300.0	1.0	121.2
NO3&NO2-N			0.1-45	0.0	0.0	0.0	0.2	--	0.1
TP	1		0.1-150	15.0	4.0	8.0	5.8	--	0.6
ALKALINITY (as CaCO3)			0.1-20,350	200.0	50.0	100.0	2360.0	322.0	1345.3
Cl	160	373	30-5,000	100.0	30.0	50.0	1280.0	4.0	768.7
SO4			25-500	--	--	--	41.0	6.0	25.8
O&G				150.0	50.0	100.0	10.0	--	--
pH			3.5-8.5				7.5	5.7	7.0
Temp.							28.0	17.0	22.0
Specific-Conductance (umho/cm)			960-16,300				8000.0	490.0	3967.5

Reference: 1. U.S. EPA, EPA Subtitle D Study Phase I Report, EPA/536-SW-86-054, October 1986
2. Metcalf and Eddy, Wastewater Engineering, Treatment/Disposal/Reuse, 1972

Note: NPDES PERMIT - Proposed State of Indiana NSL NPDES Permit Limits
Max (Min) - Possible highest (lowest) concentration without mixing.
PACT- Powdered Activated Carbon Treatment.
* - Proposed discharge limits for summer
--; Not detected
1. Maximum, minimum, and average concentrations are calculated where at least two samples of the total number of samples is quantified.
2. Average values (where there are at least 2 samples quantified) are calculated assuming non-detected ("--") values in other samples are 1/2 the instrument detection limits.

WATER CHARACTERISTICS AND TREATMENT CONSIDERATIONS

WATER CHARACTERISTICS:

1. Organic concentration measured in COD and TOC is in the range of weak to medium strength domestic wastewater concentration. BOD concentration is low requires treatment to reduce concentrations to meet discharge limits. Low ratios of BOD/COD and BOD/TOC indicate that most of organics are not easily biodegraded (refractory).
2. TSS and VSS are in high concentrations compared with domestic wastewater. Improper well development may be responsible for high TSS. High TDS value is related to the high concentrations of chloride and sulfate. High TDS is also correlated to high specific conductance.
3. TKN and ammonia are found at high concentrations (higher than in strong domestic wastewater). Unionized ammonia is a major portion of TKN. Low nitrate and nitrite concentrations suggest that ammonia is not being oxidized to nitrate and nitrite.
4. Total phosphorus concentration is low.
5. High alkalinity concentrations may originate from dissolved landfill materials or carbon dioxide produced by anaerobic decomposition of organics.
6. Chloride concentrations are higher than strong domestic wastewater and greater than effluent discharge limits.
7. Oil & grease concentration is low.

TREATMENT CONSIDERATIONS:

- Biological systems (PACT, activated sludge, lagoon, etc) are recommended. An acclimated culture obtained from the site may be necessary to biodegrade refractory organics.
- Ammonia removal by nitrification, ion exchange, or air stripping is necessary.
- Biological treatment system may need to be supplemented with phosphorus but effluent must meet discharge limits for phosphorus.
- Chloride removal by ion exchange or reverse osmosis or possibly dilution of final effluent is necessary to meet discharge limits.
- TSS removal by clarification and possibly filtration is necessary to meet discharge limits.
- Oil & grease is not of concern.

TABLE C-3A. WATER CHARACTERISTICS AND TREATMENT CONSIDERATIONS
GROUNDWATER - SUPPLEMENTAL INVESTIGATION AREA

PARAMETER	NPDES PERMIT (mg/l) Avg	NPDES PERMIT (mg/l) Max	AVG LEACHATE CONCENTRATION RANGE (1) (mg/l)	UNTREATED DOMESTIC WASTEWATER (2) (mg/l) STRONG	WEAK	MEDIUM	ECCMW13+ECCMW14+ECCMW15+ECCMW16+ECCMW17+ECCMW18+ECCMW19A+ECCMW19B+ECCMW20+ECCMW21+ECCMW22+ECCMW23 (mg/l) MAX	MIN	AVERAGE
COD			50-90,000	1000.0	250.0	500.0	1800	0	500.0
TDS			725-55,000	850.0	250.0	500.0	973	406	589.0
TSS	12	24	10-45,000	350.0	100.0	220.0	28940	27	6274.8
ALKALINITY (as CaCO3)			0.1-20,350	200.0	50.0	100.0	1511	341	728.9
NH3-N	1.5#	3#	0.1-2,000	50.0	12.0	25.0	2.8	0.2	0.9
Cl	160	373	30-5,000	100.0	30.0	50.0	310	11	71.9

WATER CHARACTERISTICS AND TREATMENT CONSIDERATIONS

WATER CHARACTERISTICS:

1. Organic concentration measured in COD is in the range of medium strength domestic wastewater concentration.
2. TSS concentrations are high compared with domestic wastewater. TDS is in the range of medium strength domestic wastewater.
3. Ammonia concentration is low.
4. High alkalinity concentrations may originate from dissolved landfill materials or carbon dioxide produced by anaerobic decomposition of organics.
5. Chloride concentrations are in the range of medium to strong domestic wastewater.

TREATMENT CONSIDERATIONS:

- TSS removal by clarification and possibly filtration is necessary to meet discharge limits.

Reference: 1. U.S. EPA, EPA Subtitle D Study Phase I Report, EPA/536-SW-86-054, October 1986
2. Metcalf and Eddy, Wastewater Engineering, Treatment/Disposal/Reuse, 1972

Note: NPDES PERMIT - Proposed State of Indiana NSL NPDES Permit Limits
Max (Min) - Possible highest (lowest) concentration.
PACT - Powdered Activated Carbon Treatment.
- Proposed discharge limits for summer months.
--; Not detected
1. Maximum, minimum, and average concentrations are calculated where at least two samples of the total number of samples is quantified.
2. Average values (where there are at least 2 samples quantified) are calculated assuming non-detected ("--") values in other samples are 1/2 the instrument detection limits.

Appendix D
ANALYTICAL DATA FROM SUPPLEMENTAL INVESTIGATION AREA--GROUNDWATER

Table D-1: Groundwater Metal Analytical Results

Table D-2: Groundwater Organic Analytical Results

Table D-3: Groundwater Conventional Pollutant Analytical Results

TABLE D-1

NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
GROUNDWATER - METALS

UNFILTERED

Sample Number:	ECCDW01	ECCMW1A	ECCMW12	ECCMW13	ECCMW13D	ECCMW14	ECCMW14D	ECCMW15	ECCMW16	ECCMW17	ECCMW18	ECCMW19A
Sample Location:		ECCMW1A	ECCMW12	ECCMW13	ECCMW13	ECCMW14	ECCMW14	ECCMW15	ECCMW16	ECCMW17	ECCMW18	ECCMW19A
ITR Number:	MET358	MET325	MET373	MET363	MET365	MET329	MET331	MET333	MET335	MET337	MET339	MET367
Date Sampled:	04/25/88	04/27/88	04/28/88	04/28/88	04/28/88	04/28/88	04/28/88	04/27/88	04/27/88	04/27/88	04/27/88	04/28/88
Sample Type:	DRILLERS H2O	GRAB	GRAB	GRAB	DUPL	GRAB	DUPL	GRAB	GRAB	GRAB	GRAB	GRAB
INORGANICS (ug/l)												
Aluminum	559 J	68 J,B	10300 J	138 J,B	13800 J	4440 J	3520 J	9200 J	14300 J	21100 J	9420 J	7630 J
Antimony	---	---	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	18 J	---	13 J	2.6 J,B	4 J,B	11 J	5 J	28 J	11 J	28 J
Barium	52 J	313	253	337	467	422	461	513	609	1140	578	657
Beryllium	---	---	---	---	---	---	---	---	---	2.5 J	---	---
Cadmium	---	---	4.8 J	---	5.5 J	5.1 J	3.5 J	5 J	5.9 J	14 J	6.8 J	5.3 J
Calcium	60800	120000	238000	314000	431000	186000	240000	222000	321000	516000	305000	320000
Chromium	5 J,B	7 J,B	33	---	28	18 B	15 B	26	34	50	23 B	27
Cobalt	---	---	18 J	8 J	41 J	11 J	10 J	12 J	25 J	50 J	16 J	16 J
Copper	17 J,B	3 J,B	42 J,B	---	169 J	45 J,B	66 J,B	114 J	227 J	423 J	64 J	40 J,B
Iron	3560 J	2680 J	25300	5560	49000	24600 J	28600	42600 J	44300 J	88900 J	45700 J	27400
Lead	6 J	3.9 J	48 J	3.6 J,B	115 J	31 J,B	47 J	74 J	214 J	723 J	33 J	33 J
Magnesium	16500	32900	44870	43100	88500	54900	62300	60900	74700	140000	74400	91100
Manganese	91 J	55 J	917 J	1080 J	1760 J	559 J	790 J	781 J	909 J	2600 J	1020 J	1060 J
Mercury	---	---	---	0.4	0.3	---	---	---	0.2 J	0.9 J	---	---
Nickel	---	---	60 J	21 J	100 J	30 J	34 J	42 J	78 J	135 J	49 J	42 J
Potassium	2670 J	1480 J	18700	1800 J	3290 J	2400 J	2360 J	2910 J	5460	5960	3270 J	2640 J
Selenium	--- R	--- R	--- R	--- R	7 R	--- R	--- R	--- R	25 J	147 J	--- R	--- R
Silver	---	---	---	---	---	---	---	---	---	---	---	---
Sodium	12500	9340	15300	24400	24600	15800	16200	15200	24600	16200	13600	21600
Thallium	---	---	---	---	---	---	---	---	---	---	---	---
Vanadium	---	---	25 J	---	26 J	15 J	12 J	25 J	38 J	45 J	19 J	29 J
Zinc	38 J	5 J	113 J	14 J	279 J	255 J	123 J	195 J	295 J	416 J	143 J	86 J

Sample Number:	ECCMW19B	ECCMW20	ECCMW21	ECCMW22	ECCMW22D	ECCMW23	ECCSUMP01	ECCMW96	ECCMW98	ECCMW99
Sample Location:	ECCMW19B	ECCMW20	ECCMW21	ECCMW22	ECCMW22	ECCMW23	SUMP			
ITR Number:	MET369	MET342	MET327	MET379	MET381	MET383	MET371	MET385	MET375	MET341
Date Sampled:	04/28/88	04/27/88	04/27/88	05/3/88	05/3/88	05/3/88	04/28/88	05/3/88	04/28/88	04/27/88
Sample Type:	GRAB	GRAB	GRAB	GRAB	DUPL	GRAB	GRAB	FIELD BLANK	FIELD BLANK	FIELD BLANK
INORGANICS (ug/l)										
Aluminum	171 J	27900 J	14300 J	280000 J	277000 J	221000 J	235 J	26.5 J,B	28 J,B	29 J,B
Antimony	---	---	---	--- R	--- R	--- R	---	--- R	13 J,B	52 J,B
Arsenic	---	32 J	17 J	2.2 J	--- R	2.1 J	9 J,B	--- R	2.5 J	---
Barium	392	1050	660	2430 J	2380 J	2030 J	48 J	3.7 J,B	---	---
Beryllium	---	2.6 J	---	10.8 J	12.6 J	9.9 J	---	---	---	---
Cadmium	---	13	7.5	---	7.9 J	36.9 J	---	---	---	---
Calcium	81200	514000	514000	2439000	3365000	2003000	57600	56.6 J,B	449 J	741 J
Chromium	9 J,B	65	25	233	238	286	6 J,B	---	5 J	5 J
Cobalt	---	52	25 J	245	282	194	---	---	---	---
Copper	5 J,B	350 J	113 J	1380 J	1660 J	1220 J	4 J,B	5.1 J,B	15 J	12 J
Iron	2950	92900 J	76000 J	825000 J	944000 J	468000 J	8550	15.6 J,B	---	64 R
Lead	---	278 J	122 J	15.1 J	2.9 J,B	2.8 J,B	7.7 B	2.2 J	6.3 J	---
Magnesium	27400	130000	103000	738000	995000	592000	5710	---	23	147 J
Manganese	79 J	2330 J	2220 J	14500 J	17900 J	9460 J	203 J	---	---	3 J
Mercury	---	0.4 J	0.2 J	---	---	---	---	---	---	---
Nickel	7 J	165 J	76 J	599 J	655 J	589 J	6 J	---	---	---
Potassium	1410 J	11500	4440 J	40000	40200	37800	8810	---	---	283 J
Selenium	--- R	--- R	--- R	--- R	19.5 J	34.9 J	--- R	--- R	--- R	--- R
Silver	---	---	---	3.1 J,B	---	---	---	---	---	---
Sodium	13200	57000	13300	51300	53200	77300	6980	120 J,B	131 J	224 J
Thallium	---	---	---	--- R	--- R	--- R	---	--- R	---	---
Vanadium	5 J	66 J	22 J	541 J	596 J	547 J	---	---	---	---
Zinc	3 J	534 J	324 J	2430 J	2770 J	2050 J	5 J	3.7 J,B	---	---

"---" All compounds in all samples underwent analysis. If concentration is not listed, the compound was not detected above instrument detection limit.
J Estimated value; or the report value is less than the contract required detection limit but greater than the instrument detection limit.
B Compound present at equal to or less than five times the concentration present in the laboratory or field blank.
R Data not usable, indicates possible false negative, or very low spike sample recovery.

TABLE D-1

NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
GROUNDWATER - METALS

FILTERED

Sample Number:	ECCDW01(F)	ECCMW1A(F)	ECCMW12(F)	ECCMW13(F)	ECCMW13D(F)	ECCMW14(F)	ECCMW14D(F)	ECCMW15(F)	ECCMW16(F)	ECCMW17(F)	ECCMW18(F)	ECCMW19A(F)
Sample Location:		ECCMW1A	ECCMW12	ECCMW13	ECCMW13	ECCMW14	ECCMW14	ECCMW15	ECCMW16	ECCMW17	ECCMW18	ECCMW19A
ITR Number:	MET359	MET326	MET374	MET364	MET366	MET330	MET332	MET334	MET336	MET338	MET340	MET368
Date Sampled:	04/25/88	04/27/88	04/28/88	04/28/88	04/28/88	04/28/88	04/28/88	04/27/88	04/27/88	04/27/88	04/27/88	04/28/88
Sample Type:	DRILLERS H2O	GRAB	GRAB	GRAB	DUPL	GRAB	DUPL	GRAB	GRAB	GRAB	GRAB	GRAB
INORGANICS (ug/l)												
Aluminum	18 J,B	77 J,B	55 J,B	21 J,B	168 J,B	48 J,B	28 J,B	31 J,B	36 J,B	123 J,B	382 J	534 J
Antimony	---	---	---	---	---	21 J,B	---	---	---	---	---	---
Arsenic	---	---	12	16 J	19 J	---	---	---	---	2.1 J	---	24 J
Barium	64 J	316 B	161 J,B	279 B	290 B	371 B	356 B	348 B	382 B	508	540	404 B
Beryllium	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium	---	3 J,B	---	---	---	2.7 J	---	2.1 J	---	---	3.1 J,B	---
Calcium	52500	86200	108000	157000	162000	89800	89200	90400	147000	96600	179000	92600
Chromium	---	8 J,B	7 J,B	5 J,B	8 J,B	8 J,B	6 J,B	11 J,B	8 J,B	8 J,B	10 J,B	12 J,B
Cobalt	---	---	---	---	7 J	---	---	---	---	---	---	---
Copper	6 J	15 J,B	4 J,B	3 J,B	5 J,B	3 J,B	5 J,B	5 J,B	---	4 J,B	8 J,B	9 J,B
Iron	--- R	1990 J	621 J	12500 J	10300 J	570 J	178 J,B	516 J	4420 J	408 J,B	6220 J	5220 J
Lead	---	10 J	---	---	7.3 J	---	19 J	3.9 J	3.3 J	---	11 J	4 J
Magnesium	14800	31100	13000	41300	42500	33400	33600	34200	39400	34100	37000	31200
Manganese	46	51	225	684	746	37	33	45	263	97	402	430
Mercury	---	0.2 J	---	---	---	---	---	---	---	0.2 J	0.2 J	---
Nickel	---	6 J	16 J	16 J	19 J	9 J	8 J	6 J	11 J	8 J	6 J	11 J
Potassium	2480 J	1380 J,B	16500	1740 J	2060 J	1560 J	1440 J	1180 J,B	3400 J	1920 J	1460 J,B	1780 J
Selenium	--- R	--- R	--- R	--- R	--- R	--- R	--- R	--- R	--- R	--- R	--- R	--- R
Silver	---	---	---	---	---	---	---	---	---	---	---	---
Sodium	11700	9640	16000	24300	26000	16200	15900	14800	24400	16300	13800	21100
Thallium	---	---	---	---	---	---	---	---	---	---	---	---
Vanadium	---	---	---	---	---	5 J	4 J	---	---	---	---	6 J
Zinc	38 J	305 J	177 J,B	106 J,B	77 J,B	85 J,B	12 J,B	38 J,B	56 J,B	100 J,B	126 J,B	213 J

Sample Number:	ECCMW19B(F)	ECCMW20(F)	ECCMW21(F)	ECCMW22(F)	ECCMW22D(F)	ECCMW23(F)	ECCSUMP01(F)	ECCMW96(F)	ECCMW98(F)	ECCMW99(F)
Sample Location:	ECCMW19B	ECCMW20	ECCMW21	ECCMW22	ECCMW22	ECCMW23(F)	SUMP			
ITR Number:	MET370	MET343	MET328	MET380	MET382	MET384	MET372	MET386	MET376	MET344
Date Sampled:	04/28/88	04/27/88	04/27/88	05/3/88	05/3/88	05/3/88	04/28/88	05/3/88	04/28/88	04/27/88
Sample Type:	GRAB	GRAB	GRAB	GRAB	DUPL	GRAB	GRAB	FIELD BLANK	FIELD BLANK	FIELD BLANK
INORGANICS (ug/l)										
Aluminum	43 J,B	26 J,B	254 J	1970 J	173 J,B	81.4 J,B	36 J,B	72.8 J,B	37 J,B	47 J,B
Antimony	---	15 J,B	---	--- R	--- R	--- R	---	--- R	---	72 B
Arsenic	2 J	4 J	---	6.9 J	7.9 J	3.8 J	7 J	--- R	---	---
Barium	404 B	570	320 B	398 J,B	381 J,B	455 J,B	109 J,B	106 J	100 J	81 J
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	1.9 J,B	---	---	---	---	---	---	---	2.8 J
Calcium	80500	102000	104000	102000	93500	145000	53400	268 J,B	480 J	1120 J
Chromium	9 J,B	11 J,B	6 J,B	12.3 J,B	7.4 J,B	12.5 J,B	6 J,B	9.4 J	5 J	7 J
Cobalt	---	---	---	6.5 J,B	---	---	---	5.9 J	---	---
Copper	4 J,B	3 J,B	4 J,B	21.2 J,B	8.3 J,B	8.9 J,B	3 J,B	9.6 J,B	10 J	10 J
Iron	2110 J	82 R	1440 J	5140 J	348 J,B	172 J,B	4680 J	97.5 J,B	37 J	85 R
Lead	---	---	4.8 J	16.5 J	4 J,B	3.8 J,B	---	2.2 J	---	---
Magnesium	27400	42900	30300	35100	32400	48700	5250	---	52 J	171 J
Manganese	69	200	142	196	128	231	181	---	---	4 J
Mercury	---	---	---	---	---	---	---	---	---	---
Nickel	---	13 J	---	24.8 J,B	18.2 J,B	23.4 J,B	6 J	18.6 J,B	---	---
Potassium	1480 J	7060	1280 J,B	2970 J	2770 J	3940 J	8330	---	209 J	320 J
Selenium	--- R	--- R	--- R	--- R	--- R	--- R	--- R	--- R	--- R	--- R
Silver	---	---	---	---	---	---	---	---	---	---
Sodium	14000	56400	12800	51400	49900	69900	7100	442 J,B	573 J	733 J
Thallium	---	---	---	--- R	--- R	--- R	---	--- R	---	---
Vanadium	---	4 J	---	---	---	---	---	---	---	---
Zinc	52 J,B	25 J,B	56 J,B	144 J,B	95.5 J,B	123 J,B	95 J,B	37.7 JB	38 J	55 J

"---" All compounds in all samples underwent analysis. If concentration is not listed, the compound was not detected above instrument detection limit.
J Estimated value; or the report value is less than the contract required detection limit but greater than the instrument detection limit.
B Compound present at equal to or less than five times the concentration present in the laboratory or field blank.

TABLE D-2

NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
GROUNDWATER - ORGANIC RESULTS

Sample Number:	ECCDW01	ECCMW1A	ECCMW12	ECCMW13	ECCMW13	ECCMW13D	ECCMW14	ECCMW14D	ECCMW15	ECCMW16	ECCMW17	ECCMW18	ECCMW19A
Sample Location:		ECCMW1A	ECCMW12	ECCMW13	ECCMW13	ECCMW13	ECCMW14	ECCMW14	ECCMW15	ECCMW16	ECCMW17	ECCMW18	ECCMW19A
DTR Number:	ES728	EW781	EW800	EW794	EW796	EW795	EW783	EW784	EW785	EW786	EW787	EW788	EW797
Date Sampled:	04/25/88	04/27/88	04/28/88	04/28/88	04/28/88	04/28/88	04/28/88	04/28/88	04/27/88	04/27/88	04/27/88	04/27/88	04/28/88
Sample type:	DRILLER H2O	GRAB	GRAB	GRAB	MSD	DUPL	GRAB	DUPL	GRAB	GRAB	GRAB	GRAB	GRAB
VOLATILE ORGANICS (ug/l)													
Chloromethane	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	--	--	--	2800	3600	3800	--	--	--	--	--	--	--
Methylene Chloride	--	--	12000	109 J	--	--	--	--	--	--	--	--	--
Acetone	--	--	11000	--	--	--	--	--	--	210	--	--	--
Carbon Disulfide	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	--	--	3700	--	75 J	79 J	--	--	--	15	--	--	--
1,2-Dichloroethene (Total)	--	--	72000	--	--	--	--	--	--	--	--	--	35000
Chloroform	71	--	5300	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	--	--	-- R	-- R	-- R	-- R	-- R	-- R	--	--	--	--	-- R
1,1,1-Trichloroethane	24	--	64000	--	--	--	--	--	--	--	--	--	21000
Carbon Tetrachloride	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Acetate	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	36	--	16000	--	--	--	2 J	--	--	--	--	--	11000
Dibromochloromethane	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzene	--	--	--	--	--	--	--	--	--	4 J	--	--	--
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	--	--	--	--	--	--
Trans-1,2-Dichloropropene	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	28	--	13000	--	--	--	--	--	--	--	--	--	1200 J
1,1,2,2-Tetrachloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	1 J	--	7200 J	93 J	130 J	140 J	--	--	--	0.9 J	--	--	--
Chlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	--	--	--	--	--	--	--	--	--	--	--	--	850 J
Styrene	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	--	--	--	--	--	--	--	--	--	--	--	--	2000 J
SEMIVOLATILE ORGANICS													
Phenol	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	--	--	67	--	--	--	--	--	--	--	--	--	310
1,4-Dichlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	65
2-Methylphenol	--	--	--	--	21 J	--	--	--	--	--	--	--	--
4-Methylphenol	--	--	290	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	--	--	300	10 J	10 J	5 J	--	--	--	--	--	--	--
Isophorone	--	--	120	--	--	--	--	--	--	--	--	--	--
Naphthalene	--	--	28	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	6 J
Diethylphthalate	--	--	130	19 J	4 J	4 J	--	--	6 J	--	--	--	--
Di-n-Butylphthalate	4 J	5 J	3 J	--	3 J	3 J	--	--	--	4 J	4 J	--	--
bis(2-Ethylhexyl) Phthalate	22 B	15 JB	49 B	26 B	27 B	28 B	16 JB	37 JB	21 B	18 JB	13 JB	13 JB	15 JB
Dimethyl Phthalate	--	--	57	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	--	--	-- R	-- R	-- R	-- R	-- R	-- R	--	--	--	--	-- R
3-Nitroaniline	--	--	-- R	-- R	-- R	-- R	-- R	-- R	--	--	--	--	-- R
4-Nitroaniline	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R	-- R
4,6-Dinitro-2-Methylphenol	--	--	-- R	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	-- R	-- R	-- R	-- R	-- R	-- R	--	--	--	--	-- R

'---' All compounds in all samples underwent analysis. If concentration is not listed, the compound was not detected above quantification detection limits.
J Estimated value; or the report value is less than the contract required detection limit but greater than the quantification detection limit.
B Compound present at equal to or less than five times the concentration present in the field blank.
N/A Not analyzed.
R Unusable, indicates possible false negative.

TABLE D-2

NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
GROUNDWATER - ORGANIC RESULTS

Sample Number:	ECCMW19B	ECCMW20	ECCMW21	ECCMW22	ECCMW22D	ECCMW23	ECCSUMP01	ECCMW96	ECCMW97	ECCMW98	ECCMW99
Sample Location:	ECCMW19B	ECCMW20	ECCMW21	ECCMW22	ECCMW22	ECCMW23	SUMP				
QTR Number:	EW798	EW789	EW782	ES733	ES734	ES735	EW799	ES736	EW732	ES729	EW790
Date Sampled:	04/28/88	04/27/88	04/27/88	05/03/88	05/03/88	05/03/88	04/28/88	05/03/88	04/28/88	04/28/88	04/27/88
Sample type:	GRAB	GRAB	GRAB	GRAB	DUPL	GRAB	GRAB	FIELD BLANK	TRIP BLANK	FIELD BLANK	FIELD BLANK
VOLATILE ORGANICS (ug/l)											
Chloromethane	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	--	100	--	--	--	--	--	--	--	--	--
Chloroethane	--	27	--	--	--	--	--	--	--	--	--
Methylene Chloride	--	--	--	--	--	--	3200	--	--	--	--
Acetone	--	--	--	--	--	--	--	--	--	--	--
Carbon Disulfide	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	220	26	--	--	--	--	1800	--	--	--	--
1,2-Dichloroethene (Total)	330	230	--	--	--	--	16000	--	--	--	--
Chloroform	--	--	--	--	--	--	850 J	--	--	--	8
1,2-Dichloroethane	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	-- R	--	--	--	--	--	-- R	--	-- R	-- R	--
1,1,1-Trichloroethane	360	5	--	--	--	--	13000	--	--	--	--
Carbon Tetrachloride	--	--	--	--	--	--	--	--	--	--	--
Vinyl Acetate	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	1700	--	--	--	--	--	1300	--	--	--	--
Dibromochloromethane	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--
Benzene	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	--	--	--	--
Trans-1,2-Dichloropropene	--	--	--	--	--	--	--	--	--	--	--
Bromoform	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	110	--	--	--	--	--	430 J	--	--	--	--
1,1,2,2-Tetrachloroethane	--	--	--	--	--	--	--	--	--	--	--
Toluene	--	--	--	--	--	--	700 J	--	--	--	--
Chlorobenzene	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	--	--	--	--	--	--	--	--	--	--	--
Styrene	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	--	--	--	--	--	--	--	--	--	--	--
SEMIVOLATILE ORGANICS											
Phenol	--	--	--	6 JB	6 JB	--	13 J	7 J	N/A	--	--
1,2-Dichlorobenzene	66	--	--	--	--	--	85	--	N/A	--	--
1,4-Dichlorobenzene	--	--	--	--	--	--	--	--	N/A	--	--
2-Methylphenol	--	--	--	--	--	--	140	--	N/A	--	--
4-Methylphenol	--	--	--	--	--	--	35	--	N/A	--	--
2,4-Dimethylphenol	--	--	--	--	--	--	51	--	N/A	--	--
Isophorone	--	--	--	--	--	--	35	--	N/A	--	--
Naphthalene	--	--	--	--	--	--	5 J	--	N/A	--	--
2-Methylnaphthalene	--	--	--	--	--	--	--	--	N/A	--	--
Diethylphthalate	--	--	--	--	--	--	32	--	N/A	--	--
Di-n-Butylphthalate	--	--	5 J	--	--	--	4 J	--	N/A	--	--
bis(2-Ethylhexyl) Phthalate	34 B	8 JB	26 B	5 J	--	--	36 B	--	N/A	25	15 J
Dimethyl Phthalate	--	--	--	--	--	--	8 J	--	N/A	--	--
2-Nitroaniline	-- R	--	--	--	--	--	-- R	--	N/A	-- R	--
3-Nitroaniline	-- R	--	--	--	--	--	-- R	--	N/A	-- R	--
4-Nitroaniline	-- R	-- R	-- R	--	--	--	-- R	--	N/A	-- R	-- R
4,6-Dinitro-2-Methylphenol	--	--	--	--	--	--	--	--	N/A	--	--
N-Nitrosodiphenylamine	-- R	--	--	--	--	--	-- R	--	N/A	-- R	--

"--" All compounds in all samples underwent analysis. If concentration is not listed, the compound was not detected above quantification detection limits.
J Estimated value; or the report value is less than the contract required detection limit but greater than the quantification detection limit.
B Compound present at equal to or less than five times the concentration present in the field blank.
N/A Not analyzed.
R Unusable, indicates possible false negative.

TABLE D-3

NSL/ECC PREDESIGN INVESTIGATION ANALYTICAL RESULTS
GROUNDWATER - CONVENTIONAL PARAMETERS

Sample Number:	ECCMW1A	ECCMW12	ECCMW13	ECCMW13D	ECCMW14	ECCMW14D	ECCMW15	ECCMW16	ECCMW17	ECCMW18	ECCMW19A
Sample Location:	ECCMW1A	ECCMW12	ECCMW13	ECCMW13	ECCMW14	ECCMW14	ECCMW15	ECCMW16	ECCMW17	ECCMW18	ECCMW19A
Control Number:	A2840	A2854	A2850	A2851	A2848	A2849	A2842	A2843	A2844	A2845	A2852
Date Sampled:	04/27/88	04/28/88	04/28/88	04/28/88	04/28/88	04/28/88	04/27/88	04/27/88	04/27/88	04/27/88	04/28/88
Sample type:	GRAB	GRAB	GRAB	DUPL	GRAB	DUPL	GRAB	GRAB	GRAB	GRAB	GRAB
CONVENTIONAL PARAMETERS (mg/L)											
COD	---	510	340	280	120	120	160	210	720	160	140
TDS	418	647	795	790	453	454	460	750	477	428	522
TSS	78 J	1440 J	4750 J	4580 J	1400 J	1230 J	1530 J	2530 J	8480 J	1960 J	2160 J
ALKALINITY (as CaCO3)	313	255	459	460	495	458	552	686	1052	552	376
NH3-N	0.2	5.6	1.1	1.2	0.6	0.6	0.6	1.0	0.9	0.6	1.0
CHLORIDES	12	75	81	78	21	21	21	68	24	13	47

Sample Number:	ECCMW19B	ECCMW20	ECCMW21	ECCMW22	ECCMW22D	ECCMW23	ECCSUMP01	ECCMW96	ECCMW98	ECCMW99
Sample Location:	ECCMW19B	ECCMW20	ECCMW21	ECCMW22	ECCMW22	ECCMW23	SUMP			
Control Number:	A2853	A2846	A2841	A2858	A2859	A2860	A2855	A2861	A2856	A2847
Date Sampled:	04/28/87	04/27/88	04/27/88	05/03/88	05/03/88	05/03/88	04/28/88	05/03/88	04/28/88	04/27/88
Sample type:	GRAB	GRAB	GRAB	GRAB	DUPL	GRAB	GRAB	FIELD BLANK	FIELD BLANK	FIELD BLANK
CONVENTIONAL PARAMETERS (mg/L)										
COD	---	580	300	1800	1400	1700	130	10	8	---
TDS	406	773	431	598	605	973	647	---	13	6
TSS	27 J	7290 J	4610 J	28940 J	18720 J	16900 J	32 J	---	---	---
ALKALINITY (as CaCO3)	341	1004	731	1507	1511	1008	147	3	3	5
NH3-N	0.6	2.8	0.4	0.3	0.2	0.6	3.1	---	---	---
CHLORIDES	11	170	12	86	87	310	29	---	---	---

"---" All parameters in all samples underwent analysis. If concentration is not listed, the parameter was not detected above instrument detection limit.
J Estimated value.