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FARWELL LANDFILL
GROUND WATER MONITORING SYSTEM INSTALLATION

SEPTEMBER 1987

Project Number 595-05-1

MALCOLM PIRNIE, INC.
Environmental Engineers,
Scientists and Planners
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2.0 FIELD INVESTIGATION

2.1 Boring Program

A monitoring well installation program was initiated on June 3, 1987. Rochester Drilling Company drilled all exploratory sample borings and completed all monitoring well installations. Due to drilling difficulties, Rochester Drilling Company sub-contracted Frey Well Drilling Company of Alden, New York and Dallas-Morris Drilling Company of Bradford, Pennsylvania to complete boreholes for monitoring well installations.

A total of four (4) deep monitoring wells and four (4) sample borings were completed as a part of this field investigation. Three (3) deep wells (9D, 10D and 11D) were installed adjacent to existing shallow wells 9S, 10S and 11S downgradient of the landfill. The remaining deep well, 13D, was installed at a new locale upgradient of the landfill. The number 13 was chosen since a No. 12 well already existed on-site. One additional well boring, 13S, was drilled adjacent to 13D but was subsequently abandoned due to a lack of water and installation difficulties. The total drilling footage for this investigation was 893 linear feet. Plate 1 indicates the final locations of the new monitoring wells.

All monitoring well boreholes were advanced by an Ingersoll-Rand T-4 Air Rotary rig. All exploratory sample borings were advanced using CME-55 or Mobile B61 drilling rigs. All drilling and sampling equipment was steam-cleaned between each monitoring locale and before leaving the site. A summary of drilling operations are reviewed by location below and are summarized in Table 1.

- 11D sample boring was initiated on June 3 and completed June 15, 1987. Rochester Drilling Company utilized a Mobile B-61 Pacemaker rig with 6-1/4" hollow stem augers. Bentonite (GPG30) drilling mud was utilized to aid advancement. The total linear footage was 85'.

TABLE 1
FARWELL LANDFILL CLOSURE
WELL DRILLING SUMMARY

LOCATION	DRILLING METHOD	DRILLING RIG	DRILLING CO.	TOTAL DEPTH	SAMPLING INFO.	DRILLING DATE (S)	WELL INSTALLATION DATE
11D sample bore	6-1/4" HSA	Mobile B-61 Pacemaker	Rochester Drill. Co.	85'	5' interval	6/3-5, 6/8-11, 6/15/87	-
11D well bore	12-1/4" tricone to 86', Drive 9 5/8" casing. Clean with 8-3/4" hammer and roller bit, drive to 92'. Clean 8-3/4" hammer.	Ingersoll-Rand T-4	Frey Well Drill. Co.	92'	none	6/15-16/87	6/16/87
9D sample bore	6-1/4" HSA 4" roller bit	Mobile B-61 Pacemaker	Rochester Drill. Co.	102'	5' interval	6/16-19, 6 22-23/87	-
9D well bore	Air Rotary hammer drill/drive 9-5/8" casing. Clean with 8-3/4" hammer.	Ingersoll-Rand T-4	Frey Well Drill. Co.	76'	none	6/24/87	6/24/87
10D sample bore	spin/drive 5" casing, 4-7/8" roller bit to 30 Spin/Drive 4" casing, 3-7/8" roller bit 87'.	CME-55	Rochester Drill. Co.	87'	5' interval	6/18-20/ 6/22/87	-

TABLE 1 (cont'd)
FARWELL LANDFILL CLOSURE
WELL DRILLING SUMMARY

LOCATION	DRILLING METHOD	DRILLING RIG	DRILLING CO.	TOTAL DEPTH	SAMPLING INFO.	DRILLING DATE (S)	WELL INSTALLATION DATE
10D well bore	Air Rotary hammer drill/drive 9-5/8" casing, clean out 8-3/4" hammer.	Ingersoll-Rand T-4	Frey Well Drill. Co.	87'	none	6/22-23/87	6/23/87
13D sample bore	Spin/drive 3" casing, 2-7/8" roller bit.	CME-55	Rochester Drill Co.	134'	continuous	6/23-26, 6/29-30, 7/1-2/87	-
13D well bore	12-1/4" tri-cone to 83' Remove drive 8" casing. Clean with 6-1/2" hammer. Drill drive to 135'. Clean with 6-1/2" hammer.	Ingersoll-Rand T-4	Frey Well Drill. Co.	135'	none	6/18-19/87	7/7/87
13S well bore	Air Rotary hammer	Ingersoll-Rand T-4	Dallas - Morris Well Drill. Co.	95'	none	7/6/87	abandoned

- 11D well boring was initiated on June 15 and completed on June 16, 1987. Frey Well Drilling Company utilized an Ingersoll-Rand T-4 Air Rotary rig. A 12-1/4" tricone bit was advanced to a depth of 86' and then withdrawn, followed by 9-5/8" casing driven to 86'. The casing was cleaned with an 8-3/4" hammer bit and 8-3/4" roller bit. The casing was then advanced to 92' and subsequently cleaned out by an 8-3/4" hammer. The monitoring well installation occurred on June 16, 1987. Rochester Drilling Company installed the well at 88' after backfilling from 92' with #4 silica sand.

- 9D sample boring was initiated on June 16 and completed on June 23, 1987. Rochester Drilling Company utilized a Mobile B-61 Pacemaker with 6-1/4" hollow stem augers and a 4" roller bit. Bentonite (GPG30) drilling mud was used to aid advancement. The total linear footage was 102'.

- 9D well boring was initiated on June 24, 1987. Frey Well Drilling Company utilized an Ingersoll-Rand T-4 Air Rotary rig and 9-5/8" casing. The 9-5/8" casing was driven to 76' and cleaned out with an 8-3/4" hammer bit. The monitoring well installation occurred on June 24, 1987.

- 10D sample boring was initiated on June 18 and completed on June 22, 1987. Rochester Drilling Company advanced 5" casing with a 4-7/8" roller bit to 30', and 4" casing with a 3-7/8" roller bit to 87'. A spin/drive method was used to advance casing. Bentonite (GPG30) drilling mud was used to aid advancement. The total footage was 87'.

- 10D well boring was initiated on June 22 and completed June 23, 1987. Frey Well Drilling Company utilized an Ingersoll-Rand T-4 Air Rotary rig. A 9-5/8" casing was driven to 87' and cleaned out with an 8-3/4" hammer bit. The monitoring well installation occurred on June 23, 1987.

- 13D sample boring was initiated on June 23, 1987 and completed on July 2, 1987. Rochester Drilling Company advanced 3" steel casing with a 2-7/8" roller bit to 134'. A spin/drive method was used to advance the casing. Bentonite (GPG 30) drilling mud was used to aid advancement.

- 13D well boring was initiated on June 18 and completed on June 19, 1987. Frey Well Drilling Company utilized an Ingersoll-Rand T-4 Air Rotary rig. A 12-1/4" tricone roller bit was advanced to a depth of 83' and subsequently withdrawn. An 8" casing was installed to 83' and cleaned out with a 6-1/2" hammer bit. The casing was then driven to 135' and subsequently cleaned out with a 6-1/2" hammer bit. The monitoring well installation occurred on July 7, 1987.

- 13S well boring was initiated and completed on July 6, 1987. Dallas-Morris Drilling Company utilized an Ingersoll-Rand T-4 Air Rotary rig. A 7-1/2" casing was driven to a depth of 95' and subsequently cleaned out with a hammer bit. Due to a lack of water in the well bore after a 3-1/2 day period coupled with subsequent installation difficulties, it was decided, after conferring with the NYSDEC, that the well be abandoned and not re-drilled.

TABLE 2

FARWELL LANDFILL CLOSURE
WELL CONSTRUCTION DATA

WELL NO.	APPROX. BORING DEPTH BELOW GROUND (ft.)	STICK-UP (ft.)	SCREENED INTERVAL	MATERIAL SCREENED	DIAMETER OF SAND PACK (in.)
MW9S	46'	2.10'	46'-36'	glacial till	8"
MW9D	76'	3.14'	75'-70'	glaciolacustrine and glacial till	9-5/8"
MW10S	35'	1.75'	34'-24'	glacial till	8"
MW10D	87'	2.30'	86 -76'	glacial till	9-5/8"
MW11S	45'	2.35'	44'-34'	glacial till	8"
MW11D	92'	2.79'	88'-83'	glaciofluvial	9-5/8"
MW13D	131'	2.34'	131'-121'	glaciofluvial and glacial till	8"

TABLE 3
FARWELL LANDFILL
WATER LEVEL ELEVATIONS

WELL	GROUND ELEVATION	DEPTH TOP SCREEN	ELEVATION TOP SCREEN	DEPTH BOTTOM SCREEN	DEPTH TO WATER(1) 7/16/87	ELEVATION WATER SURFACE	DEPTH TO WATER(1) 7/23/87	ELEVATION WATER SURFACE	DEPTH TO WATER(1) 7/30/87	ELEVATION WATER SURFACE
1A	1542.38	N/A	-	N/A	-	-	-	-	-	-
2	1524.54	N/A	-	N/A	-	-	-	-	-	-
3	1536.84	N/A	-	N/A	-	-	-	-	-	-
4	1598.08	N/A	-	N/A	-	-	dry	dry	-	-
5A	1640.57	N/A	-	N/A	-	-	32.04	1610.33	33.10	1609.27
6	1620.85	150.0'	1470.85	160.0'	100+	-	100+	-	100+	-
7	1556.38	30.5'	1525.88	35.5'	dry	dry	dry	dry	dry	dry
8	1633.17	13.5'	1619.67	18.5'	dry	dry	dry	dry	dry	dry
9S	1541.87	36.0'	1505.87	46.0'	dry	dry	dry	dry	dry	dry
9D	1542.17	70.0'	1472.17	75.0'	54.01	1491.3	55.78	1489.53	54.71	1490.60
10S	1525.75	24.0'	1501.75	34.0'	26.91	1500.59	27.23	1500.27	29.34	1498.16
10D	1525.49	76.0'	1449.49	86.0'	36.44	1491.35	37.29	1490.50	38.22	1489.57
11S	1532.75	33.0'	1499.75	44.0'	39.41	1495.69	40.45	1494.65	41.04	1494.06
11D	1532.95	83.0'	1449.95	88.0'	47.10	1488.64	47.15	1488.59	47.85	1487.89
12	1627.33	38.0'	1589.33	48.0'	-	-	43.67	1585.60	43.60	1585.67
13D	1584.78	121.0'	1463.78	131.0'	97.29	1489.83	97.25	1489.87	97.72	1489.40

NOTES: Wells 1A, 2, 3, 4, 5A were not measured for water levels; well construction details and materials screened are unknown.

(1) Measured from top of steel casing stick-up.

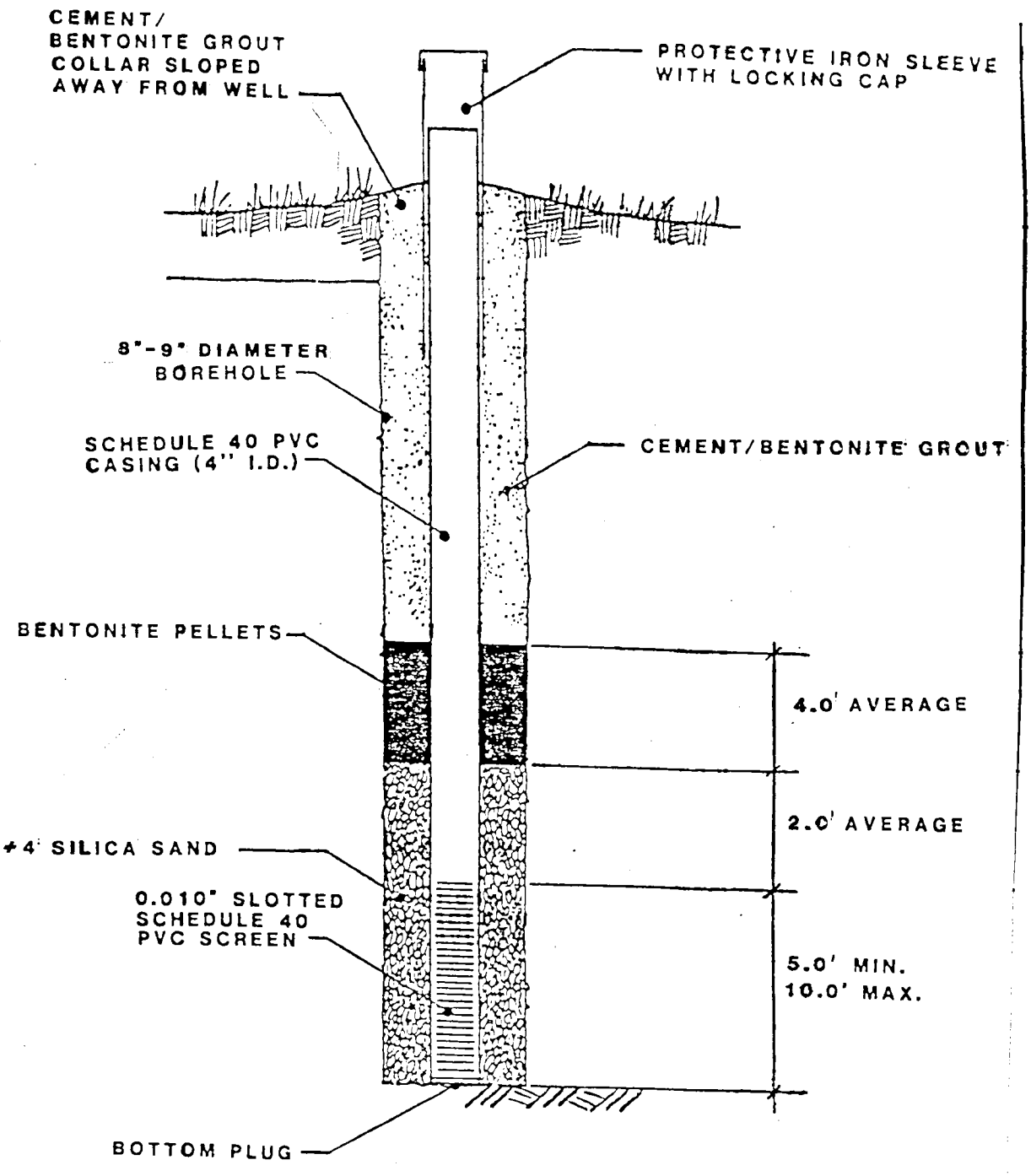
Table 3/REPT42

Split spoon soil samples were collected at five-foot intervals in sample borings 9D, 10D, and 11D to depths of 102', 87' and 85' respectively. Split spoon samples were collected continuously in sample boring 13D to a depth of 102' and at selected intervals thereafter. All split spoon samples were field-logged using both Burmister and Unified Soil Classification systems (refer to Appendix 1). Soil samples were stored in appropriately labeled glass jars. All sample borings were backfilled to the surface upon completion with cement-bentonite grout. Boring logs are presented in Appendix 2.

The new monitoring wells were constructed using 4-inch ID, Schedule 40 PVC pipe with accompanying 10 slot PVC screen, #4 silica sand, bentonite pellets, cement-bentonite grout and protective locking sleeves. All PVC pipe had flush joint threading. Cement-bentonite grout was tremie-backfilled to ground surface. A detail of a typical well design is presented as Figure 2. Well construction details are summarized in Table 2 and detailed in Appendix 3.

Monitoring wells were developed no sooner than 48 hours after installation by surging with compressed air. All new wells were surveyed to determine the exact locations and elevations relative to an established datum.

Ground water elevations from both new and existing on-site monitoring wells were recorded on July 16, 23 and 30, 1987. The data is presented in Table 3.



MALCOLM PIRNIE

TYPICAL MONITORING WELL
FARWELL LANDFILL

CATTARAUGUS CO. SEPTEMBER 1987

3.0 SITE GEOLOGY AND HYDROGEOLOGY

3.1 Geologic Units

Hydrogeologic cross-sections have been prepared which illustrate the vertical and lateral extent of the geologic deposits encountered during this program (refer to Plate 2). The cross-sections were prepared using the boring logs as presented in Appendix 2.

In order of abundance, the unconsolidated deposits occurring beneath the site include:

- glacial till;
- glaciofluvial deposits (sands and gravel); and
- glaciolacustrine/overbank deposits (sorted silts).

An organic horizon was also encountered at boring 9D. These deposits are briefly described below:

- Organic horizon/layer

  This layer was found in the uppermost two feet in sample boring 9D. It consists mainly of organic silts with varying percentages of f-m sand, rock fragments, clay and organic materials (viz: roots).

- Glaciolacustrine/Overbank Deposits

  These deposits consist of dense to very dense silt with some vf-f varved sands and clay and a trace of gravel. This zone is approximately three feet thick and appears to be a localized lense in the vicinity of MW9D.

- Glaciofluvial Deposits

  As Plate 2 illustrates, the thickness and lateral extent of these deposits varies considerably across the site. A continuous layer apparently exists between 13D and 11D and appears to slope as well as thicken in an easterly direction toward 11D. The material generally

consists of medium dense to dense sand and subrounded gravel ranging from moist to saturated. Pure sand lenses (which lacked gravel) were also detected in sample boring 13D. These particular lenses ranged from 2 to 4 feet in thickness.

- o Glacial Till

  This deposit, which predominates beneath the site, consists of an unconsolidated mixture of medium dense to very dense silt and subangular gravel with smaller percentages of sand, clay, rock fragments, and cobbles. The material was fairly dry to a depth of 96 feet at sample boring 13D, which is upgradient of the landfill, however, it was considerably moist to wet throughout the subsurface on the downgradient side (viz. sample borings 9, 10 and 11). This is illustrated on Plate 2.

The underlying bedrock formations are of late Devonian Age from the Chautauquan series, Arkwright Group. The formations include the Canadaway underlying the Chadakoin and are comprised of gray shale with interbedded siltstone. Structural details known about Cattaraugus County, based on exposed bedrock units, indicate a homoclinial structure with a dip less than 40 feet per mile to the south/southwest. Bedrock was confirmed at a number of previous wells drilled on-site, namely, numbers 4, 5A, 6, 8 and 12 (Refer to Plate 1 for locations). For further geologic details, refer to "Preliminary Hydrogeologic Investigation for the Farwell Landfill Site".

3.2 Ground Water Conditions

Two saturated ground water zones occur on-site within the unconsolidated deposits as illustrated in the hydrogeologic cross-sections, Plate 2. A deep zone, which is penetrated by the deep wells, is attributed to natural ground water conditions within the region. A shallower zone, which is penetrated by the

downgradient wells, is assumed to be a localized feature as a result of vertical seepage from the overlying landfill. This shallow zone is only associated with the downgradient wells (9, 10 and 11) and is likely attributed to the moist/wet conditions found within the unconsolidated deposits throughout the area. As Section B-B illustrates, moist/wet conditions begin almost immediately below ground surface and continue thereafter.

In contrast, Well 13D, upgradient to the landfill, does not encounter the shallow ground water zone. At this locale, the unconsolidated deposits remain fairly dry until the deep (or natural) ground water zone appears. Thus, the shallow ground water surface can be interpreted as a saturated layer which "blankets" the natural ground water surface. As Section B-B depicts, this "blanket" is expected to dissipate away from the landfill due to a reduction in overlying moisture.

Vertical gradients of ground water flow were calculated for downgradient well pairs 10S/10D and 11S/11D using the formula (Freeze and Cherry, 1979):

$$I_v = \frac{H}{B}$$

Where: I_v = vertical gradient of ground water flow (ft/ft).
H = difference in ground water elevations (ft).
B = difference in well screen elevations (ft).

The results are as follows:

10S/10D: I_v = -0.22 ft/ft suggesting a downward component of flow within the glacial till deposits.

11S/11D: I_v = -0.16 ft/ft again suggesting a downward component or seepage between the glacial till and glaciofluvial deposits.

A leachate collection system is in place for the Farwell Landfill encompassing all three fill areas. The system is effective in capturing leachate generated in the lined Phase IIIA area and at the periphery of the Phase I and II areas; however, the lack of a liner in the Phase I and II areas facilitates migration of leachate through the bottom of the landfill and into the unconsolidated deposits located below. Information acquired from split-spoon soil samples, along with chemical data (to be discussed in Section 4.3), indicate that vertical seepage is occurring within these unconsolidated deposits as a result of leachate migration from the site.

Using the ground water elevations summarized in Table 3, an isopotential map was prepared for the deep wells (9D, 10D, 11D and 13D) as measured on July 16, 1987 (refer to Plate 3). It is noted that the isopotential lines are inferred due to the limited number of data points. As Plate 3 depicts, the general direction of ground water flow across the site is to the east (toward Ischua Creek) as well as to the south/southeast. Based on published literature (Zarriello and Reynolds, 1987), the regional trend for ground water flow (associated primarily with the glaciofluvial aquifer(s)) is to the south toward the City of Olean following Ischua and Olean Creeks.

A ground water isopotential map was not prepared for the shallow wells; however, the predicted direction of flow, based on the limited data available, would be to the east toward Ischua Creek.

4.0 GROUND WATER QUALITY SAMPLING

4.1 Sample Collection

A total of six (6) ground water monitoring wells (viz: 9D, 10S, 10D, 11S, 11D and 13D) were sampled on July 16 and July 30, 1987, to evaluate existing ground water quality for the site. The parameters tested for are listed in Table 4. Well 9S was dry on both occasions and thus could not be sampled.

Prior to evacuation, the ground water elevations were measured in the wells as presented in Table 3. Continuously recharging wells, (viz. 13D, 11D, and 10D) were evacuated until the conductivity stabilized. At least three well casing volumes were removed. The remaining wells were allowed to recharge until sufficient quantities for sampling were obtained. Measurements of pH, color and conductivity were taken in the field. Table 5 presents a summary of field data measurements.

Wells 13D, 11D, 10D and 9D were evacuated using a Gould 3-3/4" OD submersible pump while Wells 11S and 10S were evacuated with a PVC bailer. The PVC bailers, pump and hosing, were decontaminated in sequence with an alconox solution, potable water, and distilled water between wells. Ground water samples were collected using Teflon bailers which were decontaminated in sequence with an alconox solution, potable water, acetone and distilled water between wells.

Samples were stored in either plastic or glass containers, as appropriate. All containers were precleaned and prelabeled. Necessary preservation of samples, including cooling, were conducted in the field. Samples were placed in coolers and transferred under chain-of-custody command to Recra Environmental, Inc.

4.2 QA/QC Procedures

Quality assurance and quality control (QA/QC) measures taken to ensure the reliability of the data generated were as follows:

TABLE 4

BACKGROUND GROUND WATER ANALYTICAL PARAMETERS

A complete Priority Pollutant Analysis (1)

Boron

Total Kjeldahl Nitrogen (TKN)

Ammonia

Nitrate

BOD

COD

TOC

TDS

Sulfate

Aluminum

Chromium (Hexavalent)

Sodium

Detergent (MBAS)

Calcium

Alkalinity

Total Hardness

Chloride

Iron

Manganese

Specific Conductivity (2)

pH (2)

Turbidity

NOTES:

(1) Listed in the Federal Resister Volume 45. No. 98, Monday, May 19, 1980, pages 33573-33579, including Metals*, Cyanide, Total Phenols, Volatile Compounds, Acid/Base Neutral Compounds and Pesticides.

(2) Field Measurements, recorded on Table 5.

* Total Metals analyses (unfiltered)

TABLE 5

FARWELL LANDFILL CLOSURE
SUMMARY OF GROUND WATER FIELD MEASUREMENTS

WELL#	pH	SPECIFIC CONDUCTANCE (umhos/cm)	SAMPLE APPEARANCE	DATE ACQUIRED
9S	N/A	N/A	N/A	7/16/87
				7/30/87
9D	10.7	4500	turbid/brown	7/16/87
	11.4	400	turbid/brown	7/30/87
10S	7.0	1200	turbid/orange	7/16/87
	9.4	1000	turbid/orange	7/30/87
10D	7.2	800	clear	7/16/87
	10.0	1000	clear	7/30/87
11S	7.0	1400	turbid/brown	7/16/87
	7.0	1200	turbid/brown	7/30/87
11D	7.4	500	clear	7/16/87
	9.7	700	clear	7/30/87
13D	7.1	250	clear	7/16/87
	7.0	1000	clear	7/30/87

NOTE: N/A, not obtained due to insufficient water yield/dry well.

- one unidentified trip blank was included with the first set of samples collected on July 16, 1987; and

- one unidentified duplicate sample was included in the second set of samples collect on July 30, 1987.

All QA/QC documentation is provided in Appendix 4 with the analytical reports prepared by Recra Environmental, Inc.

4.3 Discussion of Ground Water Quality Data

The ground water quality results for the two (2) sampling rounds at the Farwell Site are presented in Tables 6 through 15. The associated laboratory data is found in Appendix 4 of this report. Table 16 summarizes 'parameters of concern', as determined based on a comparison of the data to Class "6A" Ground Water Quality Standards. This data is briefly discussed below.

Certain volatile organic compounds (VOC's) were detected at elevated levels in the downgradient monitoring wells as compared to Well 13D (viz. upgradient) and NYSDEC ground water quality standards. Additionally, VOC concentrations were found to be significantly higher in the deeper downgradient wells as compared to the shallow wells. Key statistics are as follows:

- Concentrations of total volatile organics in Wells 9D and 10D averaged approximately 14 times greater than the concentrations found in Well 13D.

- Concentrations of total volatile organics in Well 11D were approximately 29 times greater than those concentrations in Well 13D.

- Concentrations of total volatile organics in Wells 10S and 11S averaged 1.5 times those concentrations in Well 13D.

- Concentrations of 1,1-dichloroethylene detected in the downgradient wells were significantly higher than the ground water quality standard. It is noted that a current standard does not exist for this parameter and that the above evaluation was made according to an earlier quoted limit (refer to Table 16).

- Other volatile organics, which were detected in the downgradient wells were slightly higher than the ground water quality standards.

- Well 13D (upgradient to the landfill) showed no apparent contamination of volatile organics. All parameters were below laboratory detection limits and/or ground water quality standards.

Certain trace metals were also elevated above ground water quality standards in some of the downgradient monitoring wells. Concentrations of arsenic, lead, iron and manganese were notably higher in the shallow wells as compared to the deep. Well 13D had an average iron concentration of 0.3 mg/l for the two sampling occasions, indicating that iron is naturally occurring in the area. It is noted here that all metal analyses were for total fractions only, and it is expected that the soluble fractions would be considerably less.

Finally, concentrations of TOC, COD and sulfate were elevated in most of the downgradient wells as compared to Well 13D. Also, sulfate concentrations exceeded the ground water quality standard in several of the downgradient wells on one of the sampling occasions.

It is important to note the distribution of the volatile organic compounds (VOCs) versus the trace metals within this hydrogeologic regime. The VOCs are more concentrated in the deep monitoring wells (downgradient) while the trace metals tend to be more concentrated in the shallow wells. This difference in

distribution is believed to be the result of several physiochemical factors. For the VOCs of concern, all have relatively high solubilities (compared to other organics), high specific gravity (relative to water) and low sorption constants (Hem, 1970). These physiochemical factors provide for the high-to-very-high mobility of these compounds within saturated environments, such as the one that apparently exists beneath the site. It is believed that the VOCs migrate downward from the Phase I and II areas of the landfill and are then transported laterally via the deep ground water system. The trace metals, on the other hand, exhibit a totally different behavior. It is believed that adsorption and precipitation reactions are causing the metals to migrate at very slow rates as compared to the VOCs, thus restricting their movement into lower regimes.

TABLE 6

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR PRIORITY POLLUTANT BASE/NEUTRAL/ACID EXTRACTABLES IN GROUND WATER
SAMPLE EVENT 7/16/87

PARAMETER (Units of Measure - µg/ℓ)	Ground Water Monitoring Wells						TRIP BLANK (1)
	9D	10S	10D	11S	11D	13D	
Acenaphthene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Acenaphthylene	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5
Anthracene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Benzo(a)anthracene	<7.8	<7.8	<7.8	<7.8	<7.8	<7.8	<7.8
Benzo(b)fluoranthene	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8
Benzo(k)fluoranthene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Benzo(a)pyrene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Benzo(g,h,i)perylene	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1
Bis(2-chloroethyl)ether	<5.7	<5.7	<5.7	≦5.7	<5.7	<5.7	<5.7
Bis(2-chloroethoxy)methane	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3
Bis(2-chloroisopropyl)ether	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7
Bis(2-ethylhexyl)phthalate	4.0	4.2	7.2	4.6	16	4.0	25
4-Bromophenylphenylether	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Butyl benzyl phthalate	<2.5	<2.5	<2.5	≦2.5	<2.5	<2.5	<2.5
2-Chloronaphthalene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
4-Chlorophenylphenylether	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2
Chrysene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Dibenzo(a,h)anthracene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Di-n-butyl phthalate	<2.5	15	10	21	<2.5	<2.5	<2.5
1,2-Dichlorobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
1,3-Dichlorobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
1,4-Dichlorobenzene	<4.4	≦4.4	≦4.4	≦4.4	<4.4	≦4.4	≦4.4
3,3'-Dichlorobenzidine	<17	<17	<17	<17	<17	<17	<17
Diethyl phthalate	<22	≦22	≦22	≦22	<22	<22	<22
Dimethyl phthalate	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
2,4-Dinitrotoluene	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7
2,6-Dinitrotoluene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Di-n-octylphthalate	<2.5	<2.5	<2.5	≦2.5	<2.5	<2.5	<2.5
Fluoranthene	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Fluorene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Hexachlorobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Hexachlorobutadiene	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Hexachlorocyclopentadiene	<25	<25	<25	<25	<25	<25	<25
Hexachloroethane	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Indeno(1,2,3-cd)pyrene	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7
Isophorone	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Naphthalene	2.0	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Nitrobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
N-nitrosodi-n-propylamine	<25	<25	<25	<25	<25	<25	<25
Phenanthrene	<5.4	<5.4	<5.4	<5.4	<5.4	<5.4	<5.4
Pyrene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9

TABLE 6 (cont'd.)

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR PRIORITY POLLUTANT BASE/NEUTRAL/ACID EXTRACTABLES IN GROUND WATER
SAMPLE EVENT 7/16/87

PARAMETER (Units of Measure - µg/ℓ)	Ground Water Monitoring Wells						TRIP BLANK(1)
	9D	10S	10D	11S	11D	13D	
1,2,4-Trichlorobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
4-Chloro-3-methylphenol	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
2-Chlorophenol	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
2,4-Dichlorophenol	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
2,4-Dimethylphenol	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
2,4-Dinitrophenol	<42	<42	<42	<42	<42	<42	<42
2-Methyl-4,6-dinitrophenol	<24	<24	<24	<24	<24	<24	<24
2-Nitrophenol	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
4-Nitrophenol	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
Pentachlorophenol	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
Phenol	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
2,4,6-Trichlorophenol	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7

NOTE:
(1) Trip Blank included with samples obtained 7/16/87.
Trip Blank I.D. = Distilled Water

TABLE 7

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR PRIORITY POLLUTANT VOLATILES IN GROUND WATER
SAMPLE EVENT 7/16/87

PARAMETER (Units of Measure - µg/ℓ)	Ground Water Monitoring Wells						TRIP BLANK(1)
	9D	10S	10D	11S	11D	13D	
Acrolein	<400	<400	<400	<400	<400	<400	<400
Acrylonitrile	<400	<400	<400	<400	<400	<400	<400
Benzene	≦4.4	≦4.4	≦4.4	≦4.4	7.0	<4.4	<4.4
Bromodichloromethane	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Bromoform	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7
Bromomethane	<10	<10	<10	<10	<10	<10	<10
Carbon Tetrachloride	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8
Chlorobenzene	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Chloroethane	61	<10	37	<10	51	<10	<10
2-Chloroethylvinyl ether	<10	<10	<10	<10	<10	<10	<10
Chloroform	<1.6	<1.6	≦1.6	<1.6	≦1.6	<1.6	≦1.6
Chloromethane	<10	<10	<10	<10	<10	<10	<10
Dibromochloromethane	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1
1,2-Dichlorobenzene	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
1,3-Dichlorobenzene	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
1,4-Dichlorobenzene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
1,1-Dichloroethane	300	43	400	9.0	350	<4.7	<4.7
1,2-Dichloroethane	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8
1,1-Dichloroethylene	4.2	<2.8	3.2	<2.8	6.4	<2.8	<2.8
trans-1,2-Dichloroethylene	40	≦1.6	58	≦1.6	50	<1.6	<1.6
1,2-Dichloropropane	<6.0	<6.0	<6.0	≦6.0	<6.0	<6.0	<6.0
cis-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	<7.2	<7.2	<7.2	<7.2	<7.2	<7.2	<7.2
Methylene chloride	7.6	<2.8	<2.8	<2.8	4.4	<2.8	<2.8
1,1,2,2-Tetrachloroethane	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9
Tetrachloroethylene	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1
Toluene	<6.0	<6.0	<6.0	<6.0	2.4	<6.0	<6.0
1,1,1-Trichloroethane	84	<3.8	41	<3.8	150	≦3.8	<3.8
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethylene	7.2	<1.9	11	3.2	65	<1.9	<1.9
Vinyl chloride	<10	<10	<10	<10	≦10	<10	<10

NOTES:
(1) Trip Blank included with samples obtained 7/16/86.
Trip blank I.D. = Distilled Water.

TABLE 8

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR PESTICIDES/PCBs IN GROUND WATER
SAMPLE EVENT 7/16/87

PARAMETER	Ground Water Monitoring Wells						QA/QC TRIP BLANK (1)
	9D	10S	10D	11S	11D	13D	
(Units of Measure - µg/ℓ)							
Aldrin	0.012	0.0061	<0.004	0.0052	0.009	0.005	0.0055
Alpha-BHC	<0.01	<0.005	<0.008	0.010	<0.008	<0.004	0.0086
Beta-BHC	0.098	0.082	<0.008	0.088	0.16	0.083	0.11
Delta-BHC	0.019	0.013	<0.008	0.038	<0.02	0.013	0.015
Gamma-BHC	<0.01	<0.01	<0.008	0.014	<0.02	<0.004	<0.008
Chlordane	<0.1	<0.1	<0.08	<0.2	<0.2	<0.1	<0.08
4,4'-DDD	<0.02	<0.02	<0.02	<0.02	<0.03	<0.02	<0.02
4,4'-DDE	<0.01	<0.02	<0.008	<0.01	<0.02	<0.01	<0.008
4,4'-DDT	<0.02	<0.02	<0.02	<0.02	<0.03	<0.02	<0.02
Dieldrin	<0.01	<0.01	<0.008	<0.01	<0.02	<0.01	<0.008
Endosulfan I	<0.01	<0.01	<0.008	<0.02	<0.02	<0.01	<0.008
Endosulfan II	<0.02	<0.02	<0.02	<0.02	<0.03	<0.02	<0.02
Endosulfan sulfate	<0.1	<0.07	<0.05	<0.09	<0.1	<0.06	<0.06
Endrin	<0.01	<0.01	<0.008	<0.01	<0.02	<0.01	<0.008
Endrin aldehyde	<0.02	<0.02	<0.02	<0.02	<0.03	<0.02	<0.02
Heptachlor	0.014	<0.01	<0.008	<0.03	<0.02	<0.01	<0.02
Heptachlor epoxide	<0.006	<0.005	<0.005	0.015	<0.02	<0.01	<0.008
Toxaphene	<0.5	<0.5	<0.4	<0.5	<0.8	<0.4	<0.4
Aroclor 1016	<0.2	<0.3	<0.3	<0.3	<0.5	<0.2	<0.1
Aroclor 1221	<0.5	<0.6	<0.5	<0.6	<1	<0.4	<0.2
Aroclor 1232	<0.5	<0.6	<0.5	<0.6	<1	<0.4	<0.2
Aroclor 1242	<0.2	<0.3	<0.3	<0.3	<0.5	<0.2	<0.1
Aroclor 1248	<0.2	<0.3	<0.3	<0.3	<0.5	<0.2	<0.1
Aroclor 1254	<0.2	<0.3	<0.3	<0.3	<0.3	<0.1	<0.1
Aroclor 1260	<0.2	<0.3	<0.3	<0.3	<0.3	<0.1	<0.1

NOTE:

(1) Trip Blank included with samples obtained 7/16/87.
Trip Blank I.D. = Distilled Water.

TABLE 9

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR TOTAL METALS IN GROUND WATER
SAMPLE EVENT 7/16/87

PARAMETER	Sample Identification 9D	10S	10D	11S	11D	13D	QA/QC TRIP BLANK (1)
(Units of Measure - ng/ℓ)							
Total Antimony	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Arsenic	<0.005	0.51	<0.005	0.042	<0.005	<0.005	<0.005
Total Beryllium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Cadmium	0.0070	<0.005	<0.006	<0.005	<0.005	<0.005	<0.0050
Total Chromium	0.050	0.15	<0.01	0.090	<0.01	0.020	<0.01
Total Copper	0.096	0.32	0.015	0.17	<0.005	0.012	<0.005
Total Lead	0.031	<0.005	<0.005	0.057	0.010	0.0060	0.014
Total Mercury	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005	<0.0005
Total Nickel	0.073	0.27	<0.006	0.16	0.005	0.006	0.008
Total Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Silver	<0.005	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Total Thallium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	0.33	0.94	0.22	0.90	0.042	0.32	0.063
Total Aluminum	24	97	0.060	62	0.16	0.070	<0.03
Total Boron	<6	<6	<6	<6	<6	<6	<6
Total Calcium	150	630	180	320	160	110	69
Hexavalent Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0070	<0.005
Total Iron	46	300	0.22	120	0.35	0.51	0.040
Total Manganese	4.0	8.1	0.17	3.6	0.12	<0.005	<0.005
Total Sodium	29	23	40	79	15	16	<5

NOTE:
(1) Trip Blank included with samples obtained 7/16/87.
Trip Blank I.D. - Distilled Water

TABLE 10

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR GROUND WATER QUALITY PARAMETERS
SAMPLE EVENT 7/16/87

PARAMETER	Units of Measure	Ground Water Monitoring Wells						QA/QC TRIP BLANK (1)
		9D	10S	10D	11S	11D	13D	
Total Alkalinity	mg/l as $CaCO_3$	58	548	401	569	241	118	1.0
Ammonia	mg NH_3-N/L	<0.1	3.6	0.17	7.29	<0.1	<0.1	<0.1
Biochemical Oxygen Demand	mg/l	<40	4.47	<2	20	3.6	<2	<2
Total Organic Carbon	mg/l	24	70	91.5	85.4	44.5	13.6	<1
Chloride	mg/l	18	20	45	124	66	38	<0.5
Chemical Oxygen Demand	mg/l	462	66	24	99.5	<5	<5	<5
Total Cyanide	mg/l	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Hardness	mg/l as $CaCO_3$	1,350	1,700	434	1,100	337	158	4.0
Nitrate	mg NO_3-N/L	0.11	0.09	<0.05	0.14	<0.05	0.68	<0.05
Total Kjeldahl Nitrogen	mg/l	1.1	7.6	0.21	20.2	3.6	0.36	<0.1
Total Recoverable Phenolics	mg/l	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Filterable Residue (180 C)	mg/l	206	740	596	960	418	307	16
Sulfate	mg/l	960	320	29	880	8.8	20	<1
Surfactants (MBAS)	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Turbidity	N.T.U.	1,050	2,200	0.58	24,500	4.3	0.80	0.21

NOTE:
(1) Trip Blank included with samples obtained 7/16/87. Trip Blank I.D. - Distilled Water

TABLE 11

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR PRIORITY POLLUTANT BASE/NEUTRAL/ACID EXTRACTABLES IN GROUND WATER
SAMPLE EVENT 7/30/87

PARAMETER (Units of Measure - µg/ℓ)	Ground Water Monitoring Wells						
	9D	10S	10D	11S	11D	13D	FIELD DUPLICATE (1)
Acenaphthene	≦1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Acenaphthylene	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5
Anthracene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Benzo(a)anthracene	<7.8	<7.8	<7.8	<7.8	<7.8	<7.8	<7.8
Benzo(b)fluoranthene	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8
Benzo(k)fluoranthene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Benzo(a)pyrene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Benzo(g,h,i)perylene	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1
Bis(2-chloroethyl)ether	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7
Bis(2-chloroethoxy)methane	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3
Bis(2-chloroisopropyl)ether	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7
Bis(2-ethylhexyl)phthalate	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	6.0
4-Bromophenylphenylether	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Butyl benzyl phthalate	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
2-Chloronaphthalene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
4-Chlorophenylphenylether	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2
Chrysene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Dibenzo(a,h)anthracene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Di-n-butyl phthalate	2.8	3.6	2.6	7.0	3.0	15	3.6
1,2-Dichlorobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
1,3-Dichlorobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
1,4-Dichlorobenzene	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4
3,3'-Dichlorobenzidine	<17	<17	<17	<17	<17	<17	<17
Diethyl phthalate	≦22	≦22	<22	≦22	≦22	≦22	≦22
Dimethyl phthalate	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
2,4-Dinitrotoluene	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7
2,6-Dinitrotoluene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Di-n-octylphthalate	<2.5	<2.5	<2.5	<2.5	<2.5	≦2.5	≦2.5
Fluoranthene	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Fluorene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Hexachlorobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Hexachlorobutadiene	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Hexachlorocyclopentadiene	<25	<25	<25	<25	<25	<25	<25
Hexachloroethane	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Indeno(1,2,3-cd)pyrene	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7
Isophorone	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Naphthalene	2.4	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Nitrobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
N-nitrosodi-n-propylamine	<25	<25	<25	<25	<25	<25	<25
Phenanthrene	≦5.4	≦5.4	≦5.4	≦5.4	≦5.4	≦5.4	≦5.4
Pyrene	≦1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9

TABLE 11 (cont'd.)

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR PRIORITY POLLUTANT BASE/NEUTRAL/ACID
EXTRACTABLES IN GROUND WATER
SAMPLE EVENT 7/30/87

PARAMETER (Units of Measure - µg/ℓ)	Ground Water Monitoring Wells						
	9D	10S	10D	11S	11D	13D	FIELD DUPLICATE (1)
1,2,4-Trichlorobenzene	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
4-Chloro-3-methylphenol	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
2-Chlorophenol	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
2,4-Dichlorophenol	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
2,4-Dimethylphenol	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
2,4-Dinitrophenol	<42	<42	<42	<42	<42	<42	<42
2-Methyl-4,6-dinitrophenol	<24	<24	<24	<24	<24	<24	<24
2-Nitrophenol	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
4-Nitrophenol	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
Pentachlorophenol	≦3.6	<3.6	<3.6	<3.6	<3.6	13	<3.6
Phenol	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
2,4,6-Trichlorophenol	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7

NOTE:
(1) Field Duplicate included with samples obtained 7/30/87.
Field Duplicate I.D. = 13D

TABLE 12

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR PRIORITY POLLUTANT VOLATILES IN GROUND WATER
SAMPLE EVENT 7/30/87

PARAMETER (Units of Measure - µg/ℓ)	Ground Water Monitoring Wells						
	9D	10S	10D	11S	11D	13D	FIELD DUPLICATE (1)
Acrolein	<400	<400	<400	<400	≦400	<400	<400
Acrylonitrile	<400	<400	<400	<400	<400	<400	<400
Benzene	<4.4	<4.4	<4.4	<4.4	8.4	≦4.4	<4.4
Bromodichloromethane	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Bromoform	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7
Bromomethane	<10	<10	<10	<10	<10	<10	<10
Carbon Tetrachloride	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8
Chlorobenzene	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Chloroethane	130	<10	32	<10	580	<10	<10
2-Chloroethylvinyl ether	<10	<10	<10	<10	<10	<10	<10
Chloroform	<1.6	<1.6	<1.6	<1.6	≦1.6	<1.6	<1.6
Chloromethane	<10	<10	<10	<10	<10	<10	<10
Dibromochloromethane	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1
1,2-Dichlorobenzene	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
1,3-Dichlorobenzene	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
1,4-Dichlorobenzene	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
1,1-Dichloroethane	520	56	470	11	250	<4.7	<4.7
1,2-Dichloroethane	<2.8	<2.8	<2.8	<2.8	3.0	<2.8	<2.8
1,1-Dichloroethylene	62	<2.8	15	<2.8	57	<2.8	<2.8
trans-1,2-Dichloroethylene	<1.6	<1.6	54	<1.6	69	<1.6	<1.6
1,2-Dichloropropane	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
cis-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	<7.2	<7.2	<7.2	<7.2	<7.2	<7.2	<7.2
Methylene chloride	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8
1,1,2,2-Tetrachloroethane	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9
Tetrachloroethylene	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1
Toluene	<6.0	<6.0	19	<6.0	13	6.4	≦6.0
1,1,1-Trichloroethane	<3.8	<3.8	38	<3.8	810	<3.8	<3.8
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethylene	<1.9	<1.9	13	<1.9	120	<1.9	<1.9
Vinyl chloride	<10	<10	<10	<10	11	<10	<10

NOTES:
(1) Field Duplicate included with samples obtained 7/30/87.
Field Duplicate I.D. = 13D

TABLE 13

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR PESTICIDES/PCBs IN GROUND WATER
Sample Event 7/30/87

PARAMETER	Ground Water Monitoring Wells						FIELD DUPLICATE (1)
	9D	10S	10D	11S	11D	13D	
(Units of Measure - µg/ℓ)							
Aldrin	<0.01	<0.01	<0.01	<0.01	<0.02	≦0.01	<0.01
Alpha-BHC	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	≦0.01
Beta-BHC	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01
Delta-BHC	<0.01	<0.01	<0.01	<0.01	<0.02	≦0.01	<0.01
Gamma-BHC	<0.01	<0.01	<0.01	<0.01	<0.02	0.011	≦0.01
Chlordane	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
4,4'-DDD	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05
4,4'-DDE	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02
4,4'-DDT	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05
Dieldrin	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02
Endosulfan I	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02
Endosulfan II	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05
Endosulfan sulfate	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05
Endrin	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02
Endrin aldehyde	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05
Heptachlor	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01
Heptachlor epoxide	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01
Toxaphene	<1	<1	<1	<1	<2	<1	<1
Aroclor 1016	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
Aroclor 1221	<1	<1	<1	<1	<2	<1	<1
Aroclor 1232	<1	<1	<1	<1	<2	<1	<1
Aroclor 1242	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
Aroclor 1248	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
Aroclor 1254	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.2
Aroclor 1260	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.2

NOTE:

(1) Field Duplicate included with samples obtained 7/30/87.
Field Duplicate I.D. = 13D

TABLE 14

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR TOTAL METALS IN GROUND WATER
SAMPLE EVENT 7/30/87

PARAMETER	Ground Water Monitoring Wells						FIELD DUPLICATE (1)
	9D	10S	10D	11S	11D	13D	
(Units of Measure = mg/ℓ)							
Total Aluminum	42	290	<0.3	230	0.11	0.10	0.20
Total Antimony	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Arsenic	0.076	0.59	<0.005	0.51	<0.005	<0.005	<0.005
Total Beryllium	<0.005	0.013	<0.005	0.008	<0.005	<0.005	<0.005
Total Boron	<4	<4	<4	<4	<4	<4	<4
Total Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Calcium	160	1,100	140	470	110	4.2	4.2
Total Chromium	0.069	0.40	0.005	0.28	<0.005	0.007	0.008
Hexavalent Chromium	<0.005	<0.005	<0.005	<0.005	0.007	0.011	0.006
Total Copper	0.15	1.0	0.006	0.57	<0.005	0.007	0.006
Total Iron	86	700	0.08	430	0.04	0.10	0.13
Total Lead	0.09	0.54	0.023	0.37	<0.005	0.018	0.018
Total Manganese	6.9	25	0.36	12	0.13	0.01	0.01
Total Mercury	<0.0008	0.0009	<0.0008	<0.0008	0.0009	<0.0008	<0.0008
Total Nickel	0.17	0.97	<0.005	0.69	<0.005	<0.005	<0.005
Total Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Silver	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Sodium	29	22	32	69	16	17	17
Total Thallium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	0.47	2.5	<0.02	1.9	<0.005	<0.005	<0.005

NOTE:
(1) Field Duplicate included with samples obtained 7/30/87.
Field Duplicate I.D. = 13D

TABLE 15

FARWELL LANDFILL CLOSURE
ANALYTICAL RESULTS FOR GROUND WATER QUALITY PARAMETERS
SAMPLE EVENT 7/30/87

PARAMETER	Units of Measure	Ground Water Monitoring Wells						FIELD DUPLICATE (1)
		9D	10S	10D	11S	11D	13D	
Total Alkalinity	mg/l as $CaCO_3$	190	520	420	560	280	150	110
Ammonia	mg NH_3-N/L	<0.1	2.3	0.29	3.0	0.29	<0.1	<0.1
Biochemical Oxygen Demand	mg/l	14	17	<2	4.1	<2	<2	<2
Total Organic Carbon	mg/l	64	160	9.2	74	14	1.5	<1.0
Chloride	mg/l	16	<0.5	<0.5	0.52	<0.05	18	16
Chemical Oxygen Demand	mg/l	330	160	14	83	5.9	<5	<5
Total Cyanide	mg/l	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Hardness	mg/l as $CaCO_3$	460	6,700	460	1,800	380	150	140
Nitrate	mg NO_3-N/L	0.05	0.12	<0.05	0.14	<0.05	0.84	0.78
Total Kjeldahl Nitrogen	mg/l	1.1	18	0.43	11	0.14	0.1	0.37
Total Recoverable Phenolics	mg/l	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Filterable Residue (180 C)	mg/l	220	710	570	950	460	220	220
Sulfate	mg/l	58	50	24	61	9.0	27	28
Surfactants (MBAS)	mg/l	0.13*	<0.1*	<0.02	0.41*	<0.02	0.066	<0.02
Turbidity	N.T.U.	290	44,000	1.2	6,200	2.0	60	32

* Sample formed emulsion.

NOTE:
(1) Field Duplicate included with samples obtained 7/16/87. Field Duplicate I.D. = 13D

COMMENTS (Tables 6 through 15)

The values reported as "less than" (<) indicate the working detection limit for the particular sample and/or parameter.

The values reported as "less than or equal to" (≤) indicate the compound may be present at trace levels relative to the detection limit but not subject to accurate quantification.

Total Organic Carbon results may not include volatile constituents since the sample was purged with an inert gas prior to analysis.

Results of the analysis of Pesticide/PCBs are based on the matching of retention times between samples and standards on a single gas chromatographic column.

TABLE 16
FARWELL LANDFILL CLOSURE
SUMMARY OF GROUND WATER QUALITY RESULTS FOR JULY 16 and JULY 30, 1987

PARAMETERS OF CONCERN	UPGRADIENT WELL	CONCENTRATIONS DETECTED DOWNGRADIENT WELLS					QUOTED LIMITS 1.
	13D	9D	10S	10D	11S	11D	
VOLATILES (µg/ℓ)							
Benzene (July 16th)	<4.4	≤4.4	≤4.4	≤4.4	≤4.4	7.0	ND
(July 30th)	<4.4	<4.4	<4.4	<4.4	<4.4	8.4	
Chloroethane	<10	61	<10	37	<10	51	No quoted standard
	<10	130	<10	32	<10	580	
1,1-Dichloroethane	<4.7	300	43	400	9.0	350	50
	<4.7	520	56	470	11	250	
1,1-Dichloroethylene	<2.8	4.2	<2.8	3.2	<2.8	6.4	0.07[3]
	<2.8	62	<2.8	15	<2.8	57	
trans-1,2-Dichloroethylene	<1.6	40	≤1.6	58	≤1.6	50	50
	<1.6	<1.6	<1.6	54	<1.6	69	
Toluene	<6.0	<6.0	<6.0	<6.0	<6.0	2.4	50
	6.4	<6.0	<6.0	19	<6.0	13	
1,1,1-Trichloroethane	≤3.8	84	<3.8	41	<3.8	150	50
	<3.8	<3.8	<3.8	38	<3.8	810	
Trichloroethylene	<1.9	7.2	<1.9	11	3.2	65	50
	<1.9	<1.9	<1.9	13	<1.9	120	
Vinyl chloride	<10	<10	<10	<10	<10	≤10	5
	<10	<10	<10	<10	<10	11	
TOTAL METALS (mg/ℓ)							
Arsenic	<0.005	<0.005	0.51	<0.005	0.042	<0.005	0.025
	<0.005	0.076	0.59	<0.005	0.51	<0.005	
Lead	0.0060	0.031	<0.005	<0.005	0.057	0.010	0.025
	0.018	0.09	0.54	0.023	0.37	<0.005	
Iron[2]	0.51	46	300	0.22	120	0.35	0.3
	0.10	86	700	0.08	430	0.04	
Manganese[2]	<0.005	4.0	8.1	0.17	3.6	0.12	0.3
	0.01	6.9	25	0.36	12	0.13	

(continued)

TABLE 16 (cont'd.)
FARWELL LANDFILL CLOSURE
SUMMARY OF GROUND WATER QUALITY RESULTS FOR JULY 16 and JULY 30, 1987

PARAMETERS OF CONCERN	UPGRADIENT WELL	CONCENTRATIONS DETECTED DOWNGRADIENT WELLS					QUOTED LIMITS 1.
	13D	9D	10S	10D	11S	11D	
GROUND WATER QUALITY PARAMETERS (mg/ℓ)							
Total Organic Carbon	13.6	24	70	91.5	85.4	44.5	No quoted standard
	1.5	64	100	9.2	74	14	
Chemical Oxygen Demand	<5	462	66	24	99.5	<5	No quoted standard
	<5	330	160	14	83	5.9	
Sulfate	20	960	320	29	880	8.8	250
	27	58	50	24	61	9.0	

NOTES:
1. NYSDEC Codes, Rules and Regulations, Title 6, Chapter X, Part 703.5 - Class GA Ground Water, March 31, 1986.
2. Combined concentrations not to exceed 0.5 mg/ℓ.
3. NYSDEC Ambient Water Quality Standards and Guidance Values, July 24, 1985. No current limit is quoted.

ND = not detectable by analytical testing methods.

5.0 SUMMARY AND RECOMMENDATIONS FOR FURTHER STUDY

Two (2) saturated/ground water zones were encountered at depth. A deep zone is attributed to regional or natural ground water conditions while a shallower zone (associated only with the downgradient wells) is thought to be a localized effect, attributed to vertical seepage from the overlying landfill. A saturated sand and gravel layer exists beneath the site from 80 to 120 feet in depth. It was found to be discontinuous in a north-south direction as evidenced from sampling information. The direction of lateral ground water flow is to the east and south/southeast across the site. Moist/wet subsurface conditions encountered on the downgradient side of the landfill, coupled with ground water quality data, demonstrate the vertical transmitting properties of the underlying unconsolidated deposits.

Ground water quality data indicated contamination to varying degrees in all of the downgradient monitoring wells. Of prime concern, were certain volatile organic compounds which exceeded Class GA Ground Water Quality Standards. Certain metals (i.e. arsenic and lead) also exceeded Ground Water Quality Standards to a lesser degree in some of the downgradient wells. The fact that volatile organics are concentrated in the deep wells while trace metals are concentrated in the shallow wells, illustrates the relative mobilities of these parameters under saturated site conditions.

Due to the apparent contamination observed in the downgradient monitoring wells, it is recommended that further hydrogeologic investigation take place at (and in the vicinity of) the Farwell Landfill Site in order to meet the following objectives:

- define subsurface hydrogeologic conditions beyond the site (in a downgradient direction); and
- define the vertical and lateral extent of subsurface contamination off-site.

In order to meet the above identified objectives, a proposed scope of work (to be detailed in a subsequent Work Plan) will address:

- installation of additional monitoring well couplets (deep and shallow) along Ischua Creek and south of the site;

- ground water quality sampling of existing and new wells;

- surface water quality sampling upstream and downstream in Ischua Creek;

- in-situ permeability testing of wells for approximating ground water velocities and rates of contaminant migration; and

- design and implementation of an on-site pumping test to obtain additional information for future remedial activities, if deemed necessary.

Prior to implementation, the Work Plan will be submitted to the NYSDEC for review/comment and approval.

MALCOLM PIRNIE INC.

PROJECT :FARWELL LF CLOSURE
DATE :6/3-5,8-12,15-16/87
CONTRACTOR :ROCHESTER DRILLING
ELEVATION : TOP OF CASING 1535.74

BORING NUMBER:MW-11D
PROJECT NO. :0595-051-100
LOCATION :ISCHUA, N.Y.
INSPECTOR :P.TANNER
SAMP. METHOD :Split spoon

SAMPLE No.	Blows per 6"	Depth (ft.)	SOIL DESCRIPTION: Density, color, SOIL, admixtures moisture, other notes, ORIGIN
S 1	2 6 8 16	0/2'	(rec,. 24/24") 14" m. dense, br. f SAND, some gravel (subangular) (f-c) lt. silt, tr. clay, wet. to 10" m. dense, br. SILT, tr. gravel tr. clay, wet. (SP) glacial till
S 2	6 14 12 21	5/7'	(rec. 14/24") 3" m. dense, br gy, SILT, some gravel (subangular to angular), (f-c) tr. vf. sand,tr. clay, damp. 11" m. dense, SILT and GRAVEL, (subangular to rounded), moist. (GM) glacial till
S 3	15 14 10 6	10/12'	(rec. 11/24") m. dense, br. SILT and GRAVEL, (f-c) lt. vf. sand, tr. clay, damp to moist. (GM) glacial till
S 4	6 8 16 18	15/17'	(rec. 9/24") same as above, moist (GM) glacial till
S 5	24 100/3	20/22'	(rec. 0/24") no recovery
S 6	19 22 32 43	25/27'	(rec. 15/24") v. dense, br. vf f SAND, some gravel (subangular to subrounded),(f-c), some silt, moist. (SP) glaciofluvial
S 7	39 32 41 50	30/32"	(rec. 0/24") no recovery, cobble plugged spoon

WTH = weight of hammer

SAMPLE No.	Blows per 6"	Depth (ft.)	SOIL DESCRIPTION: Density, color, SOIL, admixtures moisture, other notes, ORIGIN
S 8	22 29 57 75	35/37'	(rec. 24/24) 10" v. dense, br gy, SILT and GRAVEL (subangular to subrounded,(f-c) moist, grading to 7" v. dense, SILT and GRAVEL (subangular to angular, some f to m sand, tr. clay, wet. (GM) glacial till
S 9	40 37 72 88	40/42'	(rec. 24/24") v. dense, br. SILT and GRAVEL, (subangular to subrounded) (f-c) lt. vf f sand, tr. clay, dry to sl. moist. (GM) glacial till
S 10	38 54 59 35	45/47'	(rec. 24/24") same as above
S 11	11 20 29 32	50/52'	(rec. 24/24") same as above, moist to wet. (GM) glacial till
S 12	4 6 29 60	55-57'	(rec. 12/24") 11" same as above 1" br. SILT, lt. vf f sand wet. (GM) glacial till
S 13	3 12 18 38	60-62'	(rec. 24/24") dense, br. SILT some gravel, (subangular to subrounded) (f-c) lt. vf f sand, tr. clay, wet. (GM) glacial till
S-14	19 22 28 47	65-67'	(rec. 24/24") dense, br. SILT and GRAVEL, (subangular to subrounded), (f-c), some f-c sand, tr. clay, wet. (GM) glacial till
S-15	13 52 100/3	70-72'	(rec. 10/24") v.dense, br. SILT and GRAVEL, (subrounded to subrounded) (f-c),some f-c sand, tr. clay, wet.

BORING NUMBER :MW-11D

SAMPLE No.		Depth (ft.)	SOIL DESCRIPTION Density, color, SOIL, admixtures moisture, other notes, ORIGIN
S-16	55 100/3	75-77'	(rec. 8/24") v. dense, SAND and GRAVEL, (subrounded to rounded), (f-c) lt. silt, wet. (SP-SM) glaciofluvial
S-17	16 42 100/3	12/24"	(rec. 12/24") 8" v. dense, br. m SAND and GRAVEL (rounded)(f-c) wet, grading to 4" f-m SAND, lt. silt, tr. clay, wet. glaciofluvial (GW/SW)
S-18	30 100/4	85-87'	(rec. 8/24") v. dense, br. SAND, some gravel (f-c) (rounded), lt. silt wet. glaciofluvial (SW)

Notes;

sample boring completed at 87'

well temp. casing set at 92'
6/4/87, no water in borehole, depth of 20'

6/9/87, depth to water 42.2'

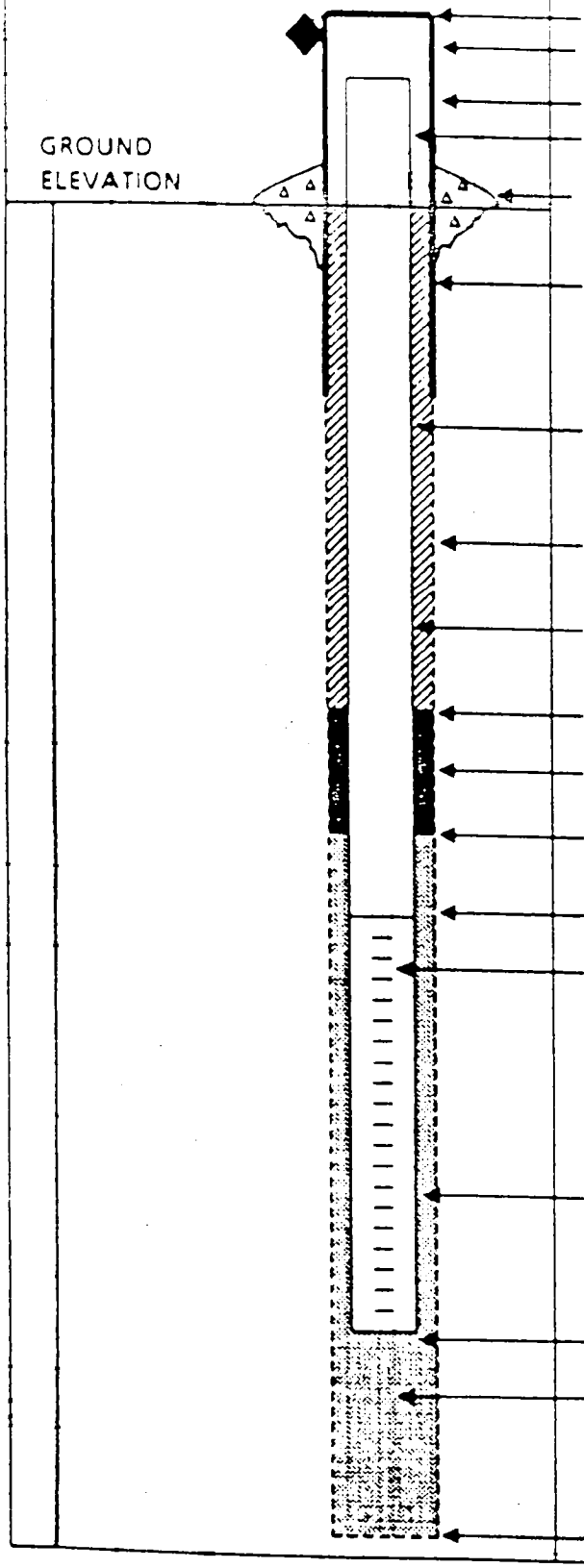
MALCOLM PIRNIE

OVERBURDEN MONITORING WELL SHEET

PROJECT Farnell Closure
PROJECT NO. 0525-051
ELEVATION 1535.74
FIELD GEOLOGIST PJT

LOCATION MW-11D
BORING
DATE June 16, 1987

DRILLER Rochester Drill Co.
DRILLING METHOD Frey Well Drill Air Rotary
DEVELOPMENT METHOD Compressed air



ELEVATION OF TOP OF SURFACE CASING: 1535.74
ELEVATION OF TOP OF RISER PIPE: -

STICK - UP TOP OF SURFACE CASING: 2.79
STICK - UP RISER PIPE: -

TYPE OF SURFACE SEAL: Cement-bentonite
GROUND ELEVATION 1532.95

I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: STEEL

RISER PIPE I.D. 4"
TYPE OF RISER PIPE: PVC, SCHED. 40

BOREHOLE DIAMETER: 9 5/8"

TYPE OF BACKFILL: Cement-bentonite grout

ELEVATION / DEPTH TOP OF SEAL: 77'

TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 81'

ELEVATION / DEPTH TOP OF SCREEN: 83'

TYPE OF SCREEN: PVC, SCHED. 40

SLOT SIZE x LENGTH: .010 slot x 5

I.D OF SCREEN: 4"

TYPE OF SAND PACK: #4 Silica SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 88'

ELEVATION / DEPTH BOTTOM OF SAND PACK: 92.0'

TYPE OF BACKFILL BELOW OBSERVATION WELL: #4 SILICA SAND

ELEVATION / DEPTH OF HOLE: 92.0'

AQUEOUS MATRIX
METHOD 8240 - PRIORITY POLLUTANT VOLATILES

COMPOUND (Units of Measure = µg/l)	SAMPLE IDENTIFICATION (DATE) 11D (7/16/87)	11S (7/16/87)
Acrolein	<400	<400
Acrylonitrile	<400	<400
Benzene	7.0	<4.4
Bromodichloromethane	<2.2	<2.2
Bromoform	<4.7	<4.7
Bromomethane	<10	<10
Carbon tetrachloride	<2.8	<2.8
Chlorobenzene	<6.0	<6.0
Chloroethane	51	<10
2-Chloroethylvinyl ether	<10	<10
Chloroform	<1.6	<1.6
Chloromethane	<10	<10
Dibromochloromethane	<3.1	<3.1
1,2-Dichlorobenzene	<2.2	<2.2
1,3-Dichlorobenzene	<2.1	<2.1
1,4-Dichlorobenzene	<2.5	<2.5
1,1-Dichloroethane	350	9.0
1,2-Dichloroethane	<2.8	<2.8
1,1-Dichloroethylene	6.4	<2.8
trans-1,2-Dichloroethylene	50	<1.6
1,2-Dichloropropane	<6.0	<6.0
cis-1,3-Dichloropropene	<5.0	<5.0
trans-1,3-Dichloropropene	<5.0	<5.0
Ethylbenzene	<7.2	<7.2
Methylene chloride	4.4	<2.8
1,1,2,2-Tetrachloroethane	<6.9	<6.9
Tetrachloroethylene	<4.1	<4.1
Toluene	2.4	<6.0
1,1,1-Trichloroethane	150	<3.8
1,1,2-Trichloroethane	<5.0	<5.0
Trichloroethylene	65	3.2
Vinyl chloride	<10	<10
Analysis Date	7/20/87	7/20/87
Internal Standards Level Added = 50 µg/l (% Recovery)		
Bromochloromethane	124	107
1,4-Difluorobenzene	125	97
Chlorobenzene D_5	120	94

I.D. #87-889

AQUEOUS MATRIX
METHOD 8270 PRIORITY POLLUTANT BASE/NEUTRAL/ACID EXTRACTABLES

COMPOUND (Units of Measure = µg/l)	SAMPLE IDENTIFICATION (DATE)	
	11D (7/16/87)	11S (7/16/87)
Acenaphthene	<1.9	<1.9
Acenaphthylene	<3.5	<3.5
Anthracene	<1.9	<1.9
Benzo(a)anthracene	<7.8	<7.8
Benzo(b)fluoranthene	<4.8	<4.8
Benzo(k)fluoranthene	<2.5	<2.5
Benzo(a)pyrene	<2.5	<2.5
Benzo(g,h,i)perylene	<4.1	<4.1
Bis(2-chloroethyl)ether	<5.7	<5.7
Bis(2-chloroethoxy)methane	<5.3	<5.3
Bis(2-chloroisopropyl)ether	<5.7	<5.7
Bis(2-ethylhexyl)phthalate	16	4.6
4-Bromophenylphenylether	<1.9	<1.9
Butyl benzyl phthalate	<2.5	<2.5
2-Chloronaphthalene	<1.9	<1.9
4-Chlorophenylphenylether	<4.2	<4.2
Chrysene	<2.5	<2.5
Dibenzo(a,h)anthracene	<2.5	<2.5
Di-n-butyl phthalate	<2.5	21
1,2-Dichlorobenzene	<1.9	<1.9
1,3-Dichlorobenzene	<1.9	<1.9
1,4-Dichlorobenzene	<4.4	<4.4
3,3'-Dichlorobenzidine	<17	<17
Diethyl phthalate	<22	<22
Dimethyl phthalate	<1.6	<1.6
2,4-Dinitrotoluene	<5.7	<5.7
2,6-Dinitrotoluene	<1.9	<1.9
Di-n-octylphthalate	<2.5	<2.5
Fluoranthene	<2.2	<2.2
Fluorene	<1.9	<1.9
Hexachlorobenzene	<1.9	<1.9
Hexachlorobutadiene	<0.9	<0.9
Hexachlorocyclopentadiene	<25	<25
Hexachloroethane	<1.6	<1.6
Indeno(1,2,3-cd)pyrene	<3.7	<3.7
Isophorone	<2.2	<2.2
Naphthalene	<1.6	<1.6
Nitrobenzene	<1.9	<1.9
N-nitrosodi-n-propylamine	<25	<25
Phenanthrene	<5.4	<5.4
Pyrene	<1.9	<1.9

(Continued)

AQUEOUS MATRIX
METHOD 8270 - PRIORITY POLLUTANT BASE/NEUTRAL/ACID EXTRACTABLES

COMPOUND (Units of Measure = µg/l)	SAMPLE IDENTIFICATION (DATE)	
	11D (7/16/87)	11S (7/16/87)
1,2,4-Trichlorobenzene	<1.9	<1.9
4-Chloro-3-methylphenol	<3.0	<3.0
2-Chlorophenol	<3.3	<3.3
2,4-Dichlorophenol	<2.7	<2.7
2,4-Dimethylphenol	<2.7	<2.7
2,4-Dinitrophenol	<42	<42
2-Methyl-4,6-dinitrophenol	<24	<24
2-Nitrophenol	<3.6	<3.6
4-Nitrophenol	<2.4	<2.4
Pentachlorophenol	<3.6	<3.6
Phenol	<1.5	<1.5
2,4,6-Trichlorophenol	<2.7	<2.7
Extraction Date	7/21/87	7/21/87
Analysis Date	7/21/87	7/21/87
Internal Standards		
Level Added = 40 µg/l		
(% Recovery)		
Phenanthrene-D_{10}	86	179
Surrogates		
Level Added = 100 µg/l		
(% Recovery)		
Decafluorobiphenyl	51	29
2-Fluorobiphenyl	44	34
2-Fluorophenol	36	21
Phenol-D_6	31	17

AQUEOUS MATRIX
METHOD 8080 - ORGANOCHLORINE PESTICIDES/PCB'S

COMPOUND (Units of Measure = µg/l)	SAMPLE IDENTIFICATION (DATE) 11D (7/16/87)	11S (7/16/87)
Aldrin	0.009	0.0052
Alpha-BHC	<0.008	0.010
Beta-BHC	0.16	0.088
Delta-BHC	<0.02	0.038
Gamma-BHC	<0.02	0.014
Chlordane	<0.2	<0.2
4,4'-DDD	<0.03	<0.02
4,4'-DDE	<0.02	<0.01
4,4'-DDT	<0.03	<0.02
Dieldrin	<0.02	<0.01
Endosulfan I	<0.02	<0.02
Endosulfan II	<0.03	<0.02
Endosulfan sulfate	<0.1	<0.09
Endrin	<0.02	<0.01
Endrin aldehyde	<0.03	<0.02
Heptachlor	<0.02	<0.03
Heptachlor epoxide	<0.02	0.015
Toxaphene	<0.8	<0.5
Aroclor 1016	<0.5	<0.3
Aroclor 1221	<1	<0.6
Aroclor 1232	<1	<0.6
Aroclor 1242	<0.5	<0.3
Aroclor 1248	<0.5	<0.3
Aroclor 1254	<0.3	<0.3
Aroclor 1260	<0.3	<0.3
Extraction Date	7/22/87	7/22/87
Analysis Date	7/25/87	7/24/87

AQUEOUS MATRIX
PRIORITY POLLUTANT METALS

PARAMETER (Units of Measure = mg/l)	METHOD NUMBER	ANALYSIS DATE	SAMPLE IDENTIFICATION (DATE) 9D (7/16/87)	10D (7/16/87)	10S (7/16/87)
Total Antimony	204.2	8/7/87	<0.005	<0.005	<0.005
Total Arsenic	206.2	7/24/87	<0.005	<0.005	0.51
Total Beryllium	210.1	7/23/87	<0.005	<0.005	<0.005
Total Cadmium	213.1	7/23/87	0.0070	<0.006	<0.005
Total Chromium	218.1	7/22/87	0.050	<0.01	0.15
Total Copper	220.1	7/23/87	0.096	0.015	0.32
Total Lead	239.2	7/27/87	0.031	<0.005	<0.005
Total Mercury	245.1	7/23/87	<0.0005	<0.0005	<0.0005
Total Nickel	249.1	8/7/87	0.073	<0.006	0.27
Total Selenium	270.2	8/16/87	<0.005	<0.005	<0.005
Total Silver	272.1	7/23/87	<0.005	<0.005	0.0050
Total Thallium	279.2	7/27/87	<0.005	<0.005	<0.005
Total Zinc	289.1	7/23/87	0.33	0.22	0.94

AQUEOUS MATRIX
PRIORITY POLLUTANT METALS

PARAMETER (Units of Measure = mg/l)	METHOD NUMBER	ANALYSIS DATE	SAMPLE IDENTIFICATION (DATE) 11D (7/16/87)	11S (7/16/87)
Total Antimony	204.2	8/7/87	<0.005	<0.005
Total Arsenic	206.2	7/24/87	<0.005	0.042
Total Beryllium	210.1	7/23/87	<0.005	<0.005
Total Cadmium	213.1	7/23/87	<0.005	<0.005
Total Chromium	218.1	7/22/87	<0.01	0.090
Total Copper	220.1	7/23/87	<0.005	0.17
Total Lead	239.2	7/27/87	0.010	0.057
Total Mercury	245.1	7/23/87	<0.005	<0.005
Total Nickel	249.1	8/7/87	0.005	0.16
Total Selenium	270.2	8/6/87	<0.005	<0.005
Total Silver	272.1	7/23/87	<0.005	<0.005
Total Thallium	279.2	7/27/87	<0.005	<0.005
Total Zinc	289.1	7/23/87	0.042	0.90

AQUEOUS MATRIX

PARAMETER	METHOD NUMBER	UNITS OF MEASURE	ANALYSIS DATE	SAMPLE IDENTIFICATION (DATE) 11S (7/16/87)	13D (7/16/87)
Total Alkalinity	310.1	mg/l as $CaCO_3$	7/22/87	569	118
Ammonia	350.3	mg NH_3-N/L	7/21/87	7.29	<0.1
Biochemical Oxygen Demand	405.1	mg/l	7/17/87	20	<2
Total Organic Carbon	9060	mg/l	7/21/87	85.4	13.6
Chloride	325.3	mg/l	7/20/87	124	38
Chemical Oxygen Demand	410.1	mg/l	7/21/87	99.5	<5
Total Cyanide	9010	mg/l	7/27-28/87	<0.010	<0.010
Total Hardness	130.2	mg/l as $CaCO_3$	7/28/87	1,100	158
Nitrate	352.1	mg NO_3-N/L	7/17/87	0.14	0.68
Total Kjeldahl Nitrogen	351.3	mg/l	7/23/87	20.2	0.36
Total Recoverable Phenolics	9065	mg/l	8/3/87	<0.010	<0.010
Filterable Residue (180°C)	160.1	mg/l	7/17/87	960	307
Sulfate	9038	mg/l	7/24/87	880	20
Surfactants (MBAS)	425.1	mg/l	7/17/87	<0.02	<0.02
Turbidity	180.1	N.T.U.	7/17/87	24,500	0.80

QUALITY CONTROL INFORMATION - PRECISION
AQUEOUS MATRIX
METHOD 8270 - PRIORITY POLLUTANT BASE/NEUTRAL/ACID EXTRACTABLES

SAMPLE IDENTIFICATION 11D

COMPOUND (Units of Measure = µg/l)	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION
Bis(2-ethylhexyl)phthalate	23	8.5	16	10
Extraction Date	7/21/87	7/21/87	-	-
Analysis Date	7/21/87	7/21/87	-	-
Internal Standards				
Level Added = 40 µg/l				
(% Recovery)				
Phenanthrene-D_{10}	89	82	86	4.9
Surrogates				
Level Added = 100 µg/l				
(% Recovery)				
Decafluorobiphenyl	52	50	51	1.4
2-Fluorobiphenyl	44	45	44	0.71
2-Fluorophenol	38	33	36	3.5
Phenol-D_6	32	30	31	1.4

QUALITY CONTROL INFORMATION - PRECISION
AQUEOUS MATRIX
METHOD 8080 - ORGANOCHLORINE PESTICIDES/PCB'S

SAMPLE IDENTIFICATION 11D

COMPOUND (Units of Measure = µg/l)	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION
Aldrin	0.009	<0.008	0.009	-
Beta-BHC	0.15	0.18	0.16	0.021
Extraction Date	7/22/87	7/22/87	-	-
Analysis Date	7/25/87	7/25/87	-	-

QUALITY CONTROL INFORMATION - ACCURACY
AQUEOUS MATRIX
METHOD 8080 - ORGANOCHLORINE PESTICIDES/PCB'S

SAMPLE IDENTIFICATION METHOD BLANK SPIKE

COMPOUND	NANOGRAMS OF SPIKE	PERCENT RECOVERY
Aldrin	0.20	65
Gamma-BHC	0.20	100
4,4'-DDE	0.20	100
Endosulfan II	0.20	110
Endrin	0.20	105
Heptachlor	0.20	91
Extraction Date	7/22/87	
Analysis Date	7/23/87	