



URS Greiner, Inc.
282 Delaware Avenue
Buffalo, New York 14202-1805
Telephone: (716) 856-5636
Facsimile: (716) 856-2545
Offices in Principal Cities Nationwide

November 20, 1996

Mr. Joseph Yavonditte, Project Manager
New York State Department of
Environmental Conservation
Division of Hazardous Waste Remediation
50 Wolf Road
Albany, New York 12233-7010

**Re: Ramapo Landfill Remediation
Results of Third Quarter Monitoring For 1996**

Dear Mr. Yavonditte:

Attached are the results of the Ramapo Landfill Remediation project third quarter monitoring event for 1996. This document provides the validated analytical data for this sampling event as well as historical analytical data tables for the four target compounds, i.e., benzene, chromium, iron, and manganese. All analytical results are within normal range except for mercury levels in the four surface water samples. Locations sampled are shown in Figure 1. Samples were collected the week of September 16, 1996, and were analyzed for the routine and site related parameters.

During this sampling event, monitoring wells 2R, 2I, 2OS, and 6R were found to be severely damaged. Monitoring well 2R remained sampleable, however, monitoring wells 2I, 2OS, and 6R could not be sampled.

The surface water ARARs for nickel were not accurate in the last few sampling reports. These ARARs were updated based on the current New York State Department of Environmental Conservation water quality regulations for surface waters (NYCRR Part 702).

The fourth quarter monitoring event for 1996 is planned for the week of December 16, 1996. Please feel free to call if you have any questions or wish to discuss.

Sincerely,

URS Greiner, Inc.

James Lanzo, P.E.
Project Manager

Enclosure

cc: Supervisor Reisman - Town of Ramapo
Mr. Gene Kolman - Town of Ramapo
Mr. Alan Simon - Town of Ramapo
Mr. Robert Nunes - USEPA
Mr. Thomas Micelli - Rockland County Department of Health
Ms. Judy Hunderfund - Rockland County Department of Health
Mr. Geoff Laccetti - NYSDOH
Ms. Arlene Lapidus - Ramapo Land Company, Inc.

Mr. George Demas - Torne Brook Farm
Mr. Raymond Cywinski - United Water New Jersey
Mr. Tanyo Parashkevov - United Water New Jersey
Mr. Michael Nee - United Water New York
Mr. Craig Flanagan
Ms. Kathleen McCue - NYSDEC
File: 05-35314.50 (C-3 and AD-2)

TABLE 1
RAMAPO LANDFILL - SEPTEMBER 1996 SAMPLING
DRINKING WATER SAMPLES

Analyte	Concentration (µg/l)*						ARARs**
	PW-1	PW-2	SWWC-93	SWWC-94	SWWC-95	SWWC-96	
Chloromethane	---	1	---	---	---	---	---
Calcium	6200	41100	22200	26900	21400	21200	---
Chromium	0.43	---	0.89	---	---	1.3	50
Copper	110	12.8	15.1	12	12.2	19.7	200
Iron	40.2	---	---	---	98.8	14.7	300
Lead	5.5	---	---	---	---	---	15 (1)
Magnesium	1960	4970	5620	7170	5850	6140	35000
Manganese	4.4	3.8	2	5.3	26.4	10.1	300
Mercury	---	0.15	0.15	0.15	0.15	0.15	---
Nickel	1.1	---	1.7	6.2	2.4	2	---
Sodium	3090	8680	40400	43400	38400	33700	20000
Zinc	46.5	86.3	17	8.4	10.4	12.1	300

Only detected results reported.

* - All concentrations given in µg/l unless otherwise noted.

** - Values obtained from Water Quality Regulations for Surface Waters and Groundwaters 6 NYCRR Parts 700-705, September 1, 1991, unless otherwise indicated.

(1) - USEPA action level.

(2) - Value obtained from Chapter 1-New York State Sanitary Code, Subpart 5-1, Principal Organic Contaminants.

3rd Quarter Monitoring Event
1996
11/15/96

MADE BY SN DATE 11/15/96
CHKD BY AK DATE 11/15/96

TABLE 1
RAMAPO LANDFILL - SEPTEMBER 1996 SAMPLING
GROUNDWATER SAMPLES

Analyte	Concentration (µg/l)*									
	7-OS	7-R	8-I	8-OS	8-R	9-I	9-OS	9-R	BB-1	RVWF-1
1,1-Dichloroethane	—	—	—	—	—	—	—	—	—	—
Benzene	—	—	2	—	—	—	—	—	—	—
Toluene	—	2	—	—	—	—	—	—	—	—
Chlorobenzene	—	—	5	—	2	—	—	—	—	—
Xylene (total)	—	4	—	—	—	—	—	—	—	—
Arsenic	—	—	6.9	—	7.5	—	—	—	—	—
Cadmium	—	0.56	—	—	—	3.6	4.1	8.4	—	—
Calcium	42800	25600	126000	31500	260000	5390	5460	11900	14800	18600
Chromium	4.4	3.4	17.4	15.9	20.4	4.8	5.2	23.8	—	0.58
Copper	11.1	13.2	21.1	11.6	23.2	10.8	13.7	15.7	68.7	11.6
Iron	305	54.2	26400	997	11700	80.5	1030	1640	399	—
Lead	—	—	—	—	—	1	1.1	1.5	—	—
Magnesium	5740	19900	56600	8470	67700	1430	1640	3070	3580	5370
Manganese	43.1	66.7	2100	679	4310	5.6	43.3	1930	15.6	1660
Mercury	0.15	—	—	0.15	—	0.15	0.15	0.15	0.15	0.15
Nickel	1.6	8.3	66	5.2	59.5	4.2	4.2	14.8	1	2.8
Sodium	8420	20900	387000	22900	176000	2750	2460	10000	4150	18600
Zinc	11.2	35.5	7.3	7.8	20.8	29.5	22.9	29.7	256	6

Only detected results reported.

* - All concentrations given in µg/l unless otherwise noted.

TABLE 1
RAMAPO LANDFILL - SEPTEMBER 1996 SAMPLING
GROUNDWATER SAMPLES

Analyte	Concentration (µg/l)*									
	1-OS	1-R	2-R	3-OS/I	3-R	4-OS	4-R	5-I	5-R	6-I
1,1-Dichloroethane	—	2	—	—	—	—	2	—	—	—
Benzene	—	—	—	—	—	—	—	—	—	—
Toluene	—	—	—	—	—	—	—	—	—	—
Chlorobenzene	—	—	—	—	—	—	—	—	—	—
Xylene (total)	—	—	—	—	—	—	—	—	—	—
Arsenic	10.8	—	—	—	—	—	—	—	—	—
Cadmium	—	—	4	—	—	0.61	—	0.5	0.61	0.67
Calcium	78600	80300	68800	124000	75900	26200	56500	7550	10900	19600
Chromium	102	176	20.7	29.7	24.2	6.2	1.8	8	7.2	7.6
Copper	120	15.3	114	13.4	17.6	10	16.3	13.5	7.4	7.5
Iron	48000	1910	6920	303	4200	1300	3970	2170	197	110
Lead	—	—	42.5	—	—	1.5	—	2.5	—	—
Magnesium	25800	15700	13700	25300	24500	8970	20300	5090	4050	4820
Manganese	4710	188	653	4880	13900	59.6	1300	77.7	7.8	11.8
Mercury	0.15	0.15	0.51	0.21	0.15	0.45	0.39	0.45	0.39	0.27
Nickel	100	272	22.8	57.2	55.1	5.5	2.6	5.7	4.7	3.9
Sodium	42400	16900	6810	44100	40500	42700	13300	3820	3220	4280
Zinc	95.4	10.5	90.3	8.5	22	15.7	20.2	18.1	13.5	17.2

Only detected results reported.

* - All concentrations given in µg/l unless otherwise noted.

TABLE 1
RAMAPO LANDFILL - SEPTEMBER 1996 SAMPLING
SURFACE WATER SAMPLES

Analyte	Concentration (µg/l)*				ARARs**
	SW-1	SW-5	SW-6	SW-8	
Chloromethane	—	—	4	2	—
Toluene	—	1	—	—	—
Cadmium	0.59	0.57	0.73	0.32	10
Calcium	10500	5960	8320	8560	—
Chromium	1.2	0.9	1	1.1	50
Copper	15.1	14.7	14.4	16.3	200
Iron	674	434	263	327	300
Lead	4.5	3.7	2.2	3	50
Magnesium	2660	1570	2650	2620	35000
Manganese	76.7	117	137	80.6	300
Mercury	0.39	0.39	0.27	0.39	0.012 ***
Nickel	2.4 (52)	20.6 (30)	37.9 (48)	25.3 (49)	****
Sodium	14200	2480	2870	2840	—
Zinc	21.5	51.2	62.4	40.9	300

Only detected results reported.

* - All concentrations given in µg/l unless otherwise noted.

** - Values obtained from Water Quality Regulations for Surface Waters and Groundwaters 6 NYCRR Parts 700-705, September 1, 1991, unless otherwise indicated.

*** - Clean Water Act

**** - The number in parentheses is the calculated ARAR value of that sample. It is calculated according to the following equation: ARAR for Ni = $\exp(0.76 [\ln(\text{ppm hardness})] + 1.06)$, as listed in 6 NYCRR Part 702.

11/21/96

TABLE 2
RAMAPO LANDFILL - SEPTEMBER 1996 SAMPLING
GROUNDWATER SAMPLES

Analyte	Concentration (mg/l)*									
	1-OS	1-R	2-R	3-OS/I	3-R	4-OS	4-R	5-I	5-R	6-I
COD	—	—	—	17	—	—	—	—	—	—
Total Hardness (mg CaCO ₃)	340	490	210	420	350	150	290	44	54	72
TKN	—	0.3	0.3	0.8	0.5	0.3	0.3	0.3	0.2	0.3
Total Alkalinity (mg CaCO ₃)	280	240	180	360	330	60	170	15	39	47
Total Dissolved Solids	410	390	300	650	490	350	390	140	140	180
Total Organic Carbon	1.8	2	—	9.3	7.8	3.3	2.9	1.1	—	—
Turbidity (NTu)	220	66	21	38	60	11	19	46	3	0.5

Only detected results reported.

* - All concentrations given in mg/l unless otherwise noted.

TABLE 2
RAMAPO LANDFILL - SEPTEMBER 1996 SAMPLING
GROUNDWATER SAMPLES

Analyte	Concentration (mg/l)*									
	7-OS	7-R	8-I	8-OS	8-R	9-I	9-OS	9-R	BB-1	RVWF-1
COD	—	—	160	—	77	—	—	—	—	—
Total Hardness (mg CaCO ₃)	200	310	220	160	780	23	25	56	62	75
TKN	0.4	0.4	120	1.6	26	0.2	0.2	0.5	—	2
Total Alkalinity (mg CaCO ₃)	120	130	1100	130	900	17	19	47	52	68
Total Dissolved Solids	170	280	1600	300	1300	33	—	79	28	150
Total Organic Carbon	2.6	2.8	79	3.3	45	—	—	2.1	—	1.6
Turbidity (NTu)	2.5	2	1400	14	290	0.6	2	2.8	3.5	0.3

Only detected results reported.

* - All concentrations given in mg/l unless otherwise noted.

TABLE 2
RAMAPO LANDFILL - SEPTEMBER 1996 SAMPLING
DRINKING WATER SAMPLES

Analyte	Concentration (mg/l)*						ARARs** (mg/l)
	PW-1	PW-2	SVWC-93	SVWC-94	SVWC-95	SVWC-96	
COD	—	—	—	—	—	—	—
Total Hardness	30	170	78	96	78	7.5	—
TKN	0.2	—	—	—	—	—	—
Total Alkalinity	34	67	35	47	52	44	—
Total Dissolved Solids	—	130	390	170	260	260	500
Total Organic Carbon	—	—	—	—	1.5	—	—
Turbidity	0.3	0.3	0.3	0.2	0.8	0.2	—

Only detected results reported.

* - All concentrations given in mg/l unless otherwise noted.

** - NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1, October 1993, Table 1.

TABLE 2
RAMAPO LANDFILL - SEPTEMBER 1996 SAMPLING
SURFACE WATER SAMPLES

Analyte	Concentration (mg/l)*				ARARs** (mg/l)
	SW-1	SW-5	SW-6	SW-8	
COD	7.2	—	—	—	—
Total Hardness	45	22	40	41	—
TKN	—	0.3	0.3	0.3	—
Total Alkalinity	30	—	—	12	—
Total Dissolved Solids	110	82	110	140	500
Total Organic Carbon	10	3.7	3.4	2.3	—
Turbidity (UNITS)	3.2	0.7	1.6	1.6	—

Only detected results reported.

* - All concentrations given in mg/l unless otherwise noted.

** - NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1, October 1993, Table 1.

TABLE 3
RAMAPO LANDFILL
GROUNDWATER AND SURFACE WATER
MONITORING DATA
COMPOUND: Benzene

Sample ID	Date of Sampling Event									
	1/90	9/90	1/93	4/93	9/93	12/93	3/94	6/94	9/94	12/94
1-OS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1-R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-OS	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
2-R	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
3-OS/I	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-OS	ND	0.3	ND	ND	ND	ND	ND	ND	ND	ND
4-R	1.0	1.0	ND	0.7	ND	ND	ND	ND	ND	ND
5-OS	2.0	ND	ND	ND	NA	NA	NA	ND	NA	NA
5-I	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND
5-R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6-I	NA	0.2	ND	ND	ND	ND	ND	ND	ND	ND
6-R	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
7-OS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7-R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8-OS	2.0	0.3	ND	ND	ND	ND	ND	ND	ND	ND
8-I	2.0	2.9	NA	ND	ND	ND	ND	ND	ND	2.0
8-R	3.0	0.4	ND	0.9	ND	ND	ND	ND	ND	ND
9-OS	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
9-I	NA	0.2	NA	NA	NA	NA	ND	ND	ND	ND
9-R	NA	0.9	ND	ND	ND	NA	ND	ND	ND	1.0
PW-1	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
PW-2	NA	NA *	ND	ND	ND	NA	NA	NA	ND	ND
PW-3	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
BP-1	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
BB-1	NA	NA	ND	ND	ND	NA	ND	ND	ND	ND
RVWF-1	NA	NA	ND	ND	ND	NA	ND	ND	ND	ND
SVWC-93	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND
SVWC-94	NA	NA	ND	ND	NA	NA	ND	ND	ND	1.0
SVWC-95	NA	NA	ND	ND	ND	NA	ND	ND	ND	ND
SVWC-96	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND
Surface Water										
Sample ID	Date of Sampling Event									
	10/89	7/90	1/93	4/93	9/93	12/93	3/94	6/94	9/94	12/94
SW-1	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
SW-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SW-6	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
SW-8	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes: Concentration reported in µg/L (ppb).

ND - Not detected

NA - Not applicable (e.g. well not installed by this date or if installed, not sampled)

* NYSDOH results from 3/92 sampling.

- Exceeded ARAR value of 0.7 ppb for groundwater.

TABLE 3 (Cont.)

**RAMAPO LANDFILL
MONITORING DATA
COMPOUND: Benzene**

Sample ID	Sample Type	Date of Sampling Event						
		3/95	6/95	9/95	12/95	03/96	06/96	09/96
1-OS	Groundwater	ND	ND	NA	ND	ND	NA	ND
1-R	Groundwater	ND	ND	ND	ND	ND	NA	ND
2-OS	Groundwater	ND	ND	NA	ND	ND	NA	NA
2-R	Groundwater	ND	ND	NA	ND	ND	NA	ND
3-OS/I	Groundwater	ND	ND	NA	ND	ND	NA	ND
3-R	Groundwater	ND	ND	NA	ND	ND	NA	ND
4-OS	Groundwater	ND	ND	NA	ND	ND	NA	ND
4-R	Groundwater	ND	ND	ND	ND	ND	NA	ND
5-OS	Groundwater	NA	ND	NA	NA	ND	NA	NA
5-I	Groundwater	ND	NA	NA	ND	NA	NA	ND
5-R	Groundwater	ND	ND	NA	ND	ND	NA	ND
6-I	Groundwater	ND	ND	NA	ND	ND	NA	ND
6-R	Groundwater	ND	0.5	ND	ND	ND	NA	NA
7-OS	Groundwater	ND	NA	NA	ND	ND	NA	ND
7-I	Groundwater	NA	ND	NA	NA	NA	NA	NA
7-R	Groundwater	ND	ND	NA	ND	ND	NA	ND
8-OS	Groundwater	ND	ND	ND	ND	ND	ND	ND
8-I	Groundwater	ND	ND	ND	1.2	1	2	2
8-R	Groundwater	2	0.9	ND	0.65	ND	ND	ND
9-OS	Groundwater	ND	ND	ND	NA	ND	ND	ND
9-I	Groundwater	ND	ND	ND	ND	ND	ND	ND
9-R	Groundwater	ND	ND	ND	ND	ND	ND	ND
BP-1	Groundwater	NA	NA	NA	NA	NA	NA	NA
BB-1	Groundwater	ND	ND	NA	ND	ND	NA	ND
RVWF-1	Groundwater	ND	ND	ND	ND	ND	NA	ND
PW-1	Drinking Water	ND	ND	ND	ND	ND	ND	ND
PW-2	Drinking Water	NA	0.5	ND	ND	ND	ND	ND
PW-3	Drinking Water	NA	NA	NA	NA	NA	NA	NA
SVWC-93	Drinking Water	ND	ND	ND	ND	ND	ND	ND
SVWC-94	Drinking Water	ND	ND	ND	ND	ND	ND	ND
SVWC-95	Drinking Water	ND	ND	ND	ND	ND	ND	ND
SVWC-96	Drinking Water	ND	ND	ND	ND	ND	ND	ND
SW-1	Surface Water	ND	ND	NA	ND	ND	NA	ND
SW-5	Surface Water	ND	ND	NA	ND	ND	NA	ND
SW-6	Surface Water	ND	ND	NA	ND	ND	NA	ND
SW-8	Surface Water	ND	ND	NA	ND	ND	NA	ND

Notes:

Concentration reported in µg/L (ppb).

ND - Not detected

NA - Not applicable (e.g. well not installed by this date or if installed, not sampled)

 - Exceeded ARAR value of 0.7 ppb for groundwater.

TABLE 4
RAMAPO LANDFILL
GROUNDWATER AND SURFACE WATER
MONITORING DATA
COMPOUND: Chromium

Sample ID	Date of Sampling Event									
	1/90	9/90	1/93	4/93	9/93	12/93	3/94	6/94	9/94	12/94
1-OS	153	57.3	8	ND	60.0	257.0	65.5	7.2	284	134
1-R	39.7	17.5	ND	ND	84.9	46.8	10.3	ND	39.3	58.3
2-OS	180	141	NA	ND	50.2	95.9	11.8	89.3	45.9	25.1
2-R	16.1	5.5	NA	ND	14.8	6.1	ND	5.1	8.3	4.9
3-OS/I	587	1290	807	40.4	1350	1100	784	304	561	1020
3-R	28	11.4	ND	ND	ND	14.7	10.5	17.8	4.8	4.9
4-OS	139	40.1	5.8	ND	10.8	11.2	15.1	25.4	23.1	53.1
4-R	35.5	13.1	ND	8.8	ND	5.9	4.4	ND	13.3	2
5-OS	90	35.6	48.8	ND	NA	NA	NA	NA	NA	NA
5-I	NA	NA	NA	NA	NA	80	30.2	7.2	40	63.1
5-R	27.4	29.3	6.8	ND	ND	8.6	13.8	6.3	52.3	105
6-I	NA	28.7	ND	ND	13.4	17.0	32.7	9.5	488	9.9
6-R	NA	31.1	24	34.8	27.7	67.4	71.3	27.1	37.7	13.6
7-OS	33.5	40.1	24.2	13.0	1890	218	31	210	571	258
7-R	16.2	16.8	ND	ND	ND	ND	ND	5.3	8.6	3.4
8-OS	34.8	16.7	ND	ND	ND	7.6	86.6	28.7	13.2	4.2
8-I	215	32.5	NA	ND	ND	ND	29	17	12.8	8.4
8-R	20	23.1	9.9	ND	17.7	18.2	7.5	17.0	10.4	6.8
9-OS	NA	6.8	ND	ND	ND	ND	22.9	27.1	14.8	2.9
9-I	NA	8.1	NA	NA	NA	NA	28	ND	2.4	5.8
9-R	NA	8.8	3.9	16.4	16.7	11.6	35.4	48.2	29.9	10.5
PW-1	NA	ND	ND	ND	ND	ND	ND	ND	0.6	ND
PW-2	NA	ND *	ND	ND	ND	4.9	NA	ND	ND	ND
PW-3	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
BP-1	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
BB-1	NA	NA	ND	ND	ND	ND	ND	ND	1.2	ND
RVWF-1	NA	NA	25.2	14.7	13.2	20.5	8.4	ND	ND	ND
SVWC-93	NA	NA	ND	ND	NA	ND	ND	ND	ND	ND
SVWC-94	NA	NA	ND	ND	NA	NA	ND	ND	ND	0.97
SVWC-95	NA	NA	ND	ND	ND	NA	ND	ND	ND	ND
SVWC-96	NA	NA	ND	ND	NA	ND	ND	ND	ND	0.87
Surface Water										
Sample ID	Date of Sampling Event									
	10/89	7/90	1/93	4/93	9/93	12/93	3/94	6/94	9/94	12/94
SW-1	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
SW-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SW-6	NA	ND	ND	ND	ND	5.1	ND	ND	ND	ND
SW-8	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes: Concentration reported in µg/L (ppb).

ND - Not detected

NA - Not applicable (e.g. well not installed by this date or if installed, not sampled)

* NYSDOH results from 3/92 sampling.



- Exceeded ARAR value of 50 ppb for groundwater.

- Exceeded ARAR value of 50 ppb for surface water.

The ARAR for SW-1 (Class A water body) is 50 ppb.

TABLE 4 (Cont.)

**RAMAPO LANDFILL
MONITORING DATA
COMPOUND: Chromium**

Sample ID	Sample Type	Date of Sampling Event						
		3/95	6/95	9/95	12/95	03/96	06/96	09/96
1-OS	Groundwater	727	17	102	70.5	127	NA	102
1-R	Groundwater	145	49.5	136	42.8	133	NA	176
2-OS	Groundwater	39.7	34.1	137	50.3	83.6	NA	NA
2-R	Groundwater	4.4	ND	5.0	5.7	ND	NA	20.7
3-OS/I	Groundwater	144	406	589.0	253	372	NA	29.7
3-R	Groundwater	3.6	2.0	10.3	7.0	ND	NA	24.2
4-OS	Groundwater	21.1	ND	38.8	12.2	11	NA	6.2
4-R	Groundwater	2.5	ND	9.0	5.8	ND	NA	1.8
5-OS	Groundwater	NA	39.0	NA	NA	216	NA	NA
5-I	Groundwater	109	NA	17.4	22.4	NA	NA	8
5-R	Groundwater	19.9	7.9	22.9	27.9	10.1	NA	7.2
6-I	Groundwater	6.9	9.1	22.6	13.3	6.3	NA	7.6
6-R	Groundwater	11.9	8.4	13.4	44.6	145	NA	NA
7-OS	Groundwater	324	NA	NA	37	125	NA	4.4
7-I	Groundwater	NA	34.8	49.2	NA	NA	NA	NA
7-R	Groundwater	2.8	12.4	13.4	9.2	ND	NA	3.4
8-OS	Groundwater	129	40.4	13.9	7.2	62.2	35.8	15.9
8-I	Groundwater	8.0	3.4	24.1	29.2	12.3	26.2	17.4
8-R	Groundwater	6.3	10.1	13.4	8.5	6.7	23.8	20.4
9-OS	Groundwater	6.6	7.6	NA	NA	9.8	11.2	5.2
9-I	Groundwater	3.9	8.0	34.6	25.3	8.1	11.4	4.8
9-R	Groundwater	16.9	26.5	66.7	45.4	43.8	12.8	23.8
BP-1	Groundwater	NA	NA	NA	NA	NA	NA	NA
BB-1	Groundwater	ND	ND	ND	ND	ND	NA	ND
RVWF-1	Groundwater	ND	ND	ND	ND	ND	NA	0.58
PW-1	Drinking Water	0.8	ND	ND	ND	ND	ND	0.43
PW-2	Drinking Water	NA	ND	ND	ND	ND	0.94	ND
PW-3	Drinking Water	NA	NA	NA	NA	NA	NA	NA
SVWC-93	Drinking Water	ND	ND	NA	ND	ND	ND	0.89
SVWC-94	Drinking Water	ND	ND	NA	ND	ND	ND	ND
SVWC-95	Drinking Water	ND	ND	NA	ND	ND	ND	ND
SVWC-96	Drinking Water	ND	1.7	NA	ND	ND	ND	1.3
SW-1	Surface Water	ND	ND	ND	ND	ND	NA	1.2
SW-5	Surface Water	ND	ND	ND	3.3	ND	NA	0.9
SW-6	Surface Water	ND	ND	ND	3.7	ND	NA	1
SW-8	Surface Water	0.67	ND	ND	ND	ND	NA	1.1

Notes:

Concentration reported in µg/L (ppb).

ND - Not detected

NA - Not applicable (e.g. well not installed by this date or if installed, not sampled)

 - Exceeded ARAR value of 50 ppb for groundwater.

 - Exceeded ARAR value of 50 ppb for surface water.

TABLE 5
RAMAPO LANDFILL
GROUNDWATER AND SURFACE WATER
MONITORING DATA
COMPOUND: Iron

Sample ID	Date of Sampling Event									
	1/90	9/90	1/93	4/93	9/93	12/93	3/94	6/94	9/94	12/94
1-OS	45000	17500	1870	884	32300	162000	12200	69.6	4950	47700
1-R	1180	2650	395	197	1940	1210	186	70600	830	1710
2-OS	912	41800	NA	186	11800	9800	946	5080	14700	4120
2-R	409	602	NA	674	1120	1450	187	83.1	248	363
3-OS/I	6630	9750	5110	333	21300	37900	19400	29900	14400	37500
3-R	1930	1370	11500	2940	3280	4800	1970	2090	2440	1730
4-OS	15600	12400	529	520	5560	10600	5720	17600	16900	15200
4-R	8230	5290	3520	4920	3100	5290	4790	4020	6850	5100
5-OS	27000	11200	11100	4700	NA	NA	NA	NA	NA	NA
5-I	NA	NA	NA	NA	NA	2030	2080	2380	8990	30700
5-R	658	368	620	2310	751	243	742	71.2	21400	64000
6-I	NA	486	953	17.3	332	2860	4020	1360	1590	153
6-R	NA	683	1220	715	662	1710	698	379	501	332
7-OS	981	24500	1250	521	619000	2200	2340	15600	14500	14400
7-R	ND	1940	31.5	56.6	989	600	762	226	681	270
8-OS	229000	43800	3230	2080	6180	12000	20300	6240	7490	6740
8-I	15700	30500	NA	ND	ND	ND	22300	41200	24200	18200
8-R	1360	2940	11600	2590	9160	4710	2510	11100	22000	10200
9-OS	NA	249	50.7	1200	383	393	2210	1040	1020	1490
9-I	NA	145	NA	NA	NA	NA	2040	62.3	84	260
9-R	NA	20200	2680	8250	11500	10800	8850	19400	9110	2700
PW-1	NA	64	186	130	1260	916	85.3	11.2	561	39.7
PW-2	NA	11 *	41.8	49.5	ND	22.7	NA	ND	53.5	13.6
PW-3	NA	NA	NA	NA	NA	NA	NA	6.4	NA	NA
BP-1	NA	NA	274	NA	NA	NA	NA	NA	NA	NA
BB-1	NA	NA	NA	297	247	225	263	282	367	332
RWWF-1	NA	NA	362	207	202	294	221	ND	47.7	58.2
SVWC-93	NA	NA	32.6	10.6	NA	553	179	ND	17.2	20.7
SVWC-94	NA	NA	40.3	19.1	NA	NA	49.4	ND	6.1	13.8
SVWC-95	NA	NA	51.7	74.4	ND	NA	45.5	ND	274	40.3
SVWC-96	NA	NA	22.3	17.3	NA	22.6	14.9	ND	61.5	66.8
Surface Water										
Sample ID	Date of Sampling Event									
	10/89	7/90	1/93	4/93	9/93	12/93	3/94	6/94	9/94	12/94
SW-1	2630	NA	141	1670	170	119	367	287	66.2	242
SW-5	93	163	194	204	168	71.7	41.9	291	124	63.1
SW-6	NA	177	82.5	245	76.7	55.2	55	159	92.4	42.6
SW-8	NA	1290	109	341	ND	26.7	66.2	187	92.6	186

Notes: Concentration reported in µg/L (ppb).

ND - Not detected

NA - Not applicable (e.g. well not installed by this date or if installed, not sampled)

* NYSDOH results from 3/92 sampling.

	- Exceeded ARAR value of 300 ppb for groundwater.
	- Exceeded ARAR value of 300 ppb for surface water.

TABLE 5 (Cont.)

**RAMAPO LANDFILL
MONITORING DATA
COMPOUND: Iron**

Sample ID	Sample Type	Date of Sampling Event						
		3/95	6/95	9/95	12/95	03/96	06/96	09/96
1-OS	Groundwater	5970	2820	27900	23400	21700	NA	48000
1-R	Groundwater	1430	1080	2750	1050	3240	NA	1910
2-OS	Groundwater	1310	1730	24300	5660	1770	NA	NA
2-R	Groundwater	259	369	541	822	189	NA	6920
3-OS/I	Groundwater	54600	16600	31400	3710	7750	NA	303
3-R	Groundwater	1260	1450	3100	1330	1060	NA	4200
4-OS	Groundwater	6110	3010	28600	7460	7470	NA	1300
4-R	Groundwater	5650	5590	6320	4880	4910	NA	3970
5-OS	Groundwater	NA	17100	NA	NA	60000	NA	NA
5-I	Groundwater	56200	NA	2200	1870	NA	NA	2170
5-R	Groundwater	11300	2260	1620	1120	434	NA	197
6-I	Groundwater	172	565	1080	37.3	597	NA	110
6-R	Groundwater	225	625	728	758	849	NA	NA
7-OS	Groundwater	12200	NA	NA	1870	11400	NA	305
7-I	Groundwater	NA	4280	2770	NA	NA	NA	NA
7-R	Groundwater	485	886	717	794	363	NA	54.2
8-OS	Groundwater	13500	5760	46900	1160	4870	4370	997
8-I	Groundwater	24300	21100	32300	28500	27300	38700	26400
8-R	Groundwater	24900	25700	26600	12400	18400	14300	11700
9-OS	Groundwater	1340	294	NA	NA	2330	1350	1030
9-I	Groundwater	788	468	4530	762	232	443	80.5
9-R	Groundwater	1080	2230	4080	1370	2060	2270	1640
BP-1	Groundwater	NA	NA	NA	NA	NA	NA	NA
BB-1	Groundwater	250	608	744	577	262	NA	399
RVWF-1	Groundwater	ND	816	1260	134	ND	NA	ND
PW-1	Drinking Water	283	400	238	252	53.9	38.1	40.2
PW-2	Drinking Water	NA	253	276	225	ND	ND	ND
PW-3	Drinking Water	NA	NA	NA	NA	NA	NA	NA
SWWC-93	Drinking Water	19	154	NA	585	ND	ND	ND
SWWC-94	Drinking Water	ND	143	NA	124	ND	ND	ND
SWWC-95	Drinking Water	279	161	NA	148	ND	ND	98.8
SWWC-96	Drinking Water	ND	173	NA	136	ND	ND	14.7
SW-1	Surface Water	183	396	168	213	231	NA	674
SW-5	Surface Water	74.4	324	379	236	25.4	NA	434
SW-6	Surface Water	54	551	385	204	43.5	NA	263
SW-8	Surface Water	339	315	276	182	29.4	NA	327

Notes:

Concentration reported in µg/L (ppb).

ND - Not detected

NA - Not applicable (e.g. well not installed by this date or if installed, not sampled)

	- Exceeded ARAR value of 300 ppb for groundwater.
	- Exceeded ARAR value of 300 ppb for surface water.

TABLE 6 (Cont.)

**RAMAPO LANDFILL
MONITORING DATA
COMPOUND: Manganese**

Sample ID	Sample Type	Date of Sampling Event						
		3/95	6/95	9/95	12/95	03/96	06/96	09/96
1-OS	Groundwater	2950	2010	4930	3130	2020	NA	4710
1-R	Groundwater	96.9	153	219	137	120	NA	188
2-OS	Groundwater	221	982	5570	883	280	NA	NA
2-R	Groundwater	94.8	70.2	143	85.5	93.8	NA	653
3-OS/I	Groundwater	3590	3270	3860	6090	11900	NA	4880
3-R	Groundwater	11900	10900	12400	9710	11100	NA	13900
4-OS	Groundwater	602	2860	2080	682	636	NA	59.6
4-R	Groundwater	1430	1120	1120	1140	1530	NA	1300
5-I	Groundwater	1410	NA	49.5	NA	618	NA	NA
5-OS	Groundwater	NA	248	NA	53.6	NA	NA	77.7
5-R	Groundwater	116	21.6	28.6	11.9	7.1	NA	7.8
6-I	Groundwater	19.9	31.3	89.5	51.9	17.7	NA	11.8
6-R	Groundwater	17.4	33.4	42.6	50.9	35.3	NA	NA
7-OS	Groundwater	1180	NA	NA	56.8	390	NA	43.1
7-I	Groundwater	NA	3500	4910	NA	NA	NA	NA
7-R	Groundwater	69.1	48.8	62.2	34.8	46.4	NA	66.7
8-OS	Groundwater	2050	2690	1420	903	2460	3120	679
8-I	Groundwater	1480	1110	2430	945	1860	3200	2100
8-R	Groundwater	3290	1300	2500	2610	4040	3230	4310
9-OS	Groundwater	32.9	3.9	NA	NA	75.7	70.9	43.3
9-I	Groundwater	40.5	10.9	129	15.9	5.2	13.1	5.6
9-R	Groundwater	1590	1790	1810	1070	738	1840	1930
BP-1	Groundwater	NA	NA	NA	NA	NA	NA	NA
BB-1	Groundwater	10.7	11.2	15.1	11.2	10.7	NA	15.6
RVWF-1	Groundwater	2880	3070	2470	3.7	630	NA	1650
PW-1	Drinking Water	18.1	5.2	83.1	57.7	83.7	25.7	4.4
PW-2	Drinking Water	NA	6.1	11.6	7.7	2.6	5	3.8
PW-3	Drinking Water	NA	NA	NA	NA	NA	NA	NA
SVWC-93	Drinking Water	9.6	0.95	NA	11.9	ND	3.4	2
SVWC-94	Drinking Water	6.7	11.4	NA	ND	3.1	ND	5.3
SVWC-95	Drinking Water	29	49.7	NA	22.1	47.4	67.4	26.4
SVWC-96	Drinking Water	1.3	ND	NA	48	ND	ND	10.1
SW-1	Surface Water	39.8	71.6	17.9	36.3	41.8	NA	76.7
SW-5	Surface Water	15.4	18.3	75.3	21.8	18.4	NA	117
SW-6	Surface Water	12.8	51.9	36.1	14.8	14.7	NA	137
SW-8	Surface Water	25.8	80.1	25.5	4.2	10.8	NA	80.6

Notes:

Concentration reported in µg/L (ppb).

ND - Not detected

NA - Not applicable (e.g. well not installed by this date or if installed, not sampled)

 - Exceeded ARAR value of 300 ppb for groundwater.

TABLE 6
RAMAPO LANDFILL
GROUNDWATER AND SURFACE WATER
MONITORING DATA
COMPOUND: Manganese

Sample ID	Date of Sampling Event									
	1/90	9/90	1/93	4/93	9/93	12/93	3/94	6/94	9/94	12/94
1-OS	3790	3700	809	1410	4010	5590	3510	26.8	5150	4770
1-R	144	98.5	61.4	38.7	143	62	29.3	6020	67	97.6
2-OS	298	4770	NA	27.0	4850	1580	92.5	985	2450	827
2-R	197	135	NA	118	126	116	99.5	91.1	92.9	88.8
3-OS/I	8700	18100	3450	1690	9590	8780	5640	10300	2240	5540
3-R	7230	12400	10700	12900	11000	12000	11800	112800	10600	11300
4-OS	4210	5020	547	506	2080	995	598	2850	3050	1130
4-R	1730	1520	1660	1890	1160	1230	1460	1350	1210	1190
5-OS	981	530	192	43.2	NA	NA	NA	NA	NA	NA
5-I	NA	NA	NA	NA	NA	52.8	40.6	215	221	474
5-R	22.3	9.3	9.6	21.9	11.4	8.2	9.6	2.5	232	624
6-I	NA	33.1	151	1.3	34.4	84.7	1060	275	156	13.2
6-R	NA	14.3	100	57.5	60.7	195	59.8	72.6	56	45.8
7-OS	1240	3260	48.3	46.1	45100	122	67.4	1580	9820	992
7-R	51.9	102	46.1	51.8	114	81.6	99.8	186	126	80.9
8-OS	2830	2750	1680	1640	3330	1910	4090	1790	3230	1640
8-I	4230	1110	NA	ND	ND	ND	877	1180	692	862
8-R	872	181	1660	2600	2440	2650	2220	1890	1740	1980
9-OS	NA	14.6	ND	21.1	9.6	8.7	74.8	34.7	26.2	40.8
9-I	NA	377	NA	NA	NA	NA	40.6	3.2	21.7	9.8
9-R	NA	3270	2320	2280	2540	1890	1660	1830	1650	1460
PW-1	NA	ND	1.2	1.8	ND	3.6	5.4	ND	5.1	15.3
PW-2	NA	ND *	4.7	7.5	6.3	6.6	NA	2.4	8.7	6.1
PW-3	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
BP-1	NA	NA	4630	NA	NA	NA	NA	NA	NA	NA
BB-1	NA	NA	7.9	11.7	11.1	10.3	8.9	12.5	20.1	12.5
RVWF-1	NA	NA	839	40.2	1710	111	46.5	767	2170	3810
SVWC-93	NA	NA	ND	1.7	NA	72.2	ND	ND	2	0.37
SVWC-94	NA	NA	7.3	ND	NA	NA	6.3	ND	10.4	11.9
SVWC-95	NA	NA	56.4	1.8	ND	NA	91.6	108	273	85.9
SVWC-96	NA	NA	ND	ND	NA	ND	ND	ND	2.1	11.9
Surface Water	Date of Sampling Event									
Sample ID	1/90	9/90	1/93	4/93	9/93	12/93	3/94	6/94	9/94	12/94
SW-1	1120	NA	16.6	107	50.4	29.6	63	83.8	27.4	27
SW-5	19.5	44.5	19.3	27.9	70.8	20.5	23	50.3	65.1	16.4
SW-6	NA	31.9	14.5	23.9	14.4	16.9	19.6	23.5	20.7	12.9
SW-8	NA	153	10.9	28.5	8.6	9.9	17.6	64.3	19.4	25.4

Notes: Concentration reported in µg/L (ppb).

ND - Not detected

NA - Not applicable (e.g. well not installed by this date or if installed, not sampled)

* NYSDOH results from 3/92 sampling.

- Exceeded ARAR value of 300 ppb for groundwater.

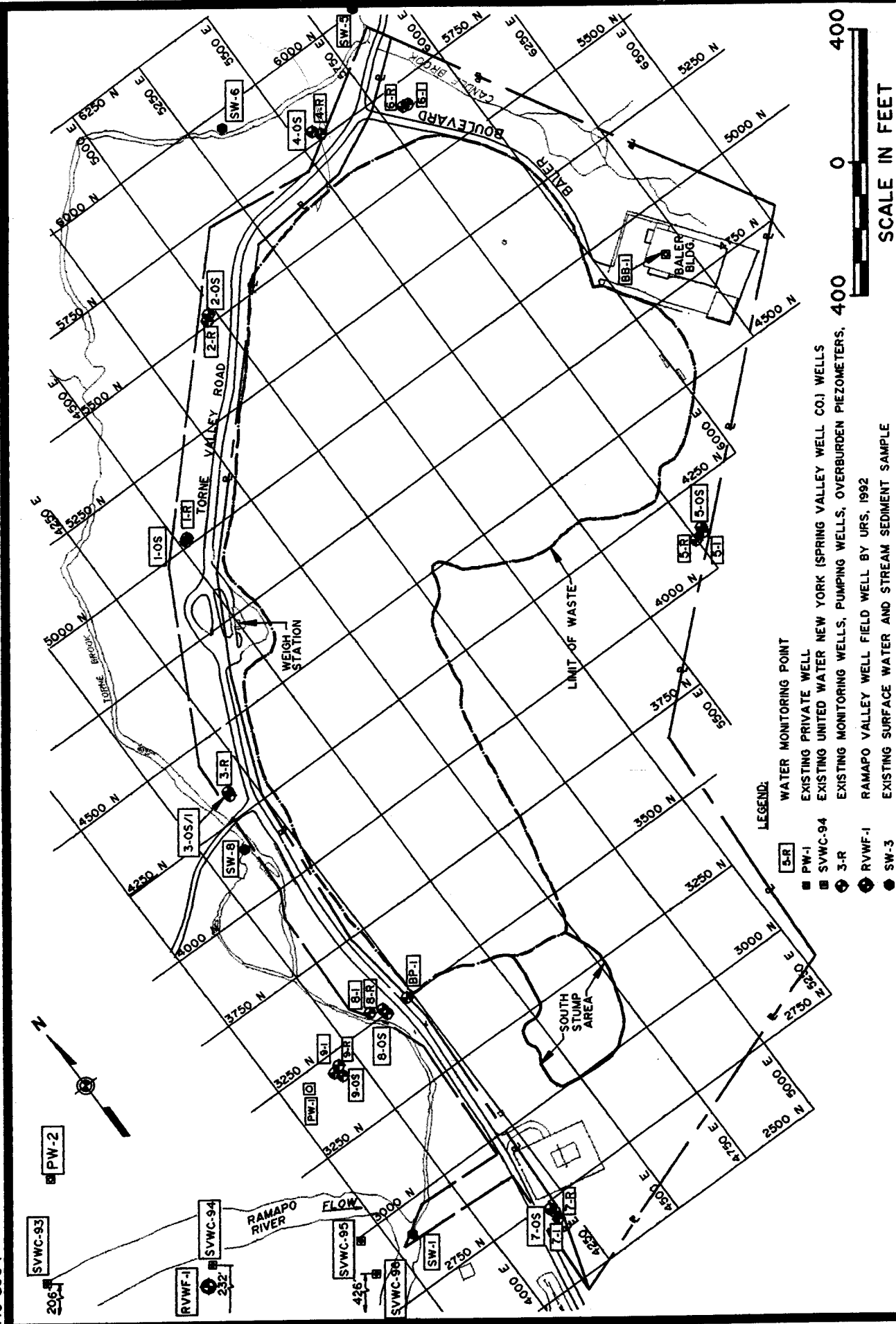


FIGURE 1