



CH2MHILL

July 16, 1997

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Dear Mr. Adler:

Subject: Semiannual Groundwater Quality Monitoring Evaluation for March 1997
Onalaska Municipal Landfill, Onalaska, Wisconsin
W.A. No. 79-5HL5 / Contract No. 68-W8-0040

Introduction

Purpose

The primary objectives of the groundwater monitoring program at the Onalaska Municipal Landfill are to:

- Provide data to determine if groundwater contaminant concentrations in the aquifer between the landfill and the Black River are being reduced by the extraction system.
- Provide data to determine if groundwater contaminant concentrations in the aquifer have been reduced to below the cleanup criteria.
- Provide data to verify that a hydraulic gradient is being maintained by the extraction system in order to contain and collect contaminated groundwater.
- Monitor water levels in the wetlands adjacent to the site to make sure that the extraction system is not lowering water levels to adversely affect the wetlands.

The semiannual sampling will also identify any seasonal fluctuations in groundwater quality and provide information on background water quality.

Groundwater Monitoring Program

Groundwater samples from the nine monitoring wells, five extraction wells, and two residential wells are collected in the spring and fall of each year.

Summary

Sampling and Observations

Groundwater samples and groundwater elevation measurements were collected on March 25 and 26, 1997. The field team consisted of Derek Clayton and Mike Mischuk. Samples were collected from MW1S (Monitoring Well 1S), MW4S (for VOCs), MW5S (for VOCs), MW6S, MW6M, MW8S, MW8M, MW12S, MW14S, EW-1 (Extraction Well 1), EW-2, EW-3, EW-4, EW-5, and from the residential well at the Hubley's home. The locations of the monitoring points are shown on attached Figure 3 from the Groundwater Monitoring Plan.

The samples were sent by overnight courier to ATC Laboratory in Indianapolis, Indiana, for testing of select volatile organic compounds, metals and wet chemistry parameters.

The monitoring wells were sampled in accordance with the procedures described in the Groundwater Monitoring Plan. The following non routine observations were made and actions taken during the sampling events:

- The Ackerman residential well was not sampled due to the water being turned off for the winter.
- The groundwater sampled from MW14S appeared to be cloudy and orange.
- Calibration of the pH meter was unsuccessful on March 26, 1997. Therefore, pH was measured using litmus paper for samples collected on March 26, 1997.

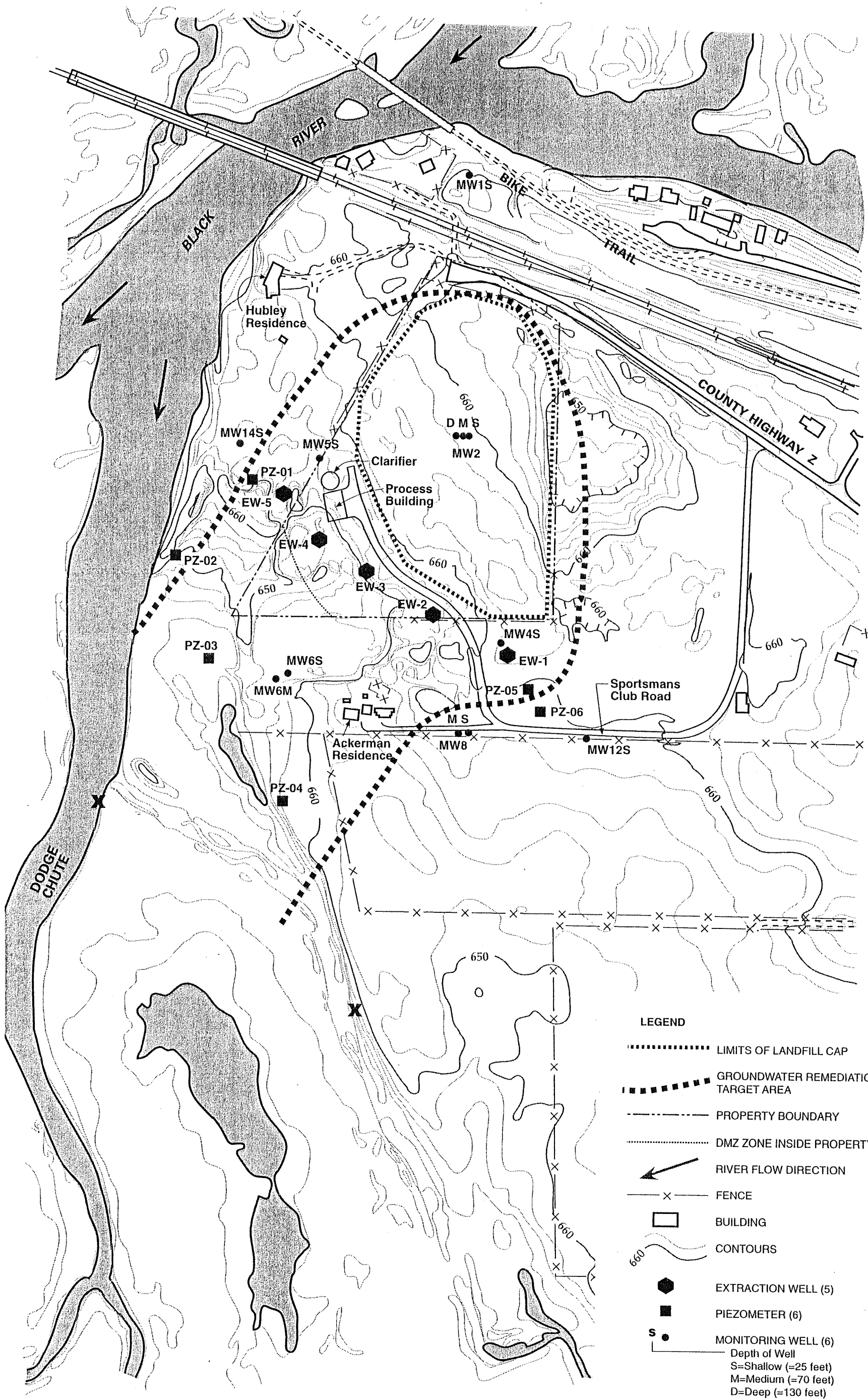
Presentation of Results

The groundwater monitoring well analytical results and groundwater elevation results are presented on the attached tables. The average and maximum baseline concentrations and groundwater cleanup standards are provided for comparison. Monitoring well results exceeding the groundwater Preventive Action Limits (PALs) are shaded. At the end of the year the semiannual samples will be evaluated in greater detail as described in the Groundwater Monitoring Plan and QAPP. In addition, a potentiometric surface map (groundwater contour map) will be developed for the annual report.

Summary of Results

Most wet chemistry parameter results were below the PALs. However, the odor concentrations exceeded the PALs in monitoring well MW14S and extraction wells EW-1, EW-2, EW-3, and EW-4. The odor concentration was reported as 3 TON for well MW14S and 2 TON for the four extraction wells, slightly higher than the PAL of 1.5 TON. Two field equipment blanks also detected odor at a concentration of 1 TON. The elevated odor concentrations may be a result of laboratory bias. The color concentration also exceeded the PAL of 7.5 color units (CU) for extraction wells EW-2, EW-3, and EW-4. The extraction wells had color concentrations ranging from 10 CU to 20 CU.

VOC concentrations were below PALs in the residential, monitoring, and extraction wells, except for monitoring wells MW4S and MW5S. Monitoring well MW4S contained total xylenes at a concentrations of 310 µg/L and monitoring well MW5S contained 230 µg/L of toluene. The PAL for total xylenes and toluene are 124 µg/L and 68.6 µg/L, respectively.



LEGEND

- LIMITS OF LANDFILL CAP
- GROUNDWATER REMEDIATION TARGET AREA
- PROPERTY BOUNDARY
- DMZ ZONE INSIDE PROPERTY BOUNDARY
- ← RIVER FLOW DIRECTION
- x — FENCE
- BUILDING
- 660 CONTOURS
- EXTRACTION WELL (5)
- PIEZOMETER (6)
- MONITORING WELL (6)
 Depth of Well
 S=Shallow (=25 feet)
 M=Medium (=70 feet)
 D=Deep (=130 feet)

Note: Monitoring well 2 is for future monitoring

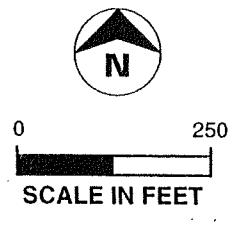


FIGURE 3
MONITORING WELL, EXTRACTION WELL,
AND PIEZOMETER NETWORK
 ONALASKA

The metal results for one or more elements were greater than PALs at all sample locations with the exception of MW12S (NOTE: monitoring wells MW4S and MW5S are sampled for VOCs only). The dissolved manganese concentration was greater than the PAL of 25 µg/L at all sample locations except for monitoring well MW12S. It is thought that the high concentration of manganese is partially attributable to background manganese concentrations. Dissolved arsenic was found at concentrations greater than the PAL in extraction wells EW-1 and EW-3. Dissolved barium was present above the PAL in monitoring wells MW6M and MW8M, and in extraction wells EW-1, EW-2, EW-3, and EW-4. Dissolved iron was present above the PAL in monitoring well MW14S, and in all five of the extraction wells. Dissolved lead was present above the PAL in monitoring well MW14S and extraction well EW-1.

Conclusions

Additional sampling events and groundwater elevation measurements are required to draw conclusions regarding cleanup. However, some general observations regarding the extent of contamination after approximately 2-3/4 years of groundwater extraction and treatment can be made.

- Target VOC analytes were below cleanup standards in all the monitoring wells sampled except MW4S and MW5S, which are both inside the extraction well network. However, concentrations in the extraction wells may be above cleanup standards on occasion.
- One or more of the five target metal analytes are above cleanup standards in the monitoring, extraction, and residential wells.
- Based on the monitoring well MW1S (an upgradient background well) manganese results being consistently greater than the PAL, it is thought that the on-site manganese concentrations are partially a result of the background manganese concentration.

Individual Well Results

MW 1S

PALs exceeded: Manganese

This monitoring well is used to monitor shallow groundwater quality upgradient of the landfill and extraction system. The results are used to evaluate background water quality. The dissolved manganese concentration of 1,320 µg/L is higher than the 25 µg/L PAL. All wet chemistry results were below their respective PALs. No VOCs were detected.

MW 4S

PALs exceeded: Total xylenes

This monitoring well is used to monitor shallow groundwater quality immediately downgradient of the landfill. The results are used to determine if a reduction in groundwater concentrations is occurring over time. This monitoring well is sampled for VOCs only. Toluene and ethylbenzene were detected at concentrations less than the PALs and average baseline concentrations. The total xylene concentration detected exceeded the PAL of 124 µg/L. The total xylene concentration detected was 310 µg/L. This is slightly less than the average baseline concentration of 317 µg/L.

MW 5S

PALs exceeded: Toluene

This monitoring well is used to monitor shallow groundwater quality immediately downgradient of the landfill. This monitoring well is sampled for VOCs only. The results are used to determine if a reduction in groundwater concentrations is occurring over time. Toluene, ethyl benzene, and total xylenes were found in this monitoring well sample. The concentration of toluene was greater than its PAL and greater than its baseline average concentration. The ethyl benzene and total xylene concentrations were less than their respective PALs and baseline average concentrations.

MW 6S

PALs exceeded: Manganese

This monitoring well is used to monitor shallow groundwater quality immediately downgradient of the landfill and extraction system. The results are used to determine if a reduction in groundwater concentrations is occurring over time. The dissolved manganese concentration of 1,680 µg/L was above the 25 µg/L PAL, but lower than the 1996 concentration range of 1,800 to 3,170 µg/L, and less than the baseline average concentration of 3,113 µg/L. All wet chemistry results were below their respective PALs. No VOCs were detected in this monitoring well.

MW 6M

PALs exceeded: Barium
Manganese

This monitoring well is used to monitor intermediate depth groundwater quality downgradient of the landfill and extraction system. The results are used to determine if a reduction in groundwater concentration is occurring over time. The dissolved barium concentration of 883 µg/L was above the 400 µg/L PAL, but less than the baseline average concentration of 2,150 µg/L. The dissolved manganese concentration of 1,890 µg/L was above the 25 µg/L PAL, but again less than the baseline average concentration of 4,747 µg/L. All wet chemistry results were below their respective PALs. No VOCs were detected in this monitoring well.

A field duplicate sample was collected from this sampling point. The purpose of field duplicates is to assess sampling and analytical reproducibility. Results were comparable for all parameters, indicating good sampling and analytical precision.

MW 8S

PALs exceeded: Manganese

This monitoring well is used to monitor shallow groundwater quality downgradient of the landfill and extraction system. The results are used to determine if contaminated groundwater has been captured. The dissolved manganese concentration of 1,350 µg/L was above the PAL of 25 µg/L, less than the baseline average concentration of 5,247 µg/L, and about the same as background monitoring well MW1S. All wet chemistry results were below their respective PALs. No VOCs were detected.

MW 8M

PALs exceeded: Manganese
Barium

This monitoring well is used to monitor intermediate depth groundwater quality downgradient of the landfill and extraction system. The results are used to determine if contaminated groundwater has been captured. The dissolved manganese result of 1,800 µg/L was above the PAL of 25 µg/L, but less than the baseline average concentration of 2,757 µg/L. The dissolved barium concentration of 459 µg/L was greater than the PAL of 400 µg/L, and about the same as the baseline average concentration of 461 µg/L. All wet chemistry results were below their respective PALs. No VOCs were detected in this monitoring well.

MW 12S

PALs exceeded: None

This monitoring well is used to monitor shallow groundwater quality east of the easternmost extraction well. The results are used to determine if contaminated groundwater has been captured. No VOCs or metals were detected. No wet chemistry parameters were detected at concentrations above their respective PALs.

MW 14S

PALs exceeded: Iron
Lead
Manganese
Odor

This monitoring well is used to monitor shallow groundwater quality northwest of the northwestern most extraction well. The results are used to determine if contaminated groundwater has been captured. The dissolved iron concentration of 1,150 µg/L was greater than the 150 µg/L PAL, but significantly less than the baseline average concentration of 6,850 µg/L. The dissolved lead concentration of 1.6 µg/L was slightly higher than the PAL of 1.5 µg/L. Lead was detected once previously during the December 1995 sampling event at a concentration of 1.7 µg/L, but was not detected in 1996. The dissolved manganese concentration of 1,230 µg/L was above the PAL of 25 µg/L, less than the baseline average concentration of 1,647 µg/L, and about the same as background monitoring well MW1S. Odor was found at a concentration of 3 TON. This value is greater than the PAL of 1.5 TON, but less than the baseline average concentration of 14 TON. Total xylenes were detected at a concentration of 1.6 µg/L. This concentration is well below the PAL of 124 µg/L.

EW-1

PALs exceeded: Odor
Arsenic
Barium
Iron
Lead
Manganese

This extraction well is monitored to determine if reduction in groundwater concentration occurs over time. The odor concentration of 2 TON is slightly greater than the PAL of 1.5 TON.

Toluene, ethylbenzene, and total xylenes were detected but at concentrations less than the PALs. Dissolved arsenic, barium, iron, lead, and manganese concentrations were above their PALs. Dissolved arsenic was detected at a concentration of 6.9 µg/L. This was the first time arsenic has been detected at this well since the first 2 quarters of 1995 (8.9 µg/L in March of 1995, and 11 µg/L in June of 1995). The dissolved barium and manganese concentrations detected were similar to those found previously in 1996. The dissolved iron concentration detected (3,190 µg/L) was higher than the range of concentrations detected in 1996 (355 to 2,820 µg/L) but less than the maximum of 5,180 µg/L found in June of 1995. The dissolved lead concentration of 1.7 µg/L was slightly higher than the PAL of 1.5 µg/L. Lead was detected once previously in March 1995 at a concentration of 2.5 µg/L, but was not detected in 1996.

EW-2

PALs exceeded: Color
 Odor
 Barium
 Iron
 Manganese

This extraction well is monitored to determine if reduction in groundwater concentration occurs over time. The color result of 10 CU was above the PAL of 7.5 CU, and the odor concentration of 2 TON is slightly greater than the PAL of 1.5 TON. Ethylbenzene and total xylenes were detected but at concentrations less than the PALs. Dissolved barium, iron, and manganese concentrations were above their PALs and were found at concentrations similar to those found previously in 1996.

EW-3

PALs exceeded: Color
 Odor
 Arsenic
 Barium
 Iron
 Manganese

This extraction well is monitored to determine if reduction in groundwater concentration occurs over time. The color result of 20 CU is above the PAL of 7.5 CU, and the odor concentration of 2 TON was slightly greater than the PAL of 1.5 TON. Toluene, ethylbenzene, and total xylenes were detected but at concentrations less than the PALs. Dissolved arsenic, barium, iron, and manganese were all above the PALs, at concentrations in the same range as what has been historically recorded.

EW-4

PALs exceeded: Color
 Odor
 Barium
 Iron
 Manganese

This extraction well is monitored to determine if reduction in groundwater concentration occurs over time. The color result of 10 CU was above the PAL of 7.5 CU, and the odor concentration of 2 TON is slightly greater than the PAL of 1.5 TON. Toluene, ethylbenzene, and total xylenes

were detected but at concentrations less than the PALs. Dissolved barium, iron, and manganese concentrations were above their PALs and were found at concentrations similar to those found previously.

EW-5

PALs exceeded: Iron
 Manganese

This extraction well is monitored to determine if reduction in groundwater concentration occurs over time. All wet chemistry parameter results were below their respective PALs. No VOCs were detected in this extraction well. Dissolved iron and manganese were found in the well at concentrations greater than the PALs. Barium was also found in the well but at a concentration less than the PAL. The metals were found at concentrations equivalent to those historically found in 1996.

Hubley Residence

PALs exceeded: Manganese

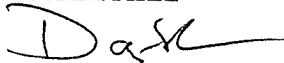
This residential well is monitored to verify that contamination from the landfill has not occurred in their well water. The wet chemistry parameter results were below the PALs. None of the targeted VOCs were detected. The dissolved manganese concentration of 129 µg/L is greater than the 25 µg/L PAL, less than the 1995 average concentration of 378 µg/L, and well below the background monitoring well MW1S concentration.

Ackerman Residence

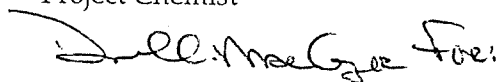
This residential well is monitored to verify that contamination has not occurred in their well water. The Ackerman residential well was not sampled due to the water being turned off for the winter.

Sincerely,

CH2M HILL



Dong-Son Pham
Project Chemist



Jim Fisher, P.E.
Site Manager

Enclosures: 1997 Groundwater Monitoring Results Tables
 1997 Groundwater Elevation Data Table
 Groundwater Monitoring Plan, Figure 3

c: Lawrence Lester/WDNR
 Stephen Nathan, PO/U.S. EPA Region 5 (w/o figure and tables)
 Peggy Hendrixson, CO/U.S. EPA (w/o figure and tables)
 Alpheus Sloan III, PM/Milwaukee

Ike Johnson, APM-OPNS/Milwaukee

John Fleissner, QAM/Milwaukee

Cherie Wilson, AA/Milwaukee (w/o figure and tables)

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: MW01S		MW01S	MW01S	MW01S	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection: 3/25/97									
Laboratory Sample Identification: 97ZC06050									
Quarter Number:	1	2	3	4					
Wet Chemistry (mg/L)									
pH	7.25				7.53	7.60	NA	NA	NA
Alkalinity	120	J			104	106	NA	NA	NA
Carbon, Total Organic	5.4				4	4	NA	NA	NA
Chemical Oxygen Demand	5	U			10	12	NA	NA	NA
Chloride	7.6				4	8	125	NA	NA
Color (CU)	1				8	10	7.5	NA	NA
Hardness	110	J			170	189	NA	NA	NA
Odor (TON)	1	R			0	0	1.5	NA	NA
Oil and Grease	0.4	UJ			5	5	NA	NA	NA
Solids, Total Dissolved	140	J			158	158	NA	NA	NA
Specific Conductance (micromhos/cm)	165				205	220	NA	NA	NA
Turbidity (NTU)	26	J			NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U			0.39	0.39	0.7	7	7
1,1-Dichloroethane	1	U			0.36	0.36	85	NA	NA
1,1,1-Trichloroethane	1	U			0.2	0.2	40	200	200
Trichloroethene	1	U			0.05	0.05	0.5	5	0
Benzene	1	U			0.08	0.08	0.5	5	0
Tetrachloroethene	0.5	U			0.29	0.29	0.5	5	0
Toluene	1	U			0.07	0.07	68.6	1,000	1,000
Ethylbenzene	1	U			0.04	0.04	140	700	700
Total Xylenes	1	U			0.06	0.06	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5	U			2	2	5	50	50
Barium, Dissolved	200	UJ			22	22	400	2,000	2,000
Iron, Dissolved	100	U			30	38	150	NA	NA
Lead, Dissolved	1.5	U			0.97	0.97	1.5	15	0
Manganese, Dissolved	1320				44	50	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper
 U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.
 UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.
 J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.
 R Rejected. The data are unusable; analyte may or may not be present.
 Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: MW04S		MW04S	MW04S	MW04S	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc	
Date of Sample Collection: 3/26/97										
Laboratory Sample Identification: 97ZC06070										
Quarter Number:		1	2	3	4					
Wet Chemistry (mg/L)										
pH	7.0 (1)					6.51	6.78	NA	NA	NA
Alkalinity	NS					272	274	NA	NA	NA
Carbon, Total Organic	NS					8	8	NA	NA	NA
Chemical Oxygen Demand	NS					34	37	NA	NA	NA
Chloride	NS					11	11	125	NA	NA
Color (CU)	NS					140	150	7.5	NA	NA
Hardness	NS					216	219	NA	NA	NA
Odor (TON)	NS					15	16	1.5	NA	NA
Oil and Grease	NS					5	6	NA	NA	NA
Solids, Total Dissolved	NS					627	131	NA	NA	NA
Specific Conductance (micromhos/cm)	360					490	495	NA	NA	NA
Turbidity (NTU)	NS					NA	NA	NA	NA	NA
VOCs (µg/L)										
1,1-Dichloroethene	1	U				0.39	0.39	0.7	7	7
1,1-Dichloroethane	1	U				6	6	85	NA	NA
1,1,1-Trichloroethane	1	U				12	13	40	200	200
Trichloroethene	1	U				0.13	0.14	0.5	5	0
Benzene	1	U				0.93	0.96	0.5	5	0
Tetrachloroethene	0.5	U				0.29	0.29	0.5	5	0
Toluene	1.4					55	56	68.6	1,000	1,000
Ethylbenzene	39.8					96	99	140	700	700
Total Xylenes	310					317	326	124	10,000	10,000
Inorganic Analytes (µg/L)										
Arsenic, Dissolved	NS					23	23	5	50	50
Barium, Dissolved	NS					782	799	400	2,000	2,000
Iron, Dissolved	NS					43333	44100	150	NA	NA
Lead, Dissolved	NS					0.97	0.97	1.5	15	0
Manganese, Dissolved	NS					1647	1690	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper

U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.

UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.

J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.

R Rejected. The data are unusable; analyte may or may not be present.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: MW05S		MW05S	MW05S	MW05S					
Date of Sample Collection: 3/26/97									
Laboratory Sample Identification: 97ZC06071									
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.0 (1)				6.51	6.78	NA	NA	NA
Alkalinity	NS				272	274	NA	NA	NA
Carbon, Total Organic	NS				8	8	NA	NA	NA
Chemical Oxygen Demand	NS				34	37	NA	NA	NA
Chloride	NS				11	11	125	NA	NA
Color (CU)	NS				140	150	7.5	NA	NA
Hardness	NS				216	219	NA	NA	NA
Odor (TON)	NS				15	16	1.5	NA	NA
Oil and Grease	NS				5	6	NA	NA	NA
Solids, Total Dissolved	NS				627	131	NA	NA	NA
Specific Conductance (micromhos/cm)	195				490	495	NA	NA	NA
Turbidity (NTU)	NS				NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U			0.39	0.39	0.7	7	7
1,1-Dichloroethane	1	U			6	6	85	NA	NA
1,1,1-Trichloroethane	1	U			12	13	40	200	200
Trichloroethene	1	U			0.13	0.14	0.5	5	0
Benzene	1	U			0.93	0.96	0.5	5	0
Tetrachloroethene	0.5	U			0.29	0.29	0.5	5	0
Toluene	230				55	56	68.6	1,000	1,000
Ethylbenzene	7.0				96	99	140	700	700
Total Xylenes	110				317	326	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	NS				23	23	5	50	50
Barium, Dissolved	NS				782	799	400	2,000	2,000
Iron, Dissolved	NS				43333	44100	150	NA	NA
Lead, Dissolved	NS				0.97	0.97	1.5	15	0
Manganese, Dissolved	NS				1647	1690	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper

U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.

UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.

J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.

R Rejected. The data are unusable; analyte may or may not be present.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: MW06S		MW06S	MW06S	MW06S	MW06S	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection: 3/25/97										
Laboratory Sample Identification: 97ZC06052										
Quarter Number:		1	2	3	4					
Wet Chemistry (mg/L)										
pH	7.76					7.63	7.70	NA	NA	NA
Alkalinity	150	J				208	210	NA	NA	NA
Carbon, Total Organic	7.9					4	4	NA	NA	NA
Chemical Oxygen Demand	5	U				5	6	NA	NA	NA
Chloride	5	U				3	3	125	NA	NA
Color (CU)	1	U				1	1	7.5	NA	NA
Hardness	160	J				204	206	NA	NA	NA
Odor (TON)	1	R				3	5	1.5	NA	NA
Oil and Grease	0.4	UJ				5	5	NA	NA	NA
Solids, Total Dissolved	160	J				133	208	NA	NA	NA
Specific Conductance (micromhos/cm)	190					298	300	NA	NA	NA
Turbidity (NTU)	1.9	J				NA	NA	NA	NA	NA
VOCs (µg/L)										
1,1-Dichloroethene	1	U				0.39	0.39	0.7	7	7
1,1-Dichloroethane	1	U				7	7	85	NA	NA
1,1,1-Trichloroethane	1	U				0.2	0.2	40	200	200
Trichloroethene	1	U				0.14	0.22	0.5	5	0
Benzene	1	U				0.5	0.62	0.5	5	0
Tetrachloroethene	0.5	U				0.29	0.29	0.5	5	0
Toluene	1	U				2	2	68.6	1,000	1,000
Ethylbenzene	1	U				0.04	0.04	140	700	700
Total Xylenes	1	U				0.10	0.12	124	10,000	10,000
Inorganic Analytes (µg/L)										
Arsenic, Dissolved	5	U				2	2	5	50	50
Barium, Dissolved	200	UJ				160	161	400	2,000	2,000
Iron, Dissolved	100	U				59	64	150	NA	NA
Lead, Dissolved	1.5	U				0.97	0.97	1.5	15	0
Manganese, Dissolved	1680					3113	3120	25	NA	NA

NA Not applicable NS Not sampled (I) pH measured using litmus paper

U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.

UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.

J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.

R Rejected. The data are unusable; analyte may or may not be present.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: MW06M		MW06M	MW06M	MW06M					
Date of Sample Collection: 3/25/97									
Laboratory Sample Identification: 97ZC06051									
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.97				7.58	7.63	NA	NA	NA
Alkalinity	140	J			269	273	NA	NA	NA
Carbon, Total Organic	3.8				4	4	NA	NA	NA
Chemical Oxygen Demand	5	U			10	13	NA	NA	NA
Chloride	5	U			7	7	125	NA	NA
Color (CU)	1				2	5	7.5	NA	NA
Hardness	150	J			250	252	NA	NA	NA
Odor (TON)	1	R			7	13	1.5	NA	NA
Oil and Grease	0.4	UJ			5	5	NA	NA	NA
Solids, Total Dissolved	160	J			282	286	NA	NA	NA
Specific Conductance (micromhos/cm)	185				340	365	NA	NA	NA
Turbidity (NTU)	1	UJ			NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U			0.39	0.39	0.7	7	7
1,1-Dichloroethane	1	U			4.92	4.98	85	NA	NA
1,1,1-Trichloroethane	1	U			0.2	0.2	40	200	200
Trichloroethene	1	U			0.27	0.34	0.5	5	0
Benzene	1	U			0.79	0.8	0.5	5	0
Tetrachloroethene	0.5	U			0.29	0.29	0.5	5	0
Toluene	1	U			0.07	0.07	68.6	1,000	1,000
Ethylbenzene	1	U			0.81	0.83	140	700	700
Total Xylenes	1	U			1.06	1.14	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5	U			2	2	5	50	50
Barium, Dissolved	883	J			2150	2180	400	2,000	2,000
Iron, Dissolved	100	U			36	63	150	NA	NA
Lead, Dissolved	1.5	U			0.97	0.97	1.5	15	0
Manganese, Dissolved	1890				4747	4800	25	NA	NA

NA Not applicable NS Not sampled (I) pH measured using litmus paper
 U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.
 UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.
 J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.
 R Rejected. The data are unusable; analyte may or may not be present.
 Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: MW08S		MW08S	MW08S	MW08S					
Date of Sample Collection: 3/26/97									
Laboratory Sample Identification: 97ZC06053									
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.0 (1)				7.00	7.18	NA	NA	NA
Alkalinity	170 J				190	205	NA	NA	NA
Carbon, Total Organic	1.4				4	5	NA	NA	NA
Chemical Oxygen Demand	5 U				12	19	NA	NA	NA
Chloride	17				7	9	125	NA	NA
Color (CU)	1				30	50	7.5	NA	NA
Hardness	230 J				163	167	NA	NA	NA
Odor (TON)	1 R				7	17	1.5	NA	NA
Oil and Grease	0.4 UJ				5	5	NA	NA	NA
Solids, Total Dissolved	140 J				199	213	NA	NA	NA
Specific Conductance (micromhos/cm)	300				283	300	NA	NA	NA
Turbidity (NTU)	27 J				NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1 U				0.39	0.39	0.7	7	7
1,1-Dichloroethane	1 U				1	1	85	NA	NA
1,1,1-Trichloroethane	1 U				0.2	0.2	40	200	200
Trichloroethene	1 U				0.05	0.05	0.5	5	0
Benzene	1 U				0.36	0.49	0.5	5	0
Tetrachloroethene	0.5 U				0.29	0.29	0.5	5	0
Toluene	1 U				0.1	0.11	68.6	1,000	1,000
Ethylbenzene	1 U				0.30	0.44	140	700	700
Total Xylenes	1 U				0.09	0.10	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5 U				3	3	5	50	50
Barium, Dissolved	200 UJ				268	281	400	2,000	2,000
Iron, Dissolved	100 U				2467	2750	150	NA	NA
Lead, Dissolved	1.5 U				0.97	0.97	1.5	15	0
Manganese, Dissolved	1350				5247	5380	25	NA	NA

NA Not applicable NS Not sampled (I) pH measured using litmus paper

U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.

UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.

J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.

R Rejected. The data are unusable; analyte may or may not be present.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: MW08M		MW08M	MW08M	MW08M					
Date of Sample Collection: 3/26/97									
Laboratory Sample Identification: 97ZC06054									
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	8.0 (1)				7.45	7.50	NA	NA	NA
Alkalinity	160 J				251	253	NA	NA	NA
Carbon, Total Organic	2.7				4	4	NA	NA	NA
Chemical Oxygen Demand	5 U				9	10	NA	NA	NA
Chloride	6.7				7	7	125	NA	NA
Color (CU)	1 U				4	5	7.5	NA	NA
Hardness	250 J				241	243	NA	NA	NA
Odor (TON)	1 R				1	1	1.5	NA	NA
Oil and Grease	5.5 J				5	5	NA	NA	NA
Solids, Total Dissolved	150 J				241	244	NA	NA	NA
Specific Conductance (micromhos/cm)	235				340	350	NA	NA	NA
Turbidity (NTU)	4.4 J				NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1 U				0.39	0.39	0.7	7	7
1,1-Dichloroethane	1 U				0.76	0.91	85	NA	NA
1,1,1-Trichloroethane	1 U				0.2	0.2	40	200	200
Trichloroethene	1 U				0.49	0.58	0.5	5	0
Benzene	1 U				0.35	0.4	0.5	5	0
Tetrachloroethene	0.5 U				0.29	0.29	0.5	5	0
Toluene	1 U				0.06	0.07	68.6	1,000	1,000
Ethylbenzene	1 U				0.04	0.04	140	700	700
Total Xylenes	1 U				0.06	0.06	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5 U				2	2	5	50	50
Barium, Dissolved	459 J				461	475	400	2,000	2,000
Iron, Dissolved	100 U				41	64	150	NA	NA
Lead, Dissolved	1.5 U				0.97	0.97	1.5	15	0
Manganese, Dissolved	1800				2757	2810	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper
 U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.
 UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.
 J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.
 R Rejected. The data are unusable; analyte may or may not be present.
 Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: MW12S		MW12S	MW12S	MW12S	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection: 3/25/97									
Laboratory Sample Identification: 97ZC06055									
Quarter Number: 1		2	3	4					
Wet Chemistry (mg/L)									
pH	7.66				7.67	7.73	NA	NA	NA
Alkalinity	170	J			109	109	NA	NA	NA
Carbon, Total Organic	2.2				1	2	NA	NA	NA
Chemical Oxygen Demand	5	U			5	5	NA	NA	NA
Chloride	36				2	2	125	NA	NA
Color (CU)	5				1	1	7.5	NA	NA
Hardness	260	J			112	112	NA	NA	NA
Odor (TON)	1	R			0.33	1	1.5	NA	NA
Oil and Grease	0.4	UJ			5	5	NA	NA	NA
Solids, Total Dissolved	250	J			130	148	NA	NA	NA
Specific Conductance (micromhos/cm)	285				150	150	NA	NA	NA
Turbidity (NTU)	55	J			NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U			0.39	0.39	0.7	7	7
1,1-Dichloroethane	1	U			0.36	0.36	85	NA	NA
1,1,1-Trichloroethane	1	U			0.23	0.28	40	200	200
Trichloroethene	1	U			0.05	0.05	0.5	5	0
Benzene	1	U			0.08	0.08	0.5	5	0
Tetrachloroethene	0.5	U			0.29	0.29	0.5	5	0
Toluene	1	U			0.07	0.07	68.6	1,000	1,000
Ethylbenzene	1	U			0.04	0.04	140	700	700
Total Xylenes	1	U			0.06	0.06	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5	U			2	2	5	50	50
Barium, Dissolved	200	UJ			8	9	400	2,000	2,000
Iron, Dissolved	100	U			29	54	150	NA	NA
Lead, Dissolved	1.5	U			0.97	0.97	1.5	15	0
Manganese, Dissolved	10	U			0.86	1	25	NA	NA

NA Not applicable NS Not sampled (I) pH measured using litmus paper
 U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.
 UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.
 J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.
 R Rejected. The data are unusable; analyte may or may not be present.
 Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: MW14S		MW14S	MW14S	MW14S					
Date of Sample Collection: 3/26/97									
Laboratory Sample Identification: 97ZC06056									
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.0 (1)				6.85	7.20	NA	NA	NA
Alkalinity	70 J				148	150	NA	NA	NA
Carbon, Total Organic	5.2				8	9	NA	NA	NA
Chemical Oxygen Demand	7.4				27	32	NA	NA	NA
Chloride	5 U				6	6	125	NA	NA
Color (CU)	1				23	30	7.5	NA	NA
Hardness	130 J				122	129	NA	NA	NA
Odor (TON)	3 R				14	16	1.5	NA	NA
Oil and Grease	0.4 UJ				5	5	NA	NA	NA
Solids, Total Dissolved	130 J				197	215	NA	NA	NA
Specific Conductance (micromhos/cm)	160				256	260	NA	NA	NA
Turbidity (NTU)	34 J				NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1 U				0.39	0.39	0.7	7	7
1,1-Dichloroethane	1 U				0.36	0.36	85	NA	NA
1,1,1-Trichloroethane	1 U				0.2	0.2	40	200	200
Trichloroethene	1 U				0.07	0.08	0.5	5	0
Benzene	1 U				0.06	0.08	0.5	5	0
Tetrachloroethene	0.5 U				0.29	0.29	0.5	5	0
Toluene	1 U				0.17	0.24	68.6	1,000	1,000
Ethylbenzene	1 U				0.03	0.04	140	700	700
Total Xylenes	1.6				1.42	2.63	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5 U				2	2	5	50	50
Barium, Dissolved	200 UJ				100	103	400	2,000	2,000
Iron, Dissolved	1150 J				6850	7800	150	NA	NA
Lead, Dissolved	1.6 J				0.97	0.97	1.5	15	0
Manganese, Dissolved	1230				1647	1750	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper
 U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.
 UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.
 J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.
 R Rejected. The data are unusable; analyte may or may not be present.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification:	EW1	EW1	EW1	EW1					
Date of Sample Collection:	3/25/97								
Laboratory Sample Identification:	97ZC06057								
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.59				NS	NS	NA	NA	NA
Alkalinity	180	J			NS	NS	NA	NA	NA
Carbon, Total Organic	2.3				NS	NS	NA	NA	NA
Chemical Oxygen Demand	5	U			NS	NS	NA	NA	NA
Chloride	12				NS	NS	125	NA	NA
Color (CU)	5				NS	NS	7.5	NA	NA
Hardness	200	J			NS	NS	NA	NA	NA
Odor (TON)	2	R			NS	NS	1.5	NA	NA
Oil and Grease	0.4	UJ			NS	NS	NA	NA	NA
Solids, Total Dissolved	240	J			NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	295				NS	NS	NA	NA	NA
Turbidity (NTU)	44	J			NS	NS	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U			NS	NS	0.7	7	7
1,1-Dichloroethane	1	U			NS	NS	85	NA	NA
1,1,1-Trichloroethane	1	U			NS	NS	40	200	200
Trichloroethene	1	U			NS	NS	0.5	5	0
Benzene	1	U			NS	NS	0.5	5	0
Tetrachloroethene	0.5	U			NS	NS	0.5	5	0
Toluene	7.4				NS	NS	68.6	1,000	1,000
Ethylbenzene	2.2				NS	NS	140	700	700
Total Xylenes	18.7				NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	6.9				NS	NS	5	50	50
Barium, Dissolved	557	J			NS	NS	400	2,000	2,000
Iron, Dissolved	3190	J			NS	NS	150	NA	NA
Lead, Dissolved	1.7	J			NS	NS	1.5	15	0
Manganese, Dissolved	1620				NS	NS	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper

U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.

UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.

J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.

R Rejected. The data are unusable; analyte may or may not be present.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: EW2		EW2	EW2	EW2	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection: 3/25/97									
Laboratory Sample Identification: 97ZC06058									
Quarter Number: 1		2	3	4					
Wet Chemistry (mg/L)									
pH	7.40				NS	NS	NA	NA	NA
Alkalinity	180	J			NS	NS	NA	NA	NA
Carbon, Total Organic	4.7				NS	NS	NA	NA	NA
Chemical Oxygen Demand	20				NS	NS	NA	NA	NA
Chloride	9.6				NS	NS	125	NA	NA
Color (CU)	10				NS	NS	7.5	NA	NA
Hardness	200	J			NS	NS	NA	NA	NA
Odor (TON)	2	R			NS	NS	1.5	NA	NA
Oil and Grease	0.4	UJ			NS	NS	NA	NA	NA
Solids, Total Dissolved	210	J			NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	295				NS	NS	NA	NA	NA
Turbidity (NTU)	96	J			NS	NS	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U			NS	NS	0.7	7	7
1,1-Dichloroethane	1	U			NS	NS	85	NA	NA
1,1,1-Trichloroethane	1	U			NS	NS	40	200	200
Trichloroethene	1	U			NS	NS	0.5	5	0
Benzene	1	U			NS	NS	0.5	5	0
Tetrachloroethene	0.5	U			NS	NS	0.5	5	0
Toluene	1	U			NS	NS	68.6	1,000	1,000
Ethylbenzene	1.5				NS	NS	140	700	700
Total Xylenes	18.2				NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5	U			NS	NS	5	50	50
Barium, Dissolved	771	J			NS	NS	400	2,000	2,000
Iron, Dissolved	6290	J			NS	NS	150	NA	NA
Lead, Dissolved	1.5	U			NS	NS	1.5	15	0
Manganese, Dissolved	2340				NS	NS	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper
 U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.
 UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.
 J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.
 R Rejected. The data are unusable; analyte may or may not be present.
 Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: EW3		EW3	EW3	EW3					
Date of Sample Collection: 3/25/97									
Laboratory Sample Identification: 97ZC06059									
Quarter Number: 1		2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.35				NS	NS	NA	NA	NA
Alkalinity	160	J			NS	NS	NA	NA	NA
Carbon, Total Organic	5.3				NS	NS	NA	NA	NA
Chemical Oxygen Demand	5	U			NS	NS	NA	NA	NA
Chloride	8.9				NS	NS	125	NA	NA
Color (CU)	20				NS	NS	7.5	NA	NA
Hardness	200	J			NS	NS	NA	NA	NA
Odor (TON)	2	R			NS	NS	1.5	NA	NA
Oil and Grease	0.4	UJ			NS	NS	NA	NA	NA
Solids, Total Dissolved	160	J			NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	275				NS	NS	NA	NA	NA
Turbidity (NTU)	96	J			NS	NS	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U			NS	NS	0.7	7	7
1,1-Dichloroethane	1	U			NS	NS	85	NA	NA
1,1,1-Trichloroethane	1	U			NS	NS	40	200	200
Trichloroethene	1	U			NS	NS	0.5	5	0
Benzene	1	U			NS	NS	0.5	5	0
Tetrachloroethene	0.5	U			NS	NS	0.5	5	0
Toluene	3.6				NS	NS	68.6	1,000	1,000
Ethylbenzene	1.3				NS	NS	140	700	700
Total Xylenes	26.2				NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	8.9				NS	NS	5	50	50
Barium, Dissolved	863	J			NS	NS	400	2,000	2,000
Iron, Dissolved	8670	J			NS	NS	150	NA	NA
Lead, Dissolved	1.5	U			NS	NS	1.5	15	0
Manganese, Dissolved	2550				NS	NS	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper
 U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.
 UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.
 J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.
 R Rejected. The data are unusable; analyte may or may not be present.
 Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: EW4		EW4	EW4	EW4					
Date of Sample Collection: 3/25/97									
Laboratory Sample Identification: 97ZC06060									
Quarter Number: 1		2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.42				NS	NS	NA	NA	NA
Alkalinity	130	J			NS	NS	NA	NA	NA
Carbon, Total Organic	4.9				NS	NS	NA	NA	NA
Chemical Oxygen Demand	5	U			NS	NS	NA	NA	NA
Chloride	7.6				NS	NS	125	NA	NA
Color (CU)	10				NS	NS	7.5	NA	NA
Hardness	160	J			NS	NS	NA	NA	NA
Odor (TON)	2	R			NS	NS	1.5	NA	NA
Oil and Grease	0.4	UJ			NS	NS	NA	NA	NA
Solids, Total Dissolved	140	J			NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	220				NS	NS	NA	NA	NA
Turbidity (NTU)	35	J			NS	NS	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U			NS	NS	0.7	7	7
1,1-Dichloroethane	1	U			NS	NS	85	NA	NA
1,1,1-Trichloroethane	1	U			NS	NS	40	200	200
Trichloroethene	1	U			NS	NS	0.5	5	0
Benzene	1	U			NS	NS	0.5	5	0
Tetrachloroethene	0.5	U			NS	NS	0.5	5	0
Toluene	10.6				NS	NS	68.6	1,000	1,000
Ethylbenzene	2.3				NS	NS	140	700	700
Total Xylenes	25.9				NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5	U			NS	NS	5	50	50
Barium, Dissolved	578	J			NS	NS	400	2,000	2,000
Iron, Dissolved	5840	J			NS	NS	150	NA	NA
Lead, Dissolved	1.5	U			NS	NS	1.5	15	0
Manganese, Dissolved	2070				NS	NS	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper

U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.

UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.

J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.

R Rejected. The data are unusable; analyte may or may not be present.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: EW5	EW5	EW5	EW5						
Date of Sample Collection: 3/25/97									
Laboratory Sample Identification: 97ZC06061									
Quarter Number: 1	2	3	4		Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.63				NS	NS	NA	NA	NA
Alkalinity	110	J			NS	NS	NA	NA	NA
Carbon, Total Organic	4.5				NS	NS	NA	NA	NA
Chemical Oxygen Demand	5	U			NS	NS	NA	NA	NA
Chloride	7.9				NS	NS	125	NA	NA
Color (CU)	5				NS	NS	7.5	NA	NA
Hardness	140	J			NS	NS	NA	NA	NA
Odor (TON)	1	R			NS	NS	1.5	NA	NA
Oil and Grease	0.4	UJ			NS	NS	NA	NA	NA
Solids, Total Dissolved	140	J			NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	180				NS	NS	NA	NA	NA
Turbidity (NTU)	3.7	J			NS	NS	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U			NS	NS	0.7	7	7
1,1-Dichloroethane	1	U			NS	NS	85	NA	NA
1,1,1-Trichloroethane	1	U			NS	NS	40	200	200
Trichloroethene	1	U			NS	NS	0.5	5	0
Benzene	1	U			NS	NS	0.5	5	0
Tetrachloroethene	0.5	U			NS	NS	0.5	5	0
Toluene	1	U			NS	NS	68.6	1,000	1,000
Ethylbenzene	1	U			NS	NS	140	700	700
Total Xylenes	1	U			NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5	U			NS	NS	5	50	50
Barium, Dissolved	345	J			NS	NS	400	2,000	2,000
Iron, Dissolved	359	J			NS	NS	150	NA	NA
Lead, Dissolved	1.5	U			NS	NS	1.5	15	0
Manganese, Dissolved	1010				NS	NS	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper

U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.

UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.

J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.

R Rejected. The data are unusable; analyte may or may not be present.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: HUBLEY		HUBLEY	HUBLEY	HUBLEY				
Date of Sample Collection: 3/26/97								
Laboratory Sample Identification: 97ZC06065								
Quarter Number: 1		2	3	4	Ave. '95 Conc.	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)								
pH	7.0 (1)				7.3	NA	NA	NA
Alkalinity	76 J				140	NA	NA	NA
Carbon, Total Organic	5.3				6.0	NA	NA	NA
Chemical Oxygen Demand	5 U				12.6	NA	NA	NA
Chloride	5 U				6.5	125	NA	NA
Color (CU)	1 U				23.8	7.5	NA	NA
Hardness	100 J				170	NA	NA	NA
Odor (TON)	1 R				1.0	1.5	NA	NA
Oil and Grease	0.4 UJ				3.6	NA	NA	NA
Solids, Total Dissolved	21 J				165	NA	NA	NA
Specific Conductance (micromhos/cm)	110				216	NA	NA	NA
Turbidity (NTU)	1 UJ				4.2	NA	NA	NA
VOCs (µg/L)								
1,1-Dichloroethene	0.2 U				0.2 U	0.7	7	7
1,1-Dichloroethane	0.1 U				0.1 U	85	NA	NA
1,1,1-Trichloroethane	0.1 U				0.2 U	40	200	200
Trichloroethene	0.1 U				0.3 U	0.5	5	0
Benzene	0.5 U				0.4 U	0.5	5	0
Tetrachloroethene	0.2 U				0.1 U	0.5	5	0
Toluene	0.5 U				0.5 U	68.6	1,000	1,000
Ethylbenzene	0.1 U				0.2 U	140	700	700
Total Xylenes	0.2 U				0.2 U	124	10,000	10,000
Inorganic Analytes (µg/L)								
Arsenic, Dissolved	5 U				4.6 U	5	50	50
Barium, Dissolved	200 UJ				180 U	400	2,000	2,000
Iron, Dissolved	100 U				100 U	150	NA	NA
Lead, Dissolved	1.5 U				2 U	1.5	15	0
Manganese, Dissolved	129				378	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper
 U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.
 UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.
 J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.
 R Rejected. The data are unusable; analyte may or may not be present.
 Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results**

Field Sample Identification: ACKERMAN ACKERMAN ACKERMAN ACKERMAN					Ave. '95 Conc.	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection:	NA							
Laboratory Sample Identification:	NA							
Quarter Number:	1	2	3	4				
Wet Chemistry (mg/L)								
pH	NS				7.7	NA	NA	NA
Alkalinity	NS				230 J	NA	NA	NA
Carbon, Total Organic	NS				0.6 J	NA	NA	NA
Chemical Oxygen Demand	NS				6.5 R	NA	NA	NA
Chloride	NS				8.5	125	NA	NA
Color (CU)	NS				65 J	7.5	NA	NA
Hardness	NS				202.5 J	NA	NA	NA
Odor (TON)	NS				1	1.5	NA	NA
Oil and Grease	NS				6.7	NA	NA	NA
Solids, Total Dissolved	NS				355	NA	NA	NA
Specific Conductance (micromhos/cm)	NS				207	NA	NA	NA
Turbidity (NTU)	NS				25 J	NA	NA	NA
VOCs (µg/L)								
1,1-Dichloroethene	NS				0.2 U	0.7	7	7
1,1-Dichloroethane	NS				0.1 U	85	NA	NA
1,1,1-Trichloroethane	NS				0.1 U	40	200	200
Trichloroethene	NS				0.125	0.5	5	0
Benzene	NS				0.5 U	0.5	5	0
Tetrachloroethene	NS				0.1 U	0.5	5	0
Toluene	NS				0.5 U	68.6	1,000	1,000
Ethylbenzene	NS				0.1 U	140	700	700
Total Xylenes	NS				0.2 U	124	10,000	10,000
Inorganic Analytes (µg/L)								
Arsenic, Dissolved	NS				5 U	5	50	50
Barium, Dissolved	NS				200 U	400	2,000	2,000
Iron, Dissolved	NS				448	150	NA	NA
Lead, Dissolved	NS				1.5 U	1.5	15	0
Manganese, Dissolved	NS				100	25	NA	NA

NA Not applicable NS Not sampled (1) pH measured using litmus paper

U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.

UJ Estimated, not detected. Analyte was not detected at a concentration equal to or greater than method detection limits and quality control results indicate possible bias.

J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.

R Rejected. The data are unusable; analyte may or may not be present.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results - Field Duplicates**

Field Sample Identification:	MW06M	MW06Mdup
Date of Sample Collection:	3/25/97	3/25/97
Laboratory Sample Identification:	97ZC06051	97ZC06064
Quarter Number:	1	1

Wet Chemistry (mg/L)				
Alkalinity	140	J	130	J
Carbon, Total Organic	3.8		4.1	
Chemical Oxygen Demand	5	U	5	U
Chloride	5	U	5	U
Color (CU)	1		1	
Hardness	150	J	150	J
Odor (TON)	1	R	1	R
Oil and Grease	0.4	UJ	0.4	UJ
Solids, Total Dissolved	160	J	150	J
Turbidity (NTU)	1	UJ	1	UJ

VOCs (µg/L)				
1,1-Dichloroethene	1	U	1	U
1,1-Dichloroethane	1	U	1	U
1,1,1-Trichloroethane	1	U	1	U
Trichloroethene	1	U	1	U
Benzene	1	U	1	U
Tetrachloroethene	0.5	U	0.5	U
Toluene	1	U	1	U
Ethylbenzene	1	U	1	U
Total Xylenes	1	U	1	U

Inorganic Analytes (µg/L)				
Arsenic, Dissolved	5	U	5	U
Barium, Dissolved	883	J	864	J
Iron, Dissolved	100	U	100	U
Lead, Dissolved	1.5	U	1.8	J
Manganese, Dissolved	1890		1820	

NA Not applicable **NS** Not sampled **dup** Field duplicate

U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.

J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.

R Rejected. The data are unusable; analyte may or may not be present.

**Onalaska Municipal Landfill
1997 Groundwater Monitoring Results - Blanks**

Field Sample Identification:	FB1	TB1	FB2	TB2	TB3
Date of Sample Collection:	3/25/97	3/25/97	3/26/97	3/26/97	3/26/97
Laboratory Sample ID:	97ZC06068	97ZC06062	97ZC06069	97ZC06063	97ZC06067
Quarter Number:	1	1	1	1	1

Wet Chemistry (mg/L)										
Alkalinity	2	UJ	NA		120	J	NA		NA	
Carbon, Total Organic	0.5	U	NA		0.5	U	NA		NA	
Chemical Oxygen Demand	5	U	NA		5	U	NA		NA	
Chloride	5	U	NA		5	U	NA		NA	
Color (CU)	1	U	NA		1	U	NA		NA	
Hardness	1	UJ	NA		1	UJ	NA		NA	
Odor (TON)	1	R	NA		1	R	NA		NA	
Oil and Grease	3.3	J	NA		0.4	UJ	NA		NA	
Solids, Total Dissolved	20	UJ	NA		20	UJ	NA		NA	
Turbidity (NTU)	1	UJ	NA		1	UJ	NA		NA	

VOCs (µg/L)										
1,1-Dichloroethene	1	U	1	U	1	U	1	U	0.2	U
1,1-Dichloroethane	1	U	1	U	1	U	1	U	0.1	U
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	0.1	U
Trichloroethene	1	U	1	U	1	U	1	U	0.1	U
Benzene	1	U	1	U	1	U	1	U	0.5	U
Tetrachloroethene	0.5	U	0.5	U	0.5	U	0.5	U	0.2	U
Toluene	1	U	1	U	1	U	1	U	0.5	U
Ethylbenzene	1	U	1	U	1	U	1	U	0.1	U
Total Xylenes	1	U	1	U	1	U	1	U	0.2	U

Inorganic Analytes (µg/L)										
Arsenic, Dissolved	5	U	NA		5	U	NA		NA	
Barium, Dissolved	200	UJ	NA		200	UJ	NA		NA	
Iron, Dissolved	100	U	NA		100	U	NA		NA	
Lead, Dissolved	1.5	U	NA		1.5	U	NA		NA	
Manganese, Dissolved	10	U	NA		10	U	NA		NA	

NA Not applicable **NS** Not sampled **FB** Field Blank **TB** Trip Blank
U Not detected. Analyte was not detected at a concentration equal to or greater than method detection limits.
J Estimated. Analyte was detected; however, either the value is below the report limit or quality control results indicate that the reported value may not be accurate.
R Rejected. The data are unusable; analyte may or may not be present.

Table 3
Onalaska Municipal Landfill
Groundwater Elevation Results

Quarter Number:		1		1		2		2		3		3		4		4		1		1	
Date		Mar-96	Mar-96	Jul-96	Jul-96	Oct-96	Oct-96	Dec-96	Dec-96	Mar-97	Mar-97										
Well	Well Rim Elevation	Depth to Water (ft)	Water Elevation (ft)	Depth to Water (ft)	Water Elevation (ft)	Depth to Water (ft)	Water Elevation (ft)	Depth to Water (ft)	Water Elevation (ft)	Depth to Water (ft)	Water Elevation (ft)	Depth to Water (ft)	Water Elevation (ft)	Depth to Water (ft)	Water Elevation (ft)	Depth to Water (ft)	Water Elevation (ft)	Depth to Water (ft)	Water Elevation (ft)	Depth to Water (ft)	Water Elevation (ft)
MW01S	663.22	17.7	645.52	20.0	643.22	21.45	641.77	20.09	643.13	18.83	644.39										
MW04S	665.01	21.38	643.63	22.8	642.21	24.68	640.33	23.01	642.00	21.22	643.79										
MW05S	655.56	Not meas.	Not meas.	13.5	642.06	16.13	639.43	13.68	641.88	12.66	642.9										
MW06S	646.25	2.95	643.30	4.24	642.01	5.98	640.27	4.40	641.85	3.46	642.79										
MW06M	648.20	3.47	644.73	6.08	642.12	7.79	640.41	6.28	641.92	5.3	642.9										
MW08S	659.11	15.71	643.40	17.6	641.51	18.83	640.28	17.26	641.85	16.52	642.59										
MW08M	659.07	15.8	643.27	16.9	642.17	18.34	640.73	17.28	641.79	16.46	642.61										
MW08D	658.97	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.	17.14	641.83	16.34	642.63										
MW12S	662.95	19.16	643.79	20.3	642.65	22.1	640.85	20.50	642.45	19.92	643.03										
MW14S	654.32	10.28	644.04	12.24	642.08	13.7	640.62	12.45	641.87	11.28	643.04										
PZ-01	654.73	10.94	643.79	12.98	641.75	14.31	640.42	13.06	641.67	11.92	642.81										
PZ-02	649.76	4.86	644.90	7.16	642.60	9.41	640.35	7.10	642.66	6.12	643.64										
PZ-03	647.10	3.34	643.76	5.08	642.02	6.8	640.30	5.29	641.81	4.24	642.86										
PZ-04	647.43	3.71	643.72	5.34	642.09	7.11	640.32	Not meas.	Not meas.	4.64	642.79										
PZ-05	660.23	Not meas.	Not meas.	18.2	642.03	20.01	640.22	18.38	641.85	17.7	642.53										
PZ-06	659.08	Not meas.	Not meas.	16.92	642.16	18.76	640.32	Not meas.	Not meas.	16.5	642.58										
Est. River Level at Site ¹	---	---	645.11	---	644.72	---	645.00	---	644.79	---	644.89										

¹ The river level at the site was surveyed during the first quarter sampling in March of 1997. The surveyed river level was 6.3 ft higher than the reading at the La Crescent Dam. The 1996 River Elevations were estimated as 6.3 ft higher than the La Crescent Dam river elevations.