



January 7, 1997

104194.CV.DE

Mr. Kevin Adler
U.S. Environmental Protection Agency
Mail Code HSRW-6J
77 West Jackson Boulevard
Chicago, IL 60604-3590



Dear Mr. Adler:

Subject: Onalaska Municipal Landfill, Onalaska, Wisconsin
Quarterly Groundwater Quality Monitoring Evaluation for October, 1996

Introduction

Purpose

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

- 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 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 levels that would adversely affect the wetlands.

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

Groundwater Monitoring Program

Groundwater samples from nine monitoring wells, extraction wells EW-1, EW-3, and EW-5, and two residential wells are collected at the end of March, June, September, and December. The residential wells are at the Hubley and Ackerman homes. Extraction wells number EW-2 and EW-4 are sampled biannually in June and December.

Summary

Sampling and Observations

Quarterly groundwater samples and groundwater elevation measurements were collected on October 1 and 2, 1996. The field team consisted of Gina Bayer and Kathi Kimble. Samples were collected from eight of the nine monitoring wells routinely sampled. The wells sampled were Monitoring Well 1S (MW1S), MW5S (VOCs only), MW6S, MW6M, MW8S, MW8M, MW12S, and MW14S. A sample could not be collected from Monitoring Well MW-4S due to a bend in the well, as described below. Samples were also collected from three of the five extraction wells, EW-1, EW-3, and EW-5, and from the residential wells at the Ackerman and Hubley homes. 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 ATEC Laboratory in Indianapolis, Indiana, for testing of select volatile organic compounds (VOCs), 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 during the sampling events:

- Monitoring well MW-4S has a bend in the well approximately five feet below ground surface. The bend in the well is sufficient to prevent a bailer from passing around it, subsequently a sample could not be collected. (one bailer of water was recovered from MW-4S. This water was used to assess color, odor, and turbidity. Attempts to recover additional water were not made due to the probability of getting the bailer stuck in the well)
- A hydrocarbon odor and oil sheen were apparent in the groundwater sampled from monitoring wells MW5S, MW-4S, and MW14S.
- The groundwater sampled from MW1S, MW-4S, MW5S, EW-5, and MW14S appeared to be turbid and brown in color.

Presentation of Results

The groundwater monitoring well analytical results and groundwater elevation results are presented on the attached tables. QA/QC qualifiers will be added to the analytical results table in the annual evaluation report. 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 quarterly 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 color concentration exceeded the PALs in all the monitoring wells, the three extraction wells sampled this quarter, and in the Ackerman and Hubley residential wells. This concentration of color is a result of laboratory bias. The field blank sample had a color concentration of 10 color units (CU). The monitoring, residential, and two of the three extraction wells had color concentrations ranging from 10 CU to 30 CU. These color concentrations are biased and should be considered to be estimates. The color concentration for EW-2 should be considered correct as reported.

VOC concentrations were below PALs in the residential, monitoring, and extraction wells, except for monitoring well MW5S. Monitoring well MW5S contained toluene and total xylenes at concentrations of 610 µg/L and 580 µg/L, respectively.

The metal results for one or more elements were greater than PALs at all sample locations. The dissolved manganese concentration was greater than the PAL 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-3 and EW-5. Dissolved barium was present above the PAL in monitoring wells MW6M and MW8M, and in extraction wells EW-1 and EW-3. Dissolved iron was present above the PAL in monitoring well MW01S, MW08S, and MW14S, and in extraction wells EW-1 and EW-3. Dissolved lead was not present above the PAL in any of the monitoring, extraction, or residential wells.

Conclusions

Additional quarterly sampling events and groundwater elevation measurements are required to draw conclusions regarding cleanup. However, some general observations regarding the extent of contamination, after approximately two and a quarter years of groundwater extraction and treatment, can be made.

- Target VOC analytes were below cleanup standards in all the monitoring wells sampled except MW5S. However, concentrations in the extraction wells are above cleanup standards on occasion.
- One to two of the five target metal analytes are above cleanup standards in the monitoring wells. One to four of the five target metal analytes are above cleanup standards in the extraction wells. Manganese was found in both residential wells at concentrations greater than the PALs.
- 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
 Iron
 Color

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 1,630 µg/L is higher than the 25 µg/L PAL, and significantly higher than the first and second quarter average concentration of 416 µg/L. Iron was detected in this well for the first time at a concentration greater than the PAL. The iron was detected at a concentration of 957 µg/L. Color was detected in this well after not being detected for the first time last quarter. No VOCs were detected.

MW 4S

This monitoring well could not be sampled this quarter due to a bend in the well. This monitoring well has been historically used to monitor shallow groundwater quality downgradient of the landfill and within the extraction system. The results are used to determine if a reduction in groundwater concentrations is occurring over time. In the future this monitoring well will be purged with a low flow pump and Teflon tubing, and sampled with a one inch bailer.

MW 5S

PALs exceeded: Toluene
 Total xylenes

This monitoring well is used to monitor shallow groundwater quality downgradient of the landfill and within the extraction system. This monitoring well is sampled for VOCs only. The results are used to determine if a reduction in groundwater concentrations are occurring over time. Toluene, ethyl benzene, and total xylenes were found in this monitoring well sample. The concentrations for toluene and total xylenes were greater than their respective PALs, and greater than their baseline average concentration. The estimated ethyl benzene concentration of 40 µg/L is less than the PAL and is less than the baseline average concentration.

MW 6S

PALs exceeded: Manganese
 Color

This monitoring well is used to monitor shallow groundwater quality downgradient of the landfill and extraction system. The results are used to determine if reduction in groundwater concentration occurs over time. The dissolved manganese concentration of 1,800 µg/L was above the 25 µg/L PAL, but lower than the 1996 first and second quarter average concentration of 2,645 µg/L, and less than the baseline average concentration of 3,113 µg/L. Color was detected at a concentration of 20 color units (CU). This value is greater than the PAL of 7.5 CU.

MW 6M

PALs exceeded: Barium
 Color
 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 1,530 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 2,860 µg/L was above the 25 µg/L PAL, but again less than the baseline average concentration of 4,747 µg/L. Color was found at a concentration of 10 CU which is greater than the 7.5 CU PAL and greater than the baseline average concentration of 5 CU.

MW 8S

PALs exceeded: Iron
 Manganese
 Color

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 iron concentration of 693 µg/L was above the 150 µg/L PAL, but significantly lower than the baseline average concentration of 2,467 µg/L. The dissolved manganese concentration of 3,650 µg/L was above the PAL of 25 µg/L, but less the baseline average concentration of 5,247 µg/L. Color was detected in this well after not being detected for the first time last quarter.

MW 8M

PALs exceeded: Manganese
 Barium
 Color

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 1,760 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 434 µg/L was slightly greater than the PAL of 400 µg/L, but less than the baseline average concentration of 461 µg/L. Color was detected in this well after not being detected for the first time last quarter.

MW 12S

PALs exceeded: Color

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. This well contained color at a concentration of 15 CU which is greater than the 7.5 CU PAL.

MW 14S

PALs exceeded: Color
 Iron
 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 color concentration of 10 CU was above the PAL of 7.5 CU. The dissolved iron concentration of 15,500 µg/L was greater than the 150 µg/L PAL, and approximately twice the baseline average concentration of 6,850 µg/L. The dissolved manganese concentration of 4,870 µg/L was above the PAL of 25 µg/L, and greater than the baseline average concentration of 1,647 µg/L. Odor was found at a concentration of 6 TON. This value is greater than the PAL of 1.5 TON, but less than the baseline average concentration of 14 TON.

EW-1

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 40 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, except for iron, were found at concentrations similar to those found previously in 1996. The iron concentration was approximately five times lower than the 1996 first and second quarter average concentration.

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.

EW-2 and EW-4

These extraction wells are monitored to determine if reduction in groundwater concentration occurs over time. Extraction wells number EW-2 and EW-4 will be sampled biannually (during the months of June and December).

EW-3

PALs exceeded: Color
 Odor
 Arsenic
 Barium
 Iron
 Lead
 Manganese

This extraction well is monitored to determine if reduction in groundwater concentration occurs over time. The color result of 110 CU is above the PAL of 7.5 CU, and the odor concentration of 3 TON was slightly greater than the PAL of 1.5 TON. 1,1-Dichloroethane, benzene, toluene, ethylbenzene, and total xylenes were detected but at concentrations less than the PALs. Dissolved arsenic, barium, iron, lead, and manganese were all above the PALs, at concentrations in the same range as what has been historically recorded.

EW-5

PALs exceeded: Color
 Arsenic
 Manganese

This extraction well is monitored to determine if reduction in groundwater concentration occurs over time. Except for color, the wet chemistry parameter results were below the PALs. The color result of 10 CU was above the PAL of 7.5 CU. No VOCs were detected in this well. Dissolved arsenic 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: Color
 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, except for color were below the PALs. Color was detected at a concentration of 30 CU, greater than the PAL of 7.5 CU. None of the targeted VOCs were detected. The dissolved manganese concentration of 322 µg/L was in the same range as the 1996 first and second quarter average concentration. This concentration is slightly less than the 1995 average concentration of 379 µg/L, and is consistently less than or equivalent to the site's background manganese concentration.

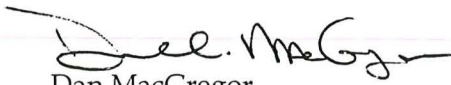
Ackerman Residence

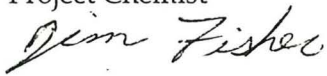
PALs exceeded: Color
 Manganese

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 except for color. The color result of 10 CU was above the PAL of 7.5 CU. None of the targeted VOCs were detected. The dissolved manganese concentration of 91.7 µg/L was above the 25 µg/L PAL, but slightly less their 1995 average concentration of 100 µg/L. The concentration of manganese in this well has been consistently less than the site's background manganese concentration.

Sincerely,

CH2M HILL


Dan MacGregor
Project Chemist


Jim Fisher, P.E.
Site Manager

MKE/10016B44.DOC

Enclosures: 1996 Groundwater Monitoring Results Tables
 1996 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
Groundwater Monitoring Results**

Field Sample Identification:	MW01S	MW01S	MW01S	MW01S						
Date of Sample Collection:	3/27/96	7/11/96	10/1/96							
Laboratory Sample Identification:	96ZC06001	96ZC07001	97ZC05001							
Quarter Number:	1	2	3	4						
						Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)										
pH	7.58	7.99	6.3			7.53	7.60	NA	NA	NA
Alkalinity	140	130	76			104	106	NA	NA	NA
Carbon, Total Organic	5.1	3.9	6.2			4	4	NA	NA	NA
Chemical Oxygen Demand	9.8	18	10			10	12	NA	NA	NA
Chloride	5.9	8.7	5	U		4	8	125	NA	NA
Color (CU)	200	1	U	10		8	10	7.5	NA	NA
Hardness	395	190	100			170	189	NA	NA	NA
Odor (TON)	1	U	1	U	1	U	0	0	1.5	NA
Oil and Grease	0.4	U	4.4	0.4	U	5	5	NA	NA	NA
Solids, Total Dissolved	147	180	88			158	158	NA	NA	NA
Specific Conductance (micromhos/cm)	185	210	140			205	220	NA	NA	NA
Turbidity (NTU)	160	81	18			NA	NA	NA	NA	NA
VOCs (µg/L)										
1,1-Dichloroethene	1	U	1	U	1	U	0.39	0.39	0.7	7
1,1-Dichloroethane	1	U	1	U	1	U	0.36	0.36	85	NA
1,1,1-Trichloroethane	1	U	1	U	1	U	0.2	0.2	40	200
Trichloroethene	1	U	1	U	1	U	0.05	0.05	0.5	5
Benzene	1	U	1	U	1	U	0.08	0.08	0.5	5
1,1,2,2-Tetrachloroethylene	0.5	U	0.5	U	0.5	U	0.29	0.29	0.5	5
Toluene	1	U	1	U	1	U	0.07	0.07	68.6	1,000
Ethylbenzene	1	U	1	U	1	U	0.04	0.04	140	700
Total Xylenes	1	U	0.1	J	1	U	0.06	0.06	124	10,000
Inorganic Analytes (µg/L)										
Arsenic, Dissolved	5	U	5	U	5	U	2	2	5	50
Barium, Dissolved	200	U	200	U	200	U	22	22	400	2,000
Iron, Dissolved	100	U	100	U	957		30	38	150	NA
Lead, Dissolved	1.5	U	1.5	U	1.5	U	0.97	0.97	1.5	15
Manganese, Dissolved	628		205		1630		44	50	25	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	MW04S	MW04S	MW04S	MW04S					
Date of Sample Collection:	3/27/96	7/9/96							
Laboratory Sample Identification:	96ZC06013	96ZC07014							
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.89	7.9	NS		6.51	6.78	NA	NA	NA
Alkalinity	NS	NS	NS		272	274	NA	NA	NA
Carbon, Total Organic	NS	NS	NS		8	8	NA	NA	NA
Chemical Oxygen Demand	NS	NS	NS		34	37	NA	NA	NA
Chloride	NS	NS	NS		11	11	125	NA	NA
Color (CU)	NS	NS	NS		140	150	7.5	NA	NA
Hardness	NS	NS	NS		216	219	NA	NA	NA
Odor (TON)	NS	NS	NS		15	16	1.5	NA	NA
Oil and Grease	NS	NS	NS		5	6	NA	NA	NA
Solids, Total Dissolved	NS	NS	NS		627	131	NA	NA	NA
Specific Conductance (micromhos/cm)	315	420	NS		490	495	NA	NA	NA
Turbidity (NTU)	NS	NS	NS		NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1	U	1	U	NS	0.39	0.39	0.7	7
1,1-Dichloroethane	1.6		0.2	J	NS	6	6	85	NA
1,1,1-Trichloroethane	1	U	1.4		NS	12	13	40	200
Trichloroethene	1	U	1	U	NS	0.13	0.14	0.5	5
Benzene	1	U	0.7	J	NS	0.93	0.96	0.5	5
1,1,2,2-Tetrachloroethene	0.5	U	0.5	U	NS	0.29	0.29	0.5	5
Toluene	47.8	E	2.1		NS	55	56	68.6	1,000
Ethylbenzene	30.2	E	56		NS	96	99	140	700
Total Xylenes	177	E	390		NS	317	326	124	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	NS	NS	NS		NS	23	23	5	50
Barium, Dissolved	NS	NS	NS		NS	782	799	400	2,000
Iron, Dissolved	NS	NS	NS		NS	43333	44100	150	NA
Lead, Dissolved	NS	NS	NS		NS	0.97	0.97	1.5	15
Manganese, Dissolved	NS	NS	NS		NS	1647	1690	25	NA

NA Not applicable NS Not sampled

Results exceeding cleanup standards

J Estimated. Analyte was detected and positively identified; however, quality control results indicate that the reported value may not be accurate.

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

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	MW05S	MW05S	MW05S	MW05S							
Date of Sample Collection:	3/27/96	7/9/96	10/2/96								
Laboratory Sample Identification:	96ZC06013	96ZC07015	97ZC05016								
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc		
Wet Chemistry (mg/L)											
pH	NS	8.91	6.65		6.51	6.78	NA	NA	NA		
Alkalinity	NS	NS	NS		272	274	NA	NA	NA		
Carbon, Total Organic	NS	NS	NS		8	8	NA	NA	NA		
Chemical Oxygen Demand	NS	NS	NS		34	37	NA	NA	NA		
Chloride	NS	NS	NS		11	11	125	NA	NA		
Color (CU)	NS	NS	NS		140	150	7.5	NA	NA		
Hardness	NS	NS	NS		216	219	NA	NA	NA		
Odor (TON)	NS	NS	NS		15	16	1.5	NA	NA		
Oil and Grease	NS	NS	NS		5	6	NA	NA	NA		
Solids, Total Dissolved	NS	NS	NS		627	131	NA	NA	NA		
Specific Conductance (micromhos/cm)	NS	270	315		490	495	NA	NA	NA		
Turbidity (NTU)	NS	NS	NS		NA	NA	NA	NA	NA		
VOCs (µg/L)											
1,1-Dichloroethene	1	U	1	U	50	U	0.39	0.39	0.7	7	7
1,1-Dichloroethane	1.6		0.5	J	50	U	6	6	85	NA	NA
1,1,1-Trichloroethane	1	U	1	U	50	U	12	13	40	200	200
Trichloroethene	1	U	1	U	50	U	0.13	0.14	0.5	5	0
Benzene	1	U	1	U	50	U	0.93	0.96	0.5	5	0
1,1,2,2-Tetrachloroethene	0.5	U	0.5	U	25	U	0.29	0.29	0.5	5	0
Toluene	47.8	E	57		610		55	56	68.6	1,000	1,000
Ethylbenzene	30.2	E	8		40	J	96	99	140	700	700
Total Xylenes	177	E	60		580		317	326	124	10,000	10,000
Inorganic Analytes (µg/L)											
Arsenic, Dissolved	NS	NS	NS		23	23	5	50	50		
Barium, Dissolved	NS	NS	NS		782	799	400	2,000	2,000		
Iron, Dissolved	NS	NS	NS		43333	44100	150	NA	NA		
Lead, Dissolved	NS	NS	NS		0.97	0.97	1.5	15	0		
Manganese, Dissolved	NS	NS	NS		1647	1690	25	NA	NA		

NA Not applicable NS Not sampled

Results exceeding cleanup standards

J Estimated. Analyte was detected and positively identified; however, quality control results indicate that the reported value may not be accurate.

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

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	MW06S	MW06S	MW06S	MW06S					
Date of Sample Collection:	3/28/96	7/10/96	10/2/96						
Laboratory Sample Identification:	96ZC06002	96ZC07002	97ZC05006						
Quarter Number:	1	2	3	4					
					Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.32	7.57	7.12		7.63	7.70	NA	NA	NA
Alkalinity	210	180	150		208	210	NA	NA	NA
Carbon, Total Organic	6.7	7.5	6.8		4	4	NA	NA	NA
Chemical Oxygen Demand	9.8	18	8.4		5	6	NA	NA	NA
Chloride	5 U	5.1	5 U		3	3	125	NA	NA
Color (CU)	1 U	1 U	20		1	1	7.5	NA	NA
Hardness	225	180	160		204	206	NA	NA	NA
Odor (TON)	1	1 U	1 U		3	5	1.5	NA	NA
Oil and Grease	1.4	4	0.4 U		5	5	NA	NA	NA
Solids, Total Dissolved	171	120	200		133	208	NA	NA	NA
Specific Conductance (micromhos/cm)	310	240	290		298	300	NA	NA	NA
Turbidity (NTU)	16	4.1	3.4		NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1 U	1 U	1 U		0.39	0.39	0.7	7	7
1,1-Dichloroethane	1.4	0.5 J	0.3 J		7	7	85	NA	NA
1,1,1-Trichloroethane	1 U	1 U	1 U		0.2	0.2	40	200	200
Trichloroethene	1 U	0.2 J	1 U		0.14	0.22	0.5	5	0
Benzene	1 U	1 U	1 U		0.5	0.62	0.5	5	0
1,1,2,2-Tetrachloroethylene	0.5 U	0.5 U	0.5 U		0.29	0.29	0.5	5	0
Toluene	1 U	1 U	1 U		2	2	68.6	1,000	1,000
Ethylbenzene	1 U	1 U	1 U		0.04	0.04	140	700	700
Total Xylenes	1 U	1 U	1 U		0.10	0.12	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5 U	5 U	5 U		2	2	5	50	50
Barium, Dissolved	200 U	200 U	200 U		160	161	400	2,000	2,000
Iron, Dissolved	100 U	100 U	100 U		59	64	150	NA	NA
Lead, Dissolved	1.5 U	1.5 U	1.5 U		0.97	0.97	1.5	15	0
Manganese, Dissolved	3170	2120	1800		3113	3120	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	MW06M	MW06M	MW06M	MW06M					
Date of Sample Collection:	3/28/96	7/10/96	10/2/96						
Laboratory Sample Identification:	96ZC06003	96ZC07003	97ZC05007						
Quarter Number:	1	2	3	4					
					Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.54	7.77	6.88		7.58	7.63	NA	NA	NA
Alkalinity	200	200	210		269	273	NA	NA	NA
Carbon, Total Organic	3	4.5	4.3		4	4	NA	NA	NA
Chemical Oxygen Demand	5 U	16	5 U		10	13	NA	NA	NA
Chloride	5 U	6.5	5 U		7	7	125	NA	NA
Color (CU)	1 U	1 U	10		2	5	7.5	NA	NA
Hardness	205	210	230		250	252	NA	NA	NA
Odor (TON)	1 U	1 U	1.4		7	13	1.5	NA	NA
Oil and Grease	0.4	0.7	0.4 U		5	5	NA	NA	NA
Solids, Total Dissolved	141	240	250		282	286	NA	NA	NA
Specific Conductance (micromhos/cm)	265	265	310		340	365	NA	NA	NA
Turbidity (NTU)	10	1.3	6.8		NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1 U	1 U	1 U		0.39	0.39	0.7	7	7
1,1-Dichloroethane	4.2	1.5	1.6		4.92	4.98	85	NA	NA
1,1,1-Trichloroethane	1 U	1 U	1 U		0.2	0.2	40	200	200
Trichloroethene	1 U	0.2 J	0.3 J		0.27	0.34	0.5	5	0
Benzene	1 U	1 U	1 U		0.79	0.8	0.5	5	0
1,1,2,2-Tetrachloroethylene	0.5 U	0.5 U	0.5 U		0.29	0.29	0.5	5	0
Toluene	1 U	0.1 J	1 U		0.07	0.07	68.6	1,000	1,000
Ethylbenzene	1 U	1 U	1 U		0.81	0.83	140	700	700
Total Xylenes	1 U	0.2 J	1 U		1.06	1.14	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5 U	5 U	5 U		2	2	5	50	50
Barium, Dissolved	1390	1340	1530		2150	2180	400	2,000	2,000
Iron, Dissolved	100 U	114	123		36	63	150	NA	NA
Lead, Dissolved	1.5 U	2.2	1.5 U		0.97	0.97	1.5	15	0
Manganese, Dissolved	2790	2420	2860		4747	4800	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	MW08S	MW08S ¹	MW08S	MW08S					
Date of Sample Collection:	3/27/96	7/9/96	10/2/96						
Laboratory Sample Identification:	96ZC06004	96ZC07004	97ZC05003						
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.14	7.7	6.65		7.00	7.18	NA	NA	NA
Alkalinity	188	170	170		190	205	NA	NA	NA
Carbon, Total Organic	1.3	1.35	1.9		4	5	NA	NA	NA
Chemical Oxygen Demand	5 U	5 U	5 U		12	19	NA	NA	NA
Chloride	5 U	14.5	12		7	9	125	NA	NA
Color (CU)	40	1 U	10		30	50	7.5	NA	NA
Hardness	290	265	260		163	167	NA	NA	NA
Odor (TON)	1.4	1 U	1 U		7	17	1.5	NA	NA
Oil and Grease	2.1	1.65	0.4 U		5	5	NA	NA	NA
Solids, Total Dissolved	126	225	240		199	213	NA	NA	NA
Specific Conductance (micromhos/cm)	180	305	290		283	300	NA	NA	NA
Turbidity (NTU)	31	12.9	13		NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1 U	1 U	1 U		0.39	0.39	0.7	7	7
1,1-Dichloroethane	1 U	1 U	1 U		1	1	85	NA	NA
1,1,1-Trichloroethane	1 U	1 U	1 U		0.2	0.2	40	200	200
Trichloroethene	1 U	1 U	1 U		0.05	0.05	0.5	5	0
Benzene	1 U	1 U	1 U		0.36	0.49	0.5	5	0
1,1,2,2-Tetrachloroethylene	0.5 U	0.5 U	0.5 U		0.29	0.29	0.5	5	0
Toluene	1 U	1 U	0.1 J		0.1	0.11	68.6	1,000	1,000
Ethylbenzene	1 U	1 U	1 U		0.30	0.44	140	700	700
Total Xylenes	1 U	1 U	1 U		0.09	0.10	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5 U	5 U	5 U		3	3	5	50	50
Barium, Dissolved	200 U	200 U	260		268	281	400	2,000	2,000
Iron, Dissolved	858	100 U	693		2467	2750	150	NA	NA
Lead, Dissolved	1.5 U	1.55	1.5 U		0.97	0.97	1.5	15	0
Manganese, Dissolved	3540	1355	3650		5247	5380	25	NA	NA

NA Not applicable NS Not sampled (1) Average of sample & field duplicate results

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	MW08M	MW08M	MW08M	MW08M					
Date of Sample Collection:	3/28/96	7/9/96	10/2/96						
Laboratory Sample Identification:	96ZC06005	96ZC07006	97ZC05005						
Quarter Number:	1	2	3	4					
					Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.77	7.8	6.88		7.45	7.50	NA	NA	NA
Alkalinity	165	160	160		251	253	NA	NA	NA
Carbon, Total Organic	2.9	2.3	3.8		4	4	NA	NA	NA
Chemical Oxygen Demand	5 U	6	5 U		9	10	NA	NA	NA
Chloride	5 U	5 U	5 U		7	7	125	NA	NA
Color (CU)	150	1 U	10		4	5	7.5	NA	NA
Hardness	220	170	170		241	243	NA	NA	NA
Odor (TON)	1 U	1 U	1 U		1	1	1.5	NA	NA
Oil and Grease	0.4 U	3.8	0.4 U		5	5	NA	NA	NA
Solids, Total Dissolved	107	120	200		241	244	NA	NA	NA
Specific Conductance (micromhos/cm)	220	228	236		340	350	NA	NA	NA
Turbidity (NTU)	81	3.5	12		NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1 U	1 U	1 U		0.39	0.39	0.7	7	7
1,1-Dichloroethane	1 U	1 U	1 U		0.76	0.91	85	NA	NA
1,1,1-Trichloroethane	1 U	1 U	1 U		0.2	0.2	40	200	200
Trichloroethene	1 U	0.4 J	1 U		0.49	0.58	0.5	5	0
Benzene	1 U	1 U	1 U		0.35	0.4	0.5	5	0
1,1,2,2-Tetrachloroethylene	0.5 U	0.5 U	0.5 U		0.29	0.29	0.5	5	0
Toluene	1 U	1 U	0.1 J		0.06	0.07	68.6	1,000	1,000
Ethylbenzene	1 U	1 U	1 U		0.04	0.04	140	700	700
Total Xylenes	1 U	1 U	1 U		0.06	0.06	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5 U	5 U	5 U		2	2	5	50	50
Barium, Dissolved	427	399	434		461	475	400	2,000	2,000
Iron, Dissolved	100 U	100 U	100 U		41	64	150	NA	NA
Lead, Dissolved	1.5 U	1.5 U	1.5 U		0.97	0.97	1.5	15	0
Manganese, Dissolved	1710	816	1760		2757	2810	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification: MW12S (1)		MW12S		MW12S		MW12S		Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection: 3/27/96		7/9/96		10/2/96		MW12S						
Laboratory Sample Identification: 96ZC06006		96ZC07007		97ZC05002								
Quarter Number: 1		2		3		4						
Wet Chemistry (mg/L)												
pH	7.53		7.75		6.88			7.67	7.73	NA	NA	NA
Alkalinity	165		170		180			109	109	NA	NA	NA
Carbon, Total Organic	1.4		1.4		1.4			1	2	NA	NA	NA
Chemical Oxygen Demand	5	U	5	U	5	U		5	5	NA	NA	NA
Chloride	8.4		17		31			2	2	125	NA	NA
Color (CU)	175		1	U	15			1	1	7.5	NA	NA
Hardness	255		220		280			112	112	NA	NA	NA
Odor (TON)	1	U	1	U	1	U		0.33	1	1.5	NA	NA
Oil and Grease	0.4	U	2.7		0.4	U		5	5	NA	NA	NA
Solids, Total Dissolved	164		180		300			130	148	NA	NA	NA
Specific Conductance (micromhos/cm)	230		285		380			150	150	NA	NA	NA
Turbidity (NTU)	139		2.6		74			NA	NA	NA	NA	NA
VOCs (µg/L)												
1,1-Dichloroethene	1	U	1	U	1	U		0.39	0.39	0.7	7	7
1,1-Dichloroethane	1	U	1	U	1	U		0.36	0.36	85	NA	NA
1,1,1-Trichloroethane	1	U	1	U	1	U		0.23	0.28	40	200	200
Trichloroethene	1	U	1	U	1	U		0.05	0.05	0.5	5	0
Benzene	1	U	1	U	1	U		0.08	0.08	0.5	5	0
1,1,2,2-Tetrachloroethylene	0.5	U	0.5	U	0.5	U		0.29	0.29	0.5	5	0
Toluene	1	U	1	U	1	U		0.07	0.07	68.6	1,000	1,000
Ethylbenzene	1	U	1	U	1	U		0.04	0.04	140	700	700
Total Xylenes	1	U	1	U	1	U		0.06	0.06	124	10,000	10,000
Inorganic Analytes (µg/L)												
Arsenic, Dissolved	5	U	5	U	5	U		2	2	5	50	50
Barium, Dissolved	200	U	200	U	200	U		8	9	400	2,000	2,000
Iron, Dissolved	100	U	100	U	100	U		29	54	150	NA	NA
Lead, Dissolved	1.5	U	2.1		1.5	U		0.97	0.97	1.5	15	0
Manganese, Dissolved	10	U	10	U	10	U		0.86	1	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	MW14S	MW14S	MW14S	MW14S					
Date of Sample Collection:	3/28/96	7/11/96	10/2/96						
Laboratory Sample Identification:	96ZC06007	96ZC07008	97ZC05014						
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	7.11	7.05	6.4		6.85	7.20	NA	NA	NA
Alkalinity	100	100	79		148	150	NA	NA	NA
Carbon, Total Organic	6.9	5	5.4		8	9	NA	NA	NA
Chemical Oxygen Demand	5 U	10	10		27	32	NA	NA	NA
Chloride	5 U	7.2	8.2		6	6	125	NA	NA
Color (CU)	200	1 U	10		23	30	7.5	NA	NA
Hardness	135	120	250		122	129	NA	NA	NA
Odor (TON)	1	6	6		14	16	1.5	NA	NA
Oil and Grease	3.3	1.4	1.2		5	5	NA	NA	NA
Solids, Total Dissolved	114	32	240		197	215	NA	NA	NA
Specific Conductance (micromhos/cm)	170	200	295		256	260	NA	NA	NA
Turbidity (NTU)	82	6.3	150		NA	NA	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	1 U	1 U	1 U		0.39	0.39	0.7	7	7
1,1-Dichloroethane	1 U	1 U	1 U		0.36	0.36	85	NA	NA
1,1,1-Trichloroethane	1 U	1 U	1 U		0.2	0.2	40	200	200
Trichloroethene	1 U	1 U	1 U		0.07	0.08	0.5	5	0
Benzene	1 U	1 U	1 U		0.06	0.08	0.5	5	0
1,1,2,2-Tetrachloroethylene	0.5 U	0.5 U	0.5 U		0.29	0.29	0.5	5	0
Toluene	1 U	0.1 J	0.2 J		0.17	0.24	68.6	1,000	1,000
Ethylbenzene	1 U	0.6 J	0.8 J		0.03	0.04	140	700	700
Total Xylenes	1 U	1.7	2.5		1.42	2.63	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5 U	6.1	5 U		2	2	5	50	50
Barium, Dissolved	200 U	200 U	223		100	103	400	2,000	2,000
Iron, Dissolved	1140	3540	15500		6850	7800	150	NA	NA
Lead, Dissolved	1.5 U	1.5 U	1.5 U		0.97	0.97	1.5	15	0
Manganese, Dissolved	797	1830	4870		1647	1750	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	EW1		EW1		EW1		EW1		Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection:	3/27/96		7/11/96		10/2/96								
Laboratory Sample Identification:	96ZC06008		96ZC07009		97ZC05009								
Quarter Number:	1	2	3	4									
Wet Chemistry (mg/L)													
pH	7.24		7.98		6.61				NS	NS	NA	NA	NA
Alkalinity	190		200		180				NS	NS	NA	NA	NA
Carbon, Total Organic	2.6		1.8		2				NS	NS	NA	NA	NA
Chemical Oxygen Demand	5	U	6		5	U			NS	NS	NA	NA	NA
Chloride	8.9		12		10				NS	NS	125	NA	NA
Color (CU)	150		25		40				NS	NS	7.5	NA	NA
Hardness	210		190		200				NS	NS	NA	NA	NA
Odor (TON)	1		1	U	2				NS	NS	1.5	NA	NA
Oil and Grease	3		1		0.4	U			NS	NS	NA	NA	NA
Solids, Total Dissolved	176		48		230				NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	205		280		280				NS	NS	NA	NA	NA
Turbidity (NTU)	62		37		26				NS	NS	NA	NA	NA
VOCs (µg/L)													
1,1-Dichloroethene	1	U	1	U	1	U			NS	NS	0.7	7	7
1,1-Dichloroethane	1	U	1	U	1	U			NS	NS	85	NA	NA
1,1,1-Trichloroethane	1	U	1	U	1	U			NS	NS	40	200	200
Trichloroethene	1	U	1	U	1	U			NS	NS	0.5	5	0
Benzene	1	U	1	U	1	U			NS	NS	0.5	5	0
1,1,2,2-Tetrachloroethylene	0.5	U	0.5	U	0.5	U			NS	NS	0.5	5	0
Toluene	28.6	E	14		1.6				NS	NS	68.6	1,000	1,000
Ethylbenzene	3.8		3.2		1.4				NS	NS	140	700	700
Total Xylenes	27.6		24		6.6				NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)													
Arsenic, Dissolved	5	U	5	U	5	U			NS	NS	5	50	50
Barium, Dissolved	513		520		490				NS	NS	400	2,000	2,000
Iron, Dissolved	1520		2820		355				NS	NS	150	NA	NA
Lead, Dissolved	1.5	U	1.5	U	1.5	U			NS	NS	1.5	15	0
Manganese, Dissolved	1510		1500		1420				NS	NS	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	EW2	EW2	EW2	EW2					
Date of Sample Collection:	NA	7/11/96	NA	NA					
Laboratory Sample Identification:	NA	96ZC07010	NA	NA					
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	NS	8.2	NS	NS	NS	NS	NA	NA	NA
Alkalinity	NS	200	NS	NS	NS	NS	NA	NA	NA
Carbon, Total Organic	NS	3.5	NS	NS	NS	NS	NA	NA	NA
Chemical Oxygen Demand	NS	6	NS	NS	NS	NS	NA	NA	NA
Chloride	NS	12	NS	NS	NS	NS	125	NA	NA
Color (CU)	NS	35	NS	NS	NS	NS	7.5	NA	NA
Hardness	NS	180	NS	NS	NS	NS	NA	NA	NA
Odor (TON)	NS	1.4	NS	NS	NS	NS	1.5	NA	NA
Oil and Grease	NS	2.8	NS	NS	NS	NS	NA	NA	NA
Solids, Total Dissolved	NS	160	NS	NS	NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	NS	320	NS	NS	NS	NS	NA	NA	NA
Turbidity (NTU)	NS	82	NS	NS	NS	NS	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	NS	1	U	NS	NS	NS	0.7	7	7
1,1-Dichloroethane	NS	1	U	NS	NS	NS	85	NA	NA
1,1,1-Trichloroethane	NS	0.2	J	NS	NS	NS	40	200	200
Trichloroethene	NS	1	U	NS	NS	NS	0.5	5	0
Benzene	NS	0.1	J	NS	NS	NS	0.5	5	0
1,1,2,2-Tetrachloroethylene	NS	0.5	U	NS	NS	NS	0.5	5	0
Toluene	NS	8.2	NS	NS	NS	NS	68.6	1,000	1,000
Ethylbenzene	NS	2.1	NS	NS	NS	NS	140	700	700
Total Xylenes	NS	31	NS	NS	NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	NS	7.2	NS	NS	NS	NS	5	50	50
Barium, Dissolved	NS	772	NS	NS	NS	NS	400	2,000	2,000
Iron, Dissolved	NS	6880	NS	NS	NS	NS	150	NA	NA
Lead, Dissolved	NS	2.5	NS	NS	NS	NS	1.5	15	0
Manganese, Dissolved	NS	2200	NS	NS	NS	NS	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	EW3		EW3		EW3		EW3		Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection:	3/27/96		7/11/96		10/2/96								
Laboratory Sample Identification:	96ZC06009		96ZC07011		97ZC05011								
Quarter Number:	1	2	3	4									
Wet Chemistry (mg/L)													
pH	7.12	8.0	6.78						NS	NS	NA	NA	NA
Alkalinity	180	200	170						NS	NS	NA	NA	NA
Carbon, Total Organic	5.6	4.4	4.5						NS	NS	NA	NA	NA
Chemical Oxygen Demand	5	U	14	5	U				NS	NS	NA	NA	NA
Chloride	12	11	11						NS	NS	125	NA	NA
Color (CU)	350	120	110						NS	NS	7.5	NA	NA
Hardness	170	160	170						NS	NS	NA	NA	NA
Odor (TON)	2	1	U	3					NS	NS	1.5	NA	NA
Oil and Grease	2.6	0.4	U	0.5					NS	NS	NA	NA	NA
Solids, Total Dissolved	152	76	210						NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	165	290	295						NS	NS	NA	NA	NA
Turbidity (NTU)	150	88	69						NS	NS	NA	NA	NA
VOCs (µg/L)													
1,1-Dichloroethene	1	U	1	U	2.5	U			NS	NS	0.7	7	7
1,1-Dichloroethane	1	U	0.6	J	0.8	J			NS	NS	85	NA	NA
1,1,1-Trichloroethane	1	U	1	U	2.5	U			NS	NS	40	200	200
Trichloroethene	1	U	1	U	2.5	U			NS	NS	0.5	5	0
Benzene	1	U	0.3	J	0.2	J			NS	NS	0.5	5	0
1,1,2,2-Tetrachloroethylene	0.5	U	0.5	U	1.2	U			NS	NS	0.5	5	0
Toluene	39.1	E	26		1.5				NS	NS	68.6	1,000	1,000
Ethylbenzene	3.5		2.3		2.5	U			NS	NS	140	700	700
Total Xylenes	54.3	E	43		26.5				NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)													
Arsenic, Dissolved	14.6		6.5		13.8				NS	NS	5	50	50
Barium, Dissolved	872		759		805				NS	NS	400	2,000	2,000
Iron, Dissolved	7350		3510		7140				NS	NS	150	NA	NA
Lead, Dissolved	1.5	U	1.8		1.5	U			NS	NS	1.5	15	0
Manganese, Dissolved	2280		2230		2300				NS	NS	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	EW4	EW4	EW4	EW4					
Date of Sample Collection:	NA	7/11/96	NA	NA					
Laboratory Sample Identification:	NA	96ZC07012	NA	NA					
Quarter Number:	1	2	3	4	Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Wet Chemistry (mg/L)									
pH	NS	7.84	NS	NS	NS	NS	NA	NA	NA
Alkalinity	NS	140	NS	NS	NS	NS	NA	NA	NA
Carbon, Total Organic	NS	4	NS	NS	NS	NS	NA	NA	NA
Chemical Oxygen Demand	NS	14	NS	NS	NS	NS	NA	NA	NA
Chloride	NS	11	NS	NS	NS	NS	125	NA	NA
Color (CU)	NS	25	NS	NS	NS	NS	7.5	NA	NA
Hardness	NS	140	NS	NS	NS	NS	NA	NA	NA
Odor (TON)	NS	1.4	NS	NS	NS	NS	1.5	NA	NA
Oil and Grease	NS	1.1	NS	NS	NS	NS	NA	NA	NA
Solids, Total Dissolved	NS	84	NS	NS	NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	NS	230	NS	NS	NS	NS	NA	NA	NA
Turbidity (NTU)	NS	80	NS	NS	NS	NS	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	NS	1	U	NS	NS	NS	0.7	7	7
1,1-Dichloroethane	NS	1	U	NS	NS	NS	85	NA	NA
1,1,1-Trichloroethane	NS	1	U	NS	NS	NS	40	200	200
Trichloroethene	NS	0.2	J	NS	NS	NS	0.5	5	0
Benzene	NS	0.2	J	NS	NS	NS	0.5	5	0
1,1,2,2-Tetrachloroethylene	NS	0.5	U	NS	NS	NS	0.5	5	0
Toluene	NS	88	NS	NS	NS	NS	68.6	1,000	1,000
Ethylbenzene	NS	4.6	NS	NS	NS	NS	140	700	700
Total Xylenes	NS	51	NS	NS	NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	NS	5.5	NS	NS	NS	NS	5	50	50
Barium, Dissolved	NS	560	NS	NS	NS	NS	400	2,000	2,000
Iron, Dissolved	NS	4940	NS	NS	NS	NS	150	NA	NA
Lead, Dissolved	NS	2.4	NS	NS	NS	NS	1.5	15	0
Manganese, Dissolved	NS	1940	NS	NS	NS	NS	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	EW5		EW5		EW5		EW5		Baseline Avg Conc	Baseline Max Conc	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection:	3/27/96		7/11/96		10/2/96								
Laboratory Sample Identification:	96ZC06010		96ZC07013		97ZC05012								
Quarter Number:	1		2		3		4						
Wet Chemistry (mg/L)													
pH	7.58		8.19		7.06				NS	NS	NA	NA	NA
Alkalinity	118		160		120				NS	NS	NA	NA	NA
Carbon, Total Organic	4.9		4.5		4.6				NS	NS	NA	NA	NA
Chemical Oxygen Demand	5	U	6		5	U			NS	NS	NA	NA	NA
Chloride	6.7		7.9		7.7				NS	NS	125	NA	NA
Color (CU)	30		40		10				NS	NS	7.5	NA	NA
Hardness	130		150		230				NS	NS	NA	NA	NA
Odor (TON)	1	U	1	U	1	U			NS	NS	1.5	NA	NA
Oil and Grease	4		3.1		0.4	U			NS	NS	NA	NA	NA
Solids, Total Dissolved	110		150		160				NS	NS	NA	NA	NA
Specific Conductance (micromhos/cm)	190		180		195				NS	NS	NA	NA	NA
Turbidity (NTU)	6.9		140		3				NS	NS	NA	NA	NA
VOCs (µg/L)													
1,1-Dichloroethene	1	U	1	U	1	U			NS	NS	0.7	7	7
1,1-Dichloroethane	1	U	1	U	1	U			NS	NS	85	NA	NA
1,1,1-Trichloroethane	1	U	1	U	1	U			NS	NS	40	200	200
Trichloroethene	1	U	1	U	1	U			NS	NS	0.5	5	0
Benzene	1	U	1	U	1	U			NS	NS	0.5	5	0
1,1,2,2-Tetrachloroethylene	0.5	U	0.5	U	0.5	U			NS	NS	0.5	5	0
Toluene	3.1		5.1		1	U			NS	NS	68.6	1,000	1,000
Ethylbenzene	1	U	0.6	J	1	U			NS	NS	140	700	700
Total Xylenes	6.7		6.6		1	U			NS	NS	124	10,000	10,000
Inorganic Analytes (µg/L)													
Arsenic, Dissolved	5	U	5	U	6.2				NS	NS	5	50	50
Barium, Dissolved	307		335		333				NS	NS	400	2,000	2,000
Iron, Dissolved	100	U	238		100	U			NS	NS	150	NA	NA
Lead, Dissolved	1.5	U	1.5	U	1.5	U			NS	NS	1.5	15	0
Manganese, Dissolved	961		971		959				NS	NS	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification:	HUBLEY		HUBLEY		HUBLEY		HUBLEY		Ave. '95 Conc.	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection:	3/28/95		7/11/96		10/2/96							
Laboratory Sample Identification:	96ZC06011		96ZC07016		97ZC05019							
Quarter Number:	1	2	3	4								
Wet Chemistry (mg/L)												
pH	7.99	8.5	7.12		7.3	NA	NA	NA				
Alkalinity	110	140	200		140.0	NA	NA	NA				
Carbon, Total Organic	4.4	5.1	5.4		6.0	NA	NA	NA				
Chemical Oxygen Demand	5 U	6	10		12.6	NA	NA	NA				
Chloride	7.5	6.4	8.1		6.5	125	NA	NA				
Color (CU)	1 U	1 U	30		23.8	7.5	NA	NA				
Hardness	160	100	120		170.0	NA	NA	NA				
Odor (TON)	1 U	1 U	1 U		1.0	1.5	NA	NA				
Oil and Grease	2.5	0.4 U	0.4		3.6	NA	NA	NA				
Solids, Total Dissolved	135	140	140		165.0	NA	NA	NA				
Specific Conductance (micromhos/cm)	150	170	165		216.0	NA	NA	NA				
Turbidity (NTU)	1	5.2	1 U		4.2	NA	NA	NA				
VOCs (µg/L)												
1,1-Dichloroethene	0.2 U	0.2 U	0.2 U		0.2 U	0.7	7	7				
1,1-Dichloroethane	0.1 U	0.1 U	0.1 U		0.1 U	85	NA	NA				
1,1,1-Trichloroethane	0.1 U	0.1 U	0.1 U		0.2 U	40	200	200				
Trichloroethene	0.1 U	0.1 U	0.1 U		0.3 U	0.5	5	0				
Benzene	0.5 U	0.5 U	0.5 U		0.4 U	0.5	5	0				
1,1,2,2-Tetrachloroethylene	0.1 U	0.1 U	0.1 U		0.1 U	0.5	5	0				
Toluene	0.5 U	0.5 U	0.5 U		0.5 U	68.6	1,000	1,000				
Ethylbenzene	0.1 U	0.1 U	0.1 U		0.2 U	140	700	700				
Total Xylenes	0.2 U	0.2 U	0.2 U		0.2 U	124	10,000	10,000				
Inorganic Analytes (µg/L)												
Arsenic, Dissolved	5 U	5 U	5 U		4.6 U	5	50	50				
Barium, Dissolved	200 U	200 U	200 U		180 U	400	2,000	2,000				
Iron, Dissolved	100 U	172	142		100 U	150	NA	NA				
Lead, Dissolved	1.5 U	1.5 U	1.5 U		2 U	1.5	15	0				
Manganese, Dissolved	303	342	322		378.0	25	NA	NA				

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

**Onalaska Municipal Landfill
Groundwater Monitoring Results**

Field Sample Identification: ACKERMAN		ACKERMAN	ACKERMAN	ACKERMAN	ACKERMAN	Ave. '95 Conc.	PAL Conc	MCL Conc	MCLG Conc
Date of Sample Collection:		NA	7/10/96	10/2/96	NA				
Laboratory Sample Identification:		NA	96ZC07017	97ZC05018	NA				
Quarter Number:		1	2	3	4				
Wet Chemistry (mg/L)									
pH	NS	7.81		6.88		7.7	NA	NA	NA
Alkalinity	NS	240		230		230 J	NA	NA	NA
Carbon, Total Organic	NS	0.9		1.3		0.6 J	NA	NA	NA
Chemical Oxygen Demand	NS	8		5	U	6.5 R	NA	NA	NA
Chloride	NS	7.5		8.8		8.5	125	NA	NA
Color (CU)	NS	10		10		65 J	7.5	NA	NA
Hardness	NS	230		240		202.5 J	NA	NA	NA
Odor (TON)	NS	1	U	1	U	1	1.5	NA	NA
Oil and Grease	NS	1.2		0.4	U	6.7	NA	NA	NA
Solids, Total Dissolved	NS	250		250		355	NA	NA	NA
Specific Conductance (micromhos/cm)	NS	360		340		207	NA	NA	NA
Turbidity (NTU)	NS	7.9		5.7		25 J	NA	NA	NA
VOCs (µg/L)									
1,1-Dichloroethene	NS	0.2	U	0.2	U	0.2 U	0.7	7	7
1,1-Dichloroethane	NS	0.1	U	0.1	U	0.1 U	85	NA	NA
1,1,1-Trichloroethane	NS	0.1	U	0.1	U	0.1 U	40	200	200
Trichloroethene	NS	0.1	U	0.1	U	0.125	0.5	5	0
Benzene	NS	0.5	U	0.5	U	0.5 U	0.5	5	0
1,1,2,2-Tetrachloroethylene	NS	0.1	U	0.1	U	0.1 U	0.5	5	0
Toluene	NS	0.5	U	0.5	U	0.5 U	68.6	1,000	1,000
Ethylbenzene	NS	0.1	U	0.1	U	0.1 U	140	700	700
Total Xylenes	NS	0.2	U	0.2	U	0.2 U	124	10,000	10,000
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	NS	5	U	5	U	5 U	5	50	50
Barium, Dissolved	NS	200	U	200	U	200 U	400	2,000	2,000
Iron, Dissolved	NS	380		100	U	448	150	NA	NA
Lead, Dissolved	NS	1.5	U	1.5	U	1.5 U	1.5	15	0
Manganese, Dissolved	NS	83.1		91.7		100	25	NA	NA

NA Not applicable NS Not sampled

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.

Results exceeding cleanup standards

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

Field Sample Identification:	MW12S	MW12Sdup	MW08S	MW08S	MW08S	MW08S	MW08S	EW-1	EW-1
Date of Sample Collection:	3/27/96	3/27/96	7/9/96	7/9/96	10/2/96	10/2/96	10/2/96	10/2/96	10/2/96
Laboratory Sample Identification:	96ZC06006	96ZC06006	96ZC07004	96ZC07005	97ZC05003	97ZC05003	97ZC05003	97ZC05009	97ZC05010
Quarter Number:	1	1	2	2	3	3	3	3	3
Wet Chemistry (mg/L)									
Alkalinity	165	165	170	170	170	170	170	180	180
Carbon, Total Organic	1.4	1.4	1.1	1.6	1.9	--	--	2	1.9
Chemical Oxygen Demand	5 U	5 U	5 U	6	5 U	5 U	5 U	5 U	8.4
Chloride	8.4	8.41	15	14	12	11.5	10	13	
Color (CU)	150	200	1 U	1 U	10	--	40	35	
Hardness	250	260	260	270	260	260	200	200	
Odor (TON)	1 U	1 U	1 U	1 U	1 U	--	2	3	
Oil and Grease	0.4 U	0.4 U	0.7	2.6	0.4 U	--	0.4 U	0.5	
Solids, Total Dissolved	164	164	230	220	240	240	230	240	
Turbidity (NTU)	140	138	24	1.8	13	13	26	26	
VOCs (µg/L)									
1,1-Dichloroethene	1 U	1 U	1 U	1 U	NS	NS	1 U	1 U	
1,1-Dichloroethane	1 U	1 U	1 U	1 U	NS	NS	1 U	1 U	
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	NS	NS	1 U	1 U	
Trichloroethene	1 U	1 U	1 U	0.2 J	NS	NS	1 U	1 U	
Benzene	1 U	1 U	1 U	1 U	NS	NS	1 U	1 U	
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	NS	NS	0.5 U	0.5 U	
Toluene	1 U	1 U	1 U	1 U	NS	NS	1.6	1.8	
Ethylbenzene	1 U	1 U	1 U	1 U	NS	NS	1.4	1.3	
Total Xylenes	1 U	1 U	1 U	1 U	NS	NS	6.6	6	
Inorganic Analytes (µg/L)									
Arsenic, Dissolved	5 U	5 U	5 U	5 U	NS	NS	5 U	5 U	
Barium, Dissolved	200 U	200 U	200 U	200 U	NS	NS	490	490	
Iron, Dissolved	100 U	100 U	100 U	100 U	NS	NS	355	405	
Lead, Dissolved	1.5 U	1.5 U	1.6	1.5 U	NS	NS	1.5 U	1.5 U	
Manganese, Dissolved	10 U	10 U	1150	1560	NS	NS	1420	1420	

NA Not applicable **NS** Not sampled **d** 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
Groundwater Monitoring Results - Blanks**

Field Sample Identification:	FB1	TB1	FB1	TB1	TB2	FB1	TB1							
Date of Sample Collection:	3/28/96	3/28/96	7/11/96	7/10/96	7/11/96	10/2/96	10/2/96							
Laboratory Sample Identification:	96ZC06012	96ZC06014	96ZC07018	96ZC07019	96ZC07019	97ZC05008	97ZC05004							
Quarter Number:	1	1	2	2	2	3	3	4						
Wet Chemistry (mg/L)														
Alkalinity	2	U	NA	2	U	NA	NA	2	U	NA				
Carbon, Total Organic	0.5	U	NA	0.5	U	NA	NA	0.5	U	NA				
Chemical Oxygen Demand	5	U	NA	5	U	NA	NA	5	U	NA				
Chloride	5	U	NA	5	U	NA	NA	5	U	NA				
Color (CU)	1	U	NA	1	U	NA	NA	10	U	NA				
Hardness	1	U	NA	1	U	NA	NA	1	U	NA				
Odor (TON)	1	U	NA	1	U	NA	NA	1	U	NA				
Oil and Grease	8.1		NA	3.7		NA	NA	0.4	U	NA				
Solids, Total Dissolved	20	U	NA	20	U	NA	NA	20	U	NA				
Turbidity (NTU)	1	U	NA	1	U	NA	NA	1	U	NA				
VOCs (µg/L)														
1,1-Dichloroethene	1	U	1	U	1	U	1	U	1	U	1	U		
1,1-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	U		
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U		
Trichloroethene	1	U	1	U	1	U	1	U	1	U	1	U		
Benzene	1	U	1	U	1	U	1	U	1	U	1	U		
1,1,2,2-Tetrachloroethane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
Toluene	1	U	1	U	0.1	J	0.2	J	0.2	J	0.1	J	1	U
Ethylbenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Total Xylenes	1	U	1	U	0.1	J	0.1	J	1	U	1	U	1	U
Inorganic Analytes (µg/L)														
Arsenic, Dissolved	5	U	NA	7		NA	NA	5	U	NA				
Barium, Dissolved	200	U	NA	200	U	NA	NA	200	U	NA				
Iron, Dissolved	100	U	NA	100	U	NA	NA	126		NA				
Lead, Dissolved	1.5	U	NA	1.7		NA	NA	1.5	U	NA				
Manganese, Dissolved	10	U	NA	10	U	NA	NA	10	U	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.														

**Onalaska Municipal Landfill
Groundwater Elevation Results**

1995 Quarter Number:									
	1	1	2	2	3	3	4	4	
Well	Well Rim Elevation	Depth to Water (ft)	Water Elevation	Depth to Water (ft)	Water Elevation	Depth to Water (ft)	Water Elevation	Depth to Water (ft)	Water Elevation
MW01S	663.22	18.55	644.67	20.93	642.29	20.59	642.63	20.36	642.86
MW06S	646.25	3.28	642.97	5.12	641.13	4.77	641.48	4.8	641.45
MW06M	648.20	5.11	643.09	6.94	641.26	6.63	641.57	6.66	641.54
MW08S	659.11	16.34	642.77	17.97	641.14	17.56	641.55	17.73	641.38
MW08M	659.07	16.3	642.77	17.72	641.35	17.64	641.43	17.71	641.36
MW12S	662.95	19.7	643.25	21.24	641.71	20.91	642.04	20.9	642.05
MW14S	654.32	10.93	643.39	13.04	641.28	12.74	641.58	12.68	641.64
PZ-01	654.73	11.62	643.11	13.59	641.14	13.32	641.41	13.38	641.35
PZ-02	649.76	Not inst.	Not inst.	Not meas.	Not meas.	7.81	641.95	7.84	641.92
PZ-03	647.10	4.04	643.06	5.94	641.16	5.58	641.52	Not meas.	Not meas.
PZ-04	647.43	Not meas.	Not meas.	6.25	641.18	5.91	641.52	Not meas.	Not meas.
PZ-05	660.23	Not inst.	Not inst.	19.14	641.09	18.68	641.55	18.66	641.57
PZ-06	659.08	Not inst.	Not inst.	17.87	641.21	17.51	641.57	Not meas.	Not meas.

1996 Quarter Number:									
	1	1	2	2	3	3	4	4	
	Date	3/27/96		7/10/96		10/1/96			
Well	Well Rim Elevation	Depth to Water (ft)	Water Elevation	Depth to Water (ft)	Water Elevation	Depth to Water (ft)	Water Elevation	Depth to Water (ft)	Water Elevation
MW01S	663.22	17.7	645.52	20.0	643.2	21.45	641.77		
MW 02S	664.88	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.		
MW02M	664.93	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.		
MW02D	665.07	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.		
MW04S	665.01	21.38	643.63	22.8	642.2	24.68	640.33		
MW05S	655.56	Not meas.	Not meas.	13.5	642.1	16.13	639.43		
MW06S	646.25	2.95	643.3	4.24	642.0	5.98	640.27		
MW06M	648.20	3.47	644.73	6.08	642.1	7.79	640.41		
MW08S	659.11	15.71	643.4	17.6	641.5	18.83	640.28		
MW08M	659.07	15.8	643.27	16.9	642.2	18.34	640.73		
MW08D	658.97	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.	Not meas.		
MW12S	662.95	19.16	643.79	20.3	642.7	22.1	640.85		
MW14S	654.32	10.28	644.04	12.24	642.1	13.7	640.62		
River Level	---	---	---	639.29	---	639.18	---		
AW-14	Not surv.	12.92	Not surv.	15.15	Not surv.	14.60	Not surv.		
AW-25	Not surv.	13.85	Not surv.	13.83	Not surv.	14.06	Not surv.		
AW-29	Not surv.	17.91	Not surv.	17.56	Not surv.	19.63	Not surv.		
PZ-01	654.73	10.94	643.79	12.98	641.8	14.31	640.42		
PZ-02	649.76	4.86	644.9	7.16	642.6	9.41	640.35		
PZ-03	647.10	Not meas.	Not meas.	5.08	642.0	6.8	640.30		
PZ-04	647.43	Not meas.	Not meas.	5.34	642.1	7.11	640.32		
PZ-05	660.23	Not meas.	Not meas.	18.2	642.0	20.01	640.22		
PZ-06	659.08	Not meas.	Not meas.	16.92	642.2	18.76	640.32		

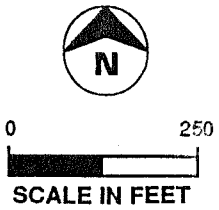
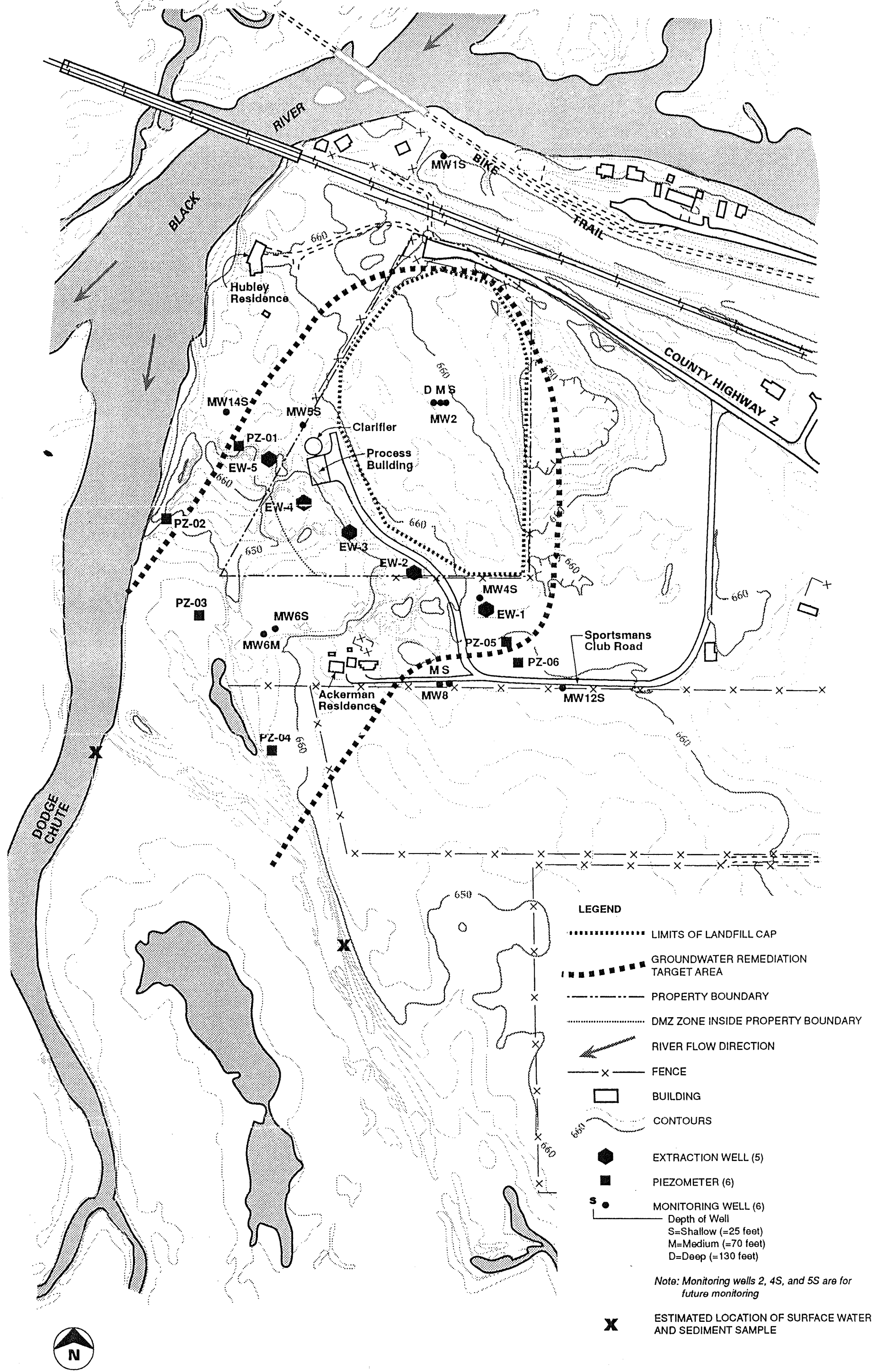


FIGURE 3
MONITORING WELL, EXTRACTION WELL,
AND PIEZOMETER NETWORK
 ONALASKA
 QAPP