August 16, 2004

Mr. Michael Schmoller
WDNR South Central Region
3911 Fish Hatchery Road
Fitchburg, WI 53711

SUBJECT: **Five-Year Groundwater Evaluation Report**
Stoughton City Landfill
FID #113005950
WDNR Purchase Order #NMA00000002
BT² Project #1764

Dear Mr. Schmoller:

In accordance with our proposal dated June 6, 2002, we are submitting the enclosed Five-Year Groundwater Evaluation Report for the Stoughton City Landfill. This report was prepared in accordance with the September 15, 2000 Quality Assurance Project Plan (QAPP) for the Stoughton City Landfill.

The purpose of the report is to evaluate groundwater quality five years after placement of the landfill cap (placed in 1998) and compare it to initial baseline groundwater quality. According to the QAPP, this evaluation will be repeated every five years until tetrahydrofuran (THF) and dichlorodifluoromethane (DCDFM) concentrations in groundwater fall below cleanup standards (i.e., NR 140 preventive action limits).

If you have any questions about the report, please call us at (608) 224-2830.

Sincerely,
BT², Inc.

Robert E. Langdon
Hydrogeologist

Leslie Busse, P.E.
Project Manager

Enclosure: Five-Year Groundwater Evaluation Report

cc: Mr. Bernard J. Schorle, USEPA Region V

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Environmental Engineering and Science

Five-Year Groundwater Evaluation Report
Stoughton City Landfill
Stoughton, Wisconsin

August 2004

Prepared For:

Wisconsin Department of Natural Resources
South Central Region
3911 Fish Hatchery Road
Fitchburg, Wisconsin 53711

Prepared By:

BT^2, Inc.
2830 Dairy Drive
Madison, Wisconsin 53718

Project #1764

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1.0 INTRODUCTION

The purpose of this report is to evaluate groundwater quality at the Stoughton City Landfill (**Figure 1**) five years after placement of the landfill cap and compare it to initial baseline groundwater quality. This report was prepared in accordance with the September 15, 2000 Quality Assurance Project Plan (QAPP) for the landfill (BT^2, Inc., 2000). According to the QAPP, groundwater quality will be evaluated every five years until tetrahydrofuran (THF) and dichlorodifluoromethane (DCDFM) concentrations in groundwater fall below cleanup standards (NR 140 preventive action limits (PALs)).

2.0 BACKGROUND

2.1 Initial characterization

The Remedial Design Data Collection Report (Roy F. Weston, 1995) for the landfill delineated the groundwater plume at the landfill into two disconnected plumes moving northwest from the landfill toward the Yahara River. Both plumes had NR 140 PAL exceedances for THF and DCDFM. Based on the United States Environmental Protection Agency (USEPA) record of decision (ROD) (USEPA, 1991) (**Appendix A**) and the Remedial Design Data Collection Report, PALs were identified as the applicable groundwater quality standards for the landfill.

2.2 Review of ROD Requirements

The ROD defines the USEPA's selected remedial alternative for the landfill. The selected remedial alternative includes the following components:

- Excavation and consolidation of saturated waste along the eastern boundary of the site (completed)
- Placement of an NR 504 solid waste cap over the landfill (completed)
- Fencing of the landfill (completed)
- Land use restrictions (completed)
- Long-term groundwater monitoring (ongoing)
- Groundwater extraction, treatment, and discharge to the Yahara River to achieve NR 140 groundwater quality standards (if required, see criteria below)

Three criteria were established in the ROD to determine whether or not the groundwater extraction and treatment portion of the remedy would be required:

1. Groundwater extraction and treatment will not be required if monitoring results are below PALs within the 12-month period following the effective date of the ROD.

2. Groundwater extraction and treatment will be initiated if there is attainment or exceedance of an enforcement standard (ES) within the 12-month period after the effective date of the ROD, unless it is determined that no PAL will be attained or exceeded at or beyond the edge of the NR 140 design management zone or the property boundary, whichever is closer to the waste boundary, ten years after the effective date of the ROD; and in the absence of groundwater extraction, the selected remedy will be protective of public health and the environment.

3. If a PAL is attained or exceeded but there is not attainment or exceedance of an ES within 12 months after the effective date of the ROD, groundwater extraction and treatment will not be required. However, if at any time monitoring reveals that State groundwater quality standards will not be met within ten years after the effective date of the ROD, unless additional action is taken, groundwater extraction and treatment will be initiated and continue until PALs are no longer attained or exceeded at any monitoring point at or beyond the waste boundary, or until an alternative concentration limit established pursuant to NR 140.28, is no longer attained or exceeded.

2.3 Baseline Groundwater Monitoring

The initial baseline groundwater monitoring samples collected by Roy F. Weston, Inc., in April 1998 were scheduled through the USEPA Contract Laboratory Program (CLP) for analysis of volatile organic compounds (VOCs), and target analyte list (TAL) metals (filtered and unfiltered). Due to this schedule, many of the VOC parameters were analyzed at detection limits above NR 140 standards. Additionally, there were problems with quality control for the baseline metals analyses, including field contamination, lab contamination, and possibly negative interferences (Wisconsin Department of Natural Resources (WDNR), 2000). Roy F. Weston's September 1998 baseline groundwater monitoring report is included in **Appendix B**.

Since August 2000, groundwater samples have been analyzed by a state-certified laboratory using detection limits consistent with NR 140 standards. Due to the problems with the initial baseline metals analyses a second baseline event for metals was performed in April 2001. A comparison of current versus

historical metals concentrations cannot be made because only one round of metals sampling has been performed since the change to a state-certified laboratory.

2.4 Current Groundwater Sampling Plan

Under the current sampling plan, groundwater sampling is performed at the following 28 landfill monitoring wells located along the western edge of the landfill: MW3S, MW3D, MW3B, MW4S, MW4D, MW5S, MW5D, MW7S, MW7I, MW7B, MW8S, MW8I, MW8B, MW9S, MW9I, MW9B, MW10S, MW10I, MW10D, MW13S, MW13I, MW13D, MW14S, MW14I, MW14D, MW15S, MW15I, and MW15D. The remaining wells, MW1S, MW1D, MW2D, MW2S, MW6S, MW6D, MW11S, MW11I, MW11D, MW12S, MW12I, and MW12D are not included in the current monitoring plan.

Eight rounds of groundwater monitoring have been performed between August 2000 and April 2004. In August 2000, monitoring wells were sampled for VOCs using EPA Method 8260B (including THF and DCDFM). Wells that showed VOC concentrations other than THF and DCDFM above PALs (MW9S, MW91, MW9B, MW10S, MW10I, MW14S, and MW14I) have been sampled for the full VOC list during subsequent monitoring events. Remaining wells have been sampled for only THF and DCDFM in subsequent events. In April 2001, all monitoring wells in the sampling plan were also sampled for TAL metals.

3.0 GROUNDWATER MONITORING RESULTS

3.1 Historical NR 140 VOC Exceedances

April 1998 baseline groundwater monitoring results indicated the presence of VOCs in groundwater at concentrations above NR 140 standards. The following VOC parameters were detected at concentrations above NR 140 standards at the indicated wells during baseline monitoring:

- Trichloroethylene (MW10I, MW14I)
- Tetrachloroethylene (MW10I, MW14I, MW14S)
- THF (MW3D, MW8I, MW9S, MW10I, MW13I, MW14S)

VOC groundwater monitoring results from April 1999 through April 2004 confirm that several other VOCs are also present in groundwater at concentrations exceeding NR 140 standards. Organic parameters including benzene, chloromethane, DCDFM, 1,2-dichloroethane, tetrachloroethylene, THF,

trichloroethylene, and vinyl chloride have been detected in groundwater at concentrations above NR 140 PALs. April 1998 baseline and April 1999 post-remedial groundwater monitoring results are included in **Appendix B**. August 2000 through April 2004 monitoring results are summarized in **Table 1**. NR 140 exceedances in groundwater for the last two years of monitoring (April 2002 through April 2004) are also summarized on **Figure 2**.

Dichloromethane has also been detected in many of the groundwater samples. However, it is consistently detected in quality control blank samples and therefore considered a sample contaminant. Refer to **Table 1** for a summary of dichloromethane concentrations and laboratory flags.

3.2 Historical NR 140 Metals Exceedances

The following metals have been detected in groundwater (April 2001) above NR 140 standards at the indicated wells:

- Antimony (MW3S, MW3D, MW7S)
- Arsenic (MW4D, MW7S, MW10S, MW13S, MW13D)
- Beryllium (MW3S, MW4S, MW5S, MW7S, MW10S, MW10D, MW13S, MW14S, MW15S)
- Cadmium (MW3S, MW4S, MW7S, MW8S, MW10S)
- Chromium (MW3S, MW4S, MW5S, MW7S, MW8I, MW8B, MW10S, MW10D, MW13S, MW14S)
- Cobalt (MW3S, MW4S, MW5S, MW7S, MW9I, MW10S, MW13S, MW14S)
- Lead (MW3S, MW4S, MW5S, MW7S, MW8S, MW10S, MW13S, MW14S, MW15S)
- Nickel (MW3S, MW5S, MW7S, MW8I, MW8B, MW10S, MW13S, MW14S, MW15I)
- Thallium (MW10I)
- Vanadium (MW3S, MW4S, MW5S, MW7S, MW10S, MW13S, MW14S)

Some of the NR 140 standard exceedances may be due to natural background, but some may be due to landfill effects. The landfill can potentially affect groundwater either by acting as a source of metals or by creating conditions that mobilize metals present in the native soil, such as an anaerobic reducing environment. The April 2001 metals baseline groundwater monitoring results are summarized in **Table 2**.

3.3 Current NR 140 VOC Exceedances

Groundwater monitoring results from the most recent groundwater monitoring event (April 2004) indicate that NR 140 exceedances exist for the following parameters and wells:

- Benzene (MW9S)
- THF (MW3D, MW9S)
- Tetrachloroethylene (MW10I, MW14I, MW14S)
- Trichloroethylene (MW9I, MW10I, MW14I, MW14S)
- Vinyl chloride (MW9I, MW10I, MW14I)

3.4 VOC Contaminant Trends

The Mann-Kendall Statistical Test was used to evaluate trends in groundwater VOC concentrations for wells with historical NR 140 exceedances. Mann-Kendall tables are included in **Appendix C**.

The following historically detected VOC parameters (at specified wells) were determined to be statistically stable or decreasing:

- DCDFM (MW9S, MW9I, MW10I, MW14S, MW14I)
- Tetrachloroethylene (MW10I, MW14S, MW14I)
- THF (MW3D, MW8I, MW9S, MW10I, MW13I)
- Trichloroethylene (MW9S, MW10I, MW14S, MW14I)
- Vinyl chloride (MW9I, MW10I)

The following parameters (at specified wells) were determined to be non-stable or exhibit an increasing trend:

- Benzene (MW9S) – increasing, but not detected above 1 microgram per liter (µg/l)
- Chloromethane (MW9I, MW9B) – non-stable, erratic concentrations, possible lab contaminant
- 1,2-Dichloroethane (MW9I) – non-stable, only detected once
- Trichloroethylene (MW9I) – increasing, but not detected above 1.4 µg/l
- THF (MW10S) – non-stable, only detected once above PAL (10 µg/l)
- Vinyl chloride (MW9I, MW14I) – appears to be increasing, but concentrations are below limit of quantitation, so trend cannot accurately be determined, maximum concentration in MW9I of 0.27 µg/l, maximum concentration in MW14I of 0.59 µg/l.

In general, the parameters that did not show stable or decreasing trends were detected at very low concentrations.

4.0 CONCLUSIONS

- DCDFM concentrations in groundwater have decreased over time to levels below NR 140 standards.

- Concentrations of THF and other VOCs including benzene, tetrachloroethylene, trichloroethylene, and vinyl chloride remain present in groundwater at concentrations above NR 140 standards.

- Mann-Kendall Statistical Test results suggest that VOC concentrations are stable or decreasing for most parameters at most wells. Some VOCs in downgradient well nests MW9, MW10, and MW14 exhibit either non-stable or increasing concentrations, but are generally at very low concentrations.

- Several metals were detected in groundwater samples from one or more wells at concentrations exceeding NR 140 standards. The metals concentrations may reflect natural background and/or landfill effects.

5.0 FUTURE MONITORING PROGRAM

A proposal for operation and maintenance services for the landfill was submitted to WDNR on May 7, 2004 (BT^2, 2004). According to the proposal, the following wells would be sampled in November 2004 and April 2005 for VOCs or for DCDFM and THF only:

MW3D*	MW4D*	MW5D*	MW7I*	MW8I*
MW9S**	MW9I**	MW9D**	MW10S**	MW10I**
MW13I*	MW14S**	MW14I**		

*Dichlorodifluoromethane (DCDFM) and Tetrahydrofuran (THF) only
** Full VOCs

According to the proposal, the following monitoring wells would not be sampled: MW3S, MW3B, MW4S, MW5S, MW7S, MW7B, MW8S, MW8B, MW10D, MW13S, MW13D, MW14D, MW15S, MW15I, and MW15D.

6.0 REFERENCES

BT^2, Inc., 2000, Draft Quality Assurance Project Plan and Health and Safety Plan and Operation and Maintenance, Stoughton City Landfill, September 15, 2000: Madison, WI.

BT^2, Inc., 2004, Proposal for Operation and Maintenance Services, Year 2004 – 2005, City of Stoughton Landfill, May 7, 2004: Madison, WI.

Roy F. Weston, 1995, Remedial Design Data Collection Report for Stoughton City Landfill, Stoughton, Wisconsin, June 1995.

Roy F. Weston, 1998, Groundwater Sampling Memorandum, Stoughton City Landfill, Stoughton, Wisconsin, September 25, 1998.

USEPA, 1991, EPA Superfund Record of Decision, Stoughton City Landfill, Stoughton, Wisconsin, September 30, 1991.

WDNR, 2000, Wisconsin Department of Natural Resources electronic mail from Paul Kozol of WDNR to Steven Smith of BT^2 re.: *Stoughton Data,* July 7, 2000.

TABLES

Table 1
Groundwater Monitoring Results - VOCs
Stoughton City Landfill / BT^2 Project #1764

Point Name	Sample Date	Dup	Primary VOCs		Other Detected VOCs																								
			Tetrahydrofuran (ug/l)	Dichlorodifluoromethane (ug/l)	1,1-Dichloroethane (ug/l)	1,1-Dichloroethylene (ug/l)	1,2,3-Trichloropropane (ug/l)	1,2,4-Trimethylbenzene (ug/l)	1,2-Dichloroethane (ug/l)	1,2-Dichloropropane (ug/l)	1,3,5-Trimethylbenzene (ug/l)	Benzene (ug/l)	Bromochloromethane (ug/l)	Bromodichloromethane (ug/l)	Butylbenzene, sec- (ug/l)	Chloroform (ug/l)	Chloromethane (ug/l)	cis-1,2-Dichloroethene (ug/l)	Dibromochloromethane (ug/l)	Dichloromethane (ug/l)	Ethylbenzene (ug/l)	Fluorotrichloromethane (ug/l)	Naphthalene (ug/l)	Tetrachloroethylene (ug/l)	Toluene (ug/l)	Tribromomethane (ug/l)	Trichloroethylene (ug/l)	Vinyl chloride (ug/l)	Xylenes (ug/l)
MW03B	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.33** JB	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002		**1.9** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		**1.9** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		**1.3** J	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW03D	8/28/2000		***65***	**3.6**	<0.25	<0.25	<0.25	**0.4**	<0.25	<0.25	**0.16** J	**0.21** J	<0.25	<0.25	<0.25	<0.25	<0.25	**0.26** J	<0.25	***0.53*** JB	<0.25	**0.25**	<0.25	<0.25	**0.47** B	<0.25	<0.25	<0.25	**0.67** J
	4/4/2001		***53***	<0.49	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2	<0.45	<0.18	<0.38	<0.23	<0.1	<0.87	<0.38	<0.58	<0.35	<0.63	<0.39	<0.14	<0.49	<0.46	<1.1
	11/20/2001		***70*** B	<0.25	<0.25	<0.25	<0.25	**1.2**	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***1*** B	**1**	<0.25	**0.51** J	<0.25	<0.1 B	<0.25	<0.25	<0.25	**1.4**
	4/22/2002		***100*** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		***61*** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		***88***	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		***48***	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003	Dup	***49***	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		***66***	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004	Dup	***67***	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW03S	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.33** JB	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<0.25 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		**2.1** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW04D	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	**0.32** J	<0.25	<0.25	**0.13** J	**0.2** J	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.31** JB	<0.25	<0.25	<0.25	<0.25	**0.26** JB	<0.25	<0.25	<0.25	**0.4** J
	4/4/2001		<1.9	<0.49	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2	<0.45	<0.18	<0.38	<0.23	<0.1	<0.87	<0.38	<0.58	<0.35	<0.63	<0.39	<0.14	<0.49	<0.46	<1.1
	11/20/2001		<1.9	<0.49	<0.25	<0.73	<0.28	**1.1**	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2 B	<0.45	<0.18	<0.38	<0.23	<0.1 B	***2.2*** JB	**0.83** J	<0.58	**0.58** J	<0.63	<0.39	<0.14 B	<0.49	<0.46	**1.6** J
	4/22/2002		**1.5** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		**2.3** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		**0.75** J	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		**1.1** J	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW04S	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25 B	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<0.25 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002		**0.84** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		**1.8** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002	Dup	<0.25 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 1
Groundwater Monitoring Results - VOCs
Stoughton City Landfill / BT^2 Project #1764

Point Name	Sample Date	Dup	Primary VOCs		Other Detected VOCs																								
			Tetrahydrofuran (ug/l)	Dichlorodifluoromethane (ug/l)	1,1-Dichloroethane (ug/l)	1,1-Dichloroethylene (ug/l)	1,2,3-Trichloropropane (ug/l)	1,2,4-Trimethylbenzene (ug/l)	1,2-Dichloroethane (ug/l)	1,2-Dichloropropane (ug/l)	1,3,5-Trimethylbenzene (ug/l)	Benzene (ug/l)	Bromochloromethane (ug/l)	Bromodichloromethane (ug/l)	Butylbenzene, sec- (ug/l)	Chloroform (ug/l)	Chloromethane (ug/l)	cis-1,2-Dichloroethene (ug/l)	Dibromochloromethane (ug/l)	Dichloromethane (ug/l)	Ethylbenzene (ug/l)	Fluorotrichloromethane (ug/l)	Naphthalene (ug/l)	Tetrachloroethylene (ug/l)	Toluene (ug/l)	Tribromomethane (ug/l)	Trichloroethylene (ug/l)	Vinyl chloride (ug/l)	Xylenes (ug/l)
MW05D	8/28/2000		3	10	<0.25	<0.25	<0.25	0.26 J	<0.25	<0.25	<0.1	0.23 J	<0.25	<0.25	<0.25	<0.25	<0.25	0.83	<0.25	*0.53* JB	<0.25	0.79 J	<0.25	0.35 J	0.14 JB	<0.25	0.48 J	<0.25	0.33 J
	4/4/2001		2.6 J	3.3	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2	<0.45	<0.18	<0.38	0.39 J	<0.1	<0.87	<0.38	<0.58	<0.35	<0.63	<0.39	<0.14	<0.49	<0.46	<1.1
	4/4/2001	Dup	2.2 J	3.2	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2	<0.45	<0.18	<0.38	0.41 J	<0.1	<0.87	<0.38	<0.58	<0.35	<0.63	<0.39	<0.14	<0.49	<0.46	<1.1
	11/20/2001		4 B	4.9	<0.25	<0.25	<0.25	1.1	<0.25	<0.25	<0.1	0.32 J	<0.25	<0.25	<0.25	<0.25	<0.25	0.75 J	<0.25	*1.9* B	0.81 J	<0.25	0.55 J	<0.25	<0.1	<0.25	0.42 J	<0.25	1.2
	11/20/2001	Dup	3.5 B	4.8	<0.25	<0.25	<0.25	1.1	<0.25	<0.25	<0.1	0.32 J	<0.25	<0.25	<0.25	<0.25	<0.25	0.74 J	<0.25	*1.9* B	0.8 J	<0.25	0.55 J	<0.25	<0.1	<0.25	0.42 J	<0.25	1.2
	4/22/2002		3.3 B	5.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002	Dup	3.4 B	5.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		3.5 B	5.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		1.2 J	4.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		1.7	4.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		2	3.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW05S	8/28/2000		<0.25	5.2	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.27 JB	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<0.25 B	0.47 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002		1.3 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		1.9 B	0.66 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW07B	11/20/2001		<1.9	<0.49	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2	<0.45	<0.18	<0.38	<0.23	<0.1	*2.2* JB	<0.38	<0.58	<0.35	<0.63	<0.39	<0.14	<0.49	<0.46	<1.1
	4/22/2002		1.7 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		2.3 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW07I	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/5/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002		1.6 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		3.4 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		1.2 J	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW07S	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.28 JB	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/5/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002		0.87 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		2.1 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW08B	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002		0.38 JB	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		0.97 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 1
Groundwater Monitoring Results - VOCs
Stoughton City Landfill / BT^2 Project #1764

Point Name	Sample Date	Dup	Primary VOCs		Other Detected VOCs																								
			Tetrahydrofuran (ug/l)	Dichlorodifluoromethane (ug/l)	1,1-Dichloroethane (ug/l)	1,1-Dichloroethylene (ug/l)	1,2,3-Trichloropropane (ug/l)	1,2,4-Trimethylbenzene (ug/l)	1,2-Dichloroethane (ug/l)	1,2-Dichloropropane (ug/l)	1,3,5-Trimethylbenzene (ug/l)	Benzene (ug/l)	Bromochloromethane (ug/l)	Bromodichloromethane (ug/l)	Butylbenzene, sec- (ug/l)	Chloroform (ug/l)	Chloromethane (ug/l)	cis-1,2-Dichloroethene (ug/l)	Dibromochloromethane (ug/l)	Dichloromethane (ug/l)	Ethylbenzene (ug/l)	Fluorotrichloromethane (ug/l)	Naphthalene (ug/l)	Tetrachloroethylene (ug/l)	Toluene (ug/l)	Tribromomethane (ug/l)	Trichloroethylene (ug/l)	Vinyl chloride (ug/l)	Xylenes (ug/l)
MW08I	8/28/2000		*19*	<0.25	<0.25	<0.25	<0.25	**0.15** J	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		**7.4**	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/4/2001	Dup	**7.6**	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		**5.5** J	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002		**3.7** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002	Dup	**3.8** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		**3.7** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		**2**	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		**1.9**	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		**1.3** J	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW08S	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/22/2002		<0.25 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2002		**2.2** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/20/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW09B	4/4/2001		<0.25	**6.1**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.32** JB	<0.25	**4.1**	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	11/20/2001		<0.25	**6.5**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	**0.41** J	<0.25	*1.9* B	<0.25	**4.7**	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/22/2002		<0.25 B	**4.9**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25 B	<0.25	<0.25	<0.25	<0.25	<0.25 B	*1.7* B	<0.25	**4.4**	<0.25	<0.25 B	<0.1	<0.25 B	<0.25	<0.25	<0.25
	11/19/2002		**2.2** B	**5.7**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25 B	*1.1*	**0.29** J	<0.25 B	*0.6* JB	<0.25	**3.7**	<0.25	<0.25	<0.1 B	<0.25 B	<0.25	<0.25	<0.25
	4/23/2003		<0.5	**4.9**	<0.5	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	<0.25	<0.5	<0.25 B	<0.25	<0.25 B	<0.25	<0.5	<0.25 B	<1 B	<0.5	**3.8**	<0.25	<0.5 B	**2.4** B	<0.25 B	<0.25	<0.5	**0.55** J
	11/18/2003		<0.5 B	**11**	<0.5	<0.5	<0.5	**1.2**	*3.2*	<0.5	**1.5**	<0.2	**0.66** J	<0.2 B	**0.36** J	<0.2 B	*3*	**0.6** J	<0.2 B	<1	**1.5** J	**7.2**	**0.41** J	<0.5 B	**0.76** B	<0.2 B	<0.2	<0.2	**5.9**
	4/20/2004		<0.5	**8.4**	<0.5	<0.5	<0.5	**0.26** J	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	**0.63** J	<0.2 B	<1	<0.5	**6.2**	<0.25	<0.5 B	**0.21** J	<0.2 B	<0.2	<0.2	**0.65** J
MW09I	8/28/2000		**5.3**	**190**	<0.25	<0.25	**0.65** J	**0.17** J	<0.25	<0.25	<0.1	**0.3** J	<0.25	<0.25	<0.25	<0.25	*82*	**2.1**	<0.25	**0.36** J	<0.25	**7.2**	<0.25	**0.25**	<0.1	<0.25	*0.98*	<0.25	<0.25
	4/4/2001		<0.25	**120**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	*1.4*	<0.25	**4.6**	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	11/20/2001		*12* B	**140**	<0.25	<0.25	**0.68** J	<0.1	<0.25	<0.25	<0.1	**0.33**	<0.25	<0.25	<0.25	<0.25	<0.25	**2.2**	<0.25	*1.9* B	<0.25	**5.7**	<0.25	**0.26** J	<0.1 B	<0.25	*1.1*	<0.25	<0.25
	4/22/2002		**7.9** B	**67**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	**0.3** J	<0.25	<0.25 B	<0.25	<0.25	<0.25	**1.6**	<0.25 B	*1.4* B	<0.25	**3.7**	<0.25	<0.25 B	<0.1	<0.25 B	*0.96*	<0.25	<0.25
	11/19/2002		**8.2** B	**130**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	**0.31** J	<0.25	<0.25	<0.25	<0.25 B	<0.25	**1.7**	<0.25 B	*1.8* B	<0.25	**4.6**	<0.25	<0.25	<0.1 B	<0.25 B	*0.95*	<0.25	<0.25
	4/23/2003		**7.8**	**100**	<0.5	<0.5	**0.57** J	<0.25	<0.5	<0.5	<0.25	**0.28** J	<0.5	<0.25 B	<0.25	<0.25 B	<0.25	**1.6** J	<0.25 B	<1 B	<0.5	**3.7**	<0.25	<0.5 B	**2.8** B	<0.25 B	*1.1*	<0.5	**0.68** J
	11/18/2003		**6.3** B	**150**	<0.5	<0.5	**0.66** J	**1**	*3.1*	<0.5	**1.3**	**0.39** J	**0.65** J	<0.2 B	**0.3** J	**0.23** JB	*44*	**0.88** J	<0.2 B	<1	**1.3** J	**4.4**	**0.31** J	<0.5 B	**0.64** JB	<0.2 B	*1.4*	*0.27* J	**5**
	4/20/2004		**6.6**	**96**	<0.5	<0.5	<0.5	**0.26** J	<0.5	<0.5	<0.2	**0.39** J	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	**1.6** J	<0.2 B	<1	<0.5	**3.6**	<0.25	<0.5 B	**0.27** JB	<0.2 B	*1.3*	*0.25* J	**0.68** J
MW09S	8/28/2000		*13*	*250*	<0.25	<0.25	**0.95**	<0.1	<0.25	<0.25	<0.1	*0.74*	<0.25	<0.25	<0.25	<0.25	<0.25	**0.95**	<0.25	**0.34** J	<0.25	**1.7**	<0.25	<0.25	<0.1	<0.25	*0.8* J	<0.25	<0.25
	4/4/2001		<0.25	**160**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	11/20/2001		*20* B	**170**	<0.25	<0.25	**- 1.1**	<0.1	<0.25	<0.25	<0.1	*0.59*	<0.25	<0.25	<0.25	<0.25	<0.25	**0.49** J	<0.25	*1.8* B	<0.25	**0.58** J	<0.25	<0.25	<0.1 B	<0.25	*0.54* J	<0.25	<0.25
	4/22/2002		*14* B	**91**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	*0.72*	<0.25	<0.25 B	<0.25	<0.25	<0.25	<0.25	<0.25 B	*1.5* B	<0.25	<0.25	<0.25	<0.25 B	<0.1	<0.25 B	<0.25	<0.25	<0.25
	11/19/2002		**4.4** B	**100**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25 B	<0.25	<0.25	<0.25 B	*0.65* JB	<0.25	<0.25	<0.25	<0.25	<0.1 B	<0.25 B	<0.25	<0.25	<0.25
	11/19/2002	Dup	**6.5** B	**96**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25 B	<0.25	<0.25	<0.25 B	*1* B	<0.25	<0.25	<0.25	<0.25	<0.1 B	<0.25 B	<0.25	<0.25	<0.25
	4/23/2003		*14*	**100**	<0.5	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	*0.79* J	<0.5	<0.25 B	<0.25	<0.25 B	<0.25	<0.5	<0.25 B	<1 B	<0.5	<0.5	<0.25	<0.5 B	<0.25 B	<0.25 B	**0.26** J	<0.5	<0.5
	4/23/2003	Dup	*15*	**110**	<0.5	<0.5	**- 0.6** J	<0.25	<0.5	<0.5	<0.25	*0.89*	<0.5	<0.25 B	<0.25	<0.25 B	<0.25	<0.5	<0.25 B	<1 B	<0.5	<0.5	<0.25	<0.5 B	<0.25 B	<0.25 B	**0.34** J	<0.5	<0.5
	11/18/2003		*11*	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	*0.83*	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	<0.5	<0.2 B	<1	<0.5	**0.6** J	<0.25	<0.5 B	<0.2 B	<0.2 B	*0.51* J	<0.2	<0.5
	11/18/2003	Dup	*11*	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	*0.79*	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	<0.5	<0.2 B	<1	<0.5	<0.5	<0.25	<0.5 B	<0.2 B	<0.2 B	**0.47** J	<0.2	<0.5
	4/20/2004		*11*	**130**	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	*0.98*	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	<0.5	<0.2 B	<1	<0.5	<0.5	<0.25	<0.5	**0.24** J	<0.2 B	**0.22** J	<0.2	<0.5
	4/20/2004	Dup	*11*	**140**	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	*0.98*	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	<0.5	<0.2 B	<1	<0.5	<0.5	<0.25	<0.5	<0.2	<0.2 B	**0.23** J	<0.2	<0.5

Table 1
Groundwater Monitoring Results - VOCs
Stoughton City Landfill / BT^2 Project #1764

Point Name	Sample Date	Dup	Primary VOCs		Other Detected VOCs																								
			Tetrahydrofuran (ug/l)	Dichlorodifluoromethane (ug/l)	1,1-Dichloroethane (ug/l)	1,1-Dichloroethylene (ug/l)	1,2,3-Trichloropropane (ug/l)	1,2,4-Trimethylbenzene (ug/l)	1,2-Dichloroethane (ug/l)	1,2-Dichloropropane (ug/l)	1,3,5-Trimethylbenzene (ug/l)	Benzene (ug/l)	Bromochloromethane (ug/l)	Bromodichloromethane (ug/l)	Butylbenzene, sec- (ug/l)	Chloroform (ug/l)	Chloromethane (ug/l)	cis-1,2-Dichloroethene (ug/l)	Dibromochloromethane (ug/l)	Dichloromethane (ug/l)	Ethylbenzene (ug/l)	Fluorotrichloromethane (ug/l)	Naphthalene (ug/l)	Tetrachloroethylene (ug/l)	Toluene (ug/l)	Tribromomethane (ug/l)	Trichloroethylene (ug/l)	Vinyl chloride (ug/l)	Xylenes (ug/l)
MW10D	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/21/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2002		<0.25 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2002		**3.1** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/21/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW10I	8/28/2000		**6.8**	**150**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	**1.8**	<0.25	***2.4*** B	<0.25	<0.25	<0.25	***1.8***	<0.1	<0.25	***1.3***	<0.25	<0.25
	4/4/2001		**5.1** J	**163** M	**0.64** J	<0.73	<0.28	<0.32	<0.2	**0.32** J	<0.33	<0.31	<0.32	<0.2	<0.45	<0.18	<0.38	**2.1**	<0.1	<0.87	<0.38	**1.4** J	<0.35	***2.5***	<0.39	<0.14	***1.5*** J	***1.1*** J	<1.1
	11/21/2001		**7**	**110**	**0.5** J	<0.73	**0.28**	<0.32	<0.2	**0.31** J	<0.33	<0.31	<0.32	<0.2 B	<0.45	<0.18	<0.38	**1.6**	<0.1 B	***2.1*** JB	<0.38	**1.3** J	<0.35	***2.1***	<0.39	<0.14 B	***1.4*** J	***0.62*** J	<1.1
	4/23/2002		**7.7** B	**110**	**0.65** J	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	**0.23** JB	<0.25	<0.25	<0.25	<0.25	<0.25	**1.7**	<0.25	<0.25 B	<0.25	<0.25	<0.25	***2.4*** B	<0.1 B	<0.25	***1.6***	***0.77*** J	<0.25 B
	4/23/2002	Dup	**7.5** B	**110**	**0.68** J	<0.25	<0.25	<0.1	<0.25	**0.33** J	<0.1	**0.22** JB	<0.25	<0.25 B	<0.25	<0.25	<0.25	**1.7**	<0.25 B	***0.51*** JB	<0.25	<0.25	<0.25	***2.4*** B	<0.1	<0.25 B	***1.6***	***0.86***	<0.25
	11/18/2002		***11*** B	**130**	**0.59** J	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	**1.7**	<0.25	***1.1*** B	<0.25	**1.1**	<0.25	***2.3***	<0.1	<0.25	***1.7***	***0.71*** J	<0.25
	4/24/2003		**5.5**	**91**	<0.5	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	<0.25	<0.5	<0.25	<0.25	<0.25	<0.25	**1.2** J	<0.25	<1 B	--	**0.66** J	<0.25 B	***1.7***	<0.25 B	<0.25	***1.2***	<0.5	<0.5
	11/19/2003		**5.7**	**79**	**0.58** J	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	**1.5** J	<0.2 B	<1	<0.5	<0.5	<0.25	***2.1*** B	<0.2	<0.2 B	***1.5***	***0.58*** J	<0.5
	4/21/2004		**5.1** B	**110**	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2	<0.25	<0.2	<0.2	**1.3** J	<0.2	<1	<0.5	**0.67** J	<0.25	***2.3***	<0.2	<0.2	***1.5***	***0.49*** J	<0.5
MW10S	8/28/2000		**3.5**	**20**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	**0.53** J	<0.25	**0.37** JB	<0.25	<0.25	<0.25	<0.25	**0.24** JB	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<1.9	**5.3**	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2	<0.45	<0.18	<0.38	<0.23	<0.1	<0.87	<0.38	<0.58	<0.35	<0.63	<0.39	<0.14	<0.49	<0.46	<1.1
	11/21/2001		<1.9	**4.9**	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2 B	<0.45	<0.18	<0.38	<0.23	<0.1 B	***1.4*** JB	<0.38	<0.58	<0.35	<0.63	<0.39	<0.14 B	<0.49	<0.46	<1.1
	4/23/2002		***20*** B	**0.47** J	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1 B	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25 B	<0.25	<0.25	<0.25	<0.25	<0.1 B	<0.25	<0.25	<0.25	<0.25 B
	11/18/2002		**3.5** B	**18**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	**0.38** J	<0.25	**0.36** JB	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/24/2003		**1.3** J	**3.6**	<0.5	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	<0.25	<0.5	<0.25	<0.25	<0.25	<0.25	<0.5	<0.25	<1 B	<0.5	<0.5	<0.25 B	<0.5	<0.25 B	<0.25	<0.25	<0.5	<0.5
	11/19/2003		<0.5	**1.6** J	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	<0.5	<0.2 B	<1	<0.5	<0.5	<0.25	<0.5 B	<0.2	<0.2 B	<0.2	<0.2	<0.5
	4/21/2004		<0.5	**0.79** J	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2	<0.25	<0.2	<0.2	<0.5	<0.2	<1	<0.5	<0.5	<0.25	<0.5	<0.2	<0.2	<0.2	<0.2	<0.5
MW13D	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.26** JB	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/21/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2002		**9.3** B	**0.61** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2002		**1.4** B	**0.32** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/21/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW13I	8/28/2000		***19***	**1.7**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		***22***	**2**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/21/2001		***22***	**0.78** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2002		**9.9** B	**0.8** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2002		***16*** B	**1.9**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003		**9.2**	**1** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003	Dup	**9.3**	**1.2** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2003		***17***	**1.4** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/21/2004		***15***	**1.2** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW13S	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	**0.1**	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.28** JB	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/21/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2002		<0.25 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2002		**4** B	**0.27** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 1
Groundwater Monitoring Results - VOCs
Stoughton City Landfill / BT^2 Project #1764

Point Name	Sample Date	Dup	Primary VOCs		Other Detected VOCs																							
			Tetrahydrofuran (ug/l)	Dichlorodifluoromethane (ug/l)	1,1-Dichloroethane (ug/l)	1,1-Dichloroethylene (ug/l)	1,2,3-Trichloropropane (ug/l)	1,2,4-Trimethylbenzene (ug/l)	1,2-Dichloroethane (ug/l)	1,2-Dichloropropane (ug/l)	1,3,5-Trimethylbenzene (ug/l)	Benzene (ug/l)	Bromochloromethane (ug/l)	Bromodichloromethane (ug/l)	Butylbenzene, sec- (ug/l)	Chloroform (ug/l)	Chloromethane (ug/l)	cis-1,2-Dichloroethene (ug/l)	Dibromochloromethane (ug/l)	Dichloromethane (ug/l)	Ethylbenzene (ug/l)	Fluorotrichloromethane (ug/l)	Naphthalene (ug/l)	Tetrachloroethylene (ug/l)	Toluene (ug/l)	Tribromomethane (ug/l)	Trichloroethylene (ug/l)	Vinyl chloride (ug/l)	Xylenes (ug/l)
MW13S (cont.)	11/19/2003	Dup	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/21/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/21/2004	Dup	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW14D	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	**0.11** J	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<0.25	**1.5**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/21/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/21/2001	Dup	<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2002		**0.47** JB	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2002		**3.7** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/21/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW14I	8/28/2000		<0.25	***250***	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***2.8*** B	<0.25	<0.25	<0.25	***1.3***	<0.1	<0.25	***3.4***	<0.25	<0.25
	4/4/2001		<0.25	**120**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25 B	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	***3.6***	<0.25	<0.25
	11/21/2001		<1.9	**140**	<0.25	<0.73	**2.2**	<0.32	<0.2	<0.29	<0.33	**0.31**	<0.32	<0.2 B	<0.45	<0.18	<0.38	**1.2**	<0.1 B	***1.1*** JB	<0.38	<0.58	<0.35	***2.2***	<0.39	<0.14 B	***3.6***	<0.46	<1.1
	4/23/2002		**2.4** B	**96**	<0.25	<0.25	<0.25	**1.1**	<0.25	<0.25	**0.28** J	**0.39** B	<0.25	<0.25	<0.25	<0.25	<0.25	**1.1**	<0.25	<0.25 B	**0.95**	<0.25	**0.27** J	***2.3*** B	**0.3** JB	<0.25	***3.6***	<0.25	**4.1** B
	11/20/2002		**3.5** B	**86**	<0.25	**0.34** J	**2**	<0.1 B	<0.25	<0.25	<0.1	**0.37**	<0.25	<0.25	<0.25	<0.25	<0.25	**1.3**	<0.25	***1.4*** B	<0.25	<0.25	<0.25	***2***	<0.1 B	<0.25	***3.7***	***0.59*** J	<0.25 B
	4/24/2003		**1.9**	**150**	<0.5	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	**0.31** J	<0.5	<0.25	<0.25	<0.25	<0.25	**0.8** J	<0.25	<1 B	<0.5	<0.5	<0.25 B	***2***	**5** B	<0.25	***2.6***	<0.5	**0.99** J
	11/19/2003		**1.3** J	**110**	<0.5	<0.5	<0.5	**1.3**	<0.5	<0.5	**0.33** J	**0.39** J	<0.5	<0.2 B	<0.25	**0.23** JB	<0.2	**0.79** J	<0.2 B	<1	**1.8**	<0.5	**0.47** J	***1.4*** JB	**1**	<0.2 B	***2.3***	***0.5*** J	**7**
	4/21/2004		**1** JB	**140**	<0.5	<0.5	<0.5	**0.28** J	<0.5	<0.5	<0.2	**0.38** J	<0.5	<0.2	<0.25	<0.2	<0.2	**0.64** J	<0.2	<1	<0.5	<0.5	<0.25	***1.8***	<0.2	<0.2	***2.5***	***0.32*** J	**0.95** J
MW14S	8/28/2000		<0.25	***330***	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***5.3*** B	<0.25	<0.25	<0.25	***5.2***	<0.1	<0.25	***4.4***	<0.25	<0.25
	8/28/2000	Dup	<0.25	***300***	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***5.2*** B	<0.25	<0.25	<0.25	***4.7***	<0.1	<0.25	***4.2***	<0.25	<0.25
	4/4/2001		<0.25	**180**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***5.1***	<0.1	<0.25	***4.1***	<0.25	<0.25
	11/21/2001		<1.9	**110**	<0.25	<0.73	**2**	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2 B	<0.45	<0.18	<0.38	**0.86**	<0.1 B	***1.2*** JB	<0.38	**2.2**	<0.35	***6.5***	<0.39	<0.14 B	***5.6***	<0.46	<1.1
	4/23/2002		<0.25 B	**98**	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25 B	<0.25	<0.25	<0.25	**0.52** J	<0.25 B	***1.7*** B	<0.25	<0.25	<0.25	***5*** B	<0.1	<0.25 B	***3.9***	<0.25	<0.25
	11/20/2002		**2.8** B	**160**	<0.25	<0.25	**2.4**	<0.1 B	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	**0.57** J	<0.25	**0.43** JB	<0.25	<0.25	<0.25	***6.2***	<0.1 B	<0.25	***4.1***	<0.25	<0.25 B
	11/20/2002	Dup	**3.1** B	**160**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003		**1.4** J	**170**	<0.5	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	<0.25	<0.5	<0.25	<0.25	<0.25	<0.25	<0.5	<0.25	<1 B	<0.5	<0.5	<0.25 B	***5.3***	<0.25 B	<0.25	***3.7***	<0.5	<0.5
	11/19/2003		<0.5	**78**	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	<0.5	<0.2 B	<1	<0.5	<0.5	<0.25	***4.2*** B	<0.2	<0.2 B	***2.7***	<0.2	<0.5
	4/21/2004		<0.5 B	**77**	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2	<0.25	<0.2	<0.2	<0.5	<0.2	<1	<0.5	<0.5	<0.25	***4.2***	<0.2	<0.2	***1.8***	<0.2	<0.5
MW15D	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	**0.16** J	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.2** JB	<0.25	<0.25	<0.25	<0.25
	4/5/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<0.25 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001	Dup	<1.9	<0.49	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2	<0.45	<0.18	<0.38	<0.23	<0.1	***1.9*** JB	<0.38	<0.58	<0.35	<0.63	<0.39	<0.14	<0.49	<0.46	<1.1
	4/23/2002		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2002		**3** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/21/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW15I	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	**0.15** J	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.13** JB	<0.25	<0.25	<0.25	<0.25
	8/28/2000	Dup	<0.25	<0.25	<0.25	<0.25	<0.25	**0.18** J	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.19** JB	<0.25	<0.25	<0.25	<0.25
	4/5/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/5/2001	Dup	<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<0.25 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2002		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2002		**3.6** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/21/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 1
Groundwater Monitoring Results - VOCs
Stoughton City Landfill / BT^2 Project #1764

Point Name	Sample Date	Dup	Primary VOCs		Other Detected VOCs																							
			Tetrahydrofuran (ug/l)	Dichlorodifluoromethane (ug/l)	1,1-Dichloroethane (ug/l)	1,1-Dichloroethylene (ug/l)	1,2,3-Trichloropropane (ug/l)	1,2,4-Trimethylbenzene (ug/l)	1,2-Dichloroethane (ug/l)	1,2-Dichloropropane (ug/l)	1,3,5-Trimethylbenzene (ug/l)	Benzene (ug/l)	Bromochloromethane (ug/l)	Bromodichloromethane (ug/l)	Butylbenzene, sec- (ug/l)	Chloroform (ug/l)	Chloromethane (ug/l)	cis-1,2-Dichloroethene (ug/l)	Dibromochloromethane (ug/l)	Dichloromethane (ug/l)	Ethylbenzene (ug/l)	Fluorotrichloromethane (ug/l)	Naphthalene (ug/l)	Tetrachloroethylene (ug/l)	Toluene (ug/l)	Tribromomethane (ug/l)	Trichloroethylene (ug/l)	Vinyl chloride (ug/l)	Xylenes (ug/l)
MW15S	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/5/2001		<0.25	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		**0.76** JB	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2002		<0.25 B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2002		**3.3** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/19/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/21/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rinsate Blank	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.3** JB	<0.25	<0.25	<0.25	<0.25	**0.25** JB	<0.25	<0.25	<0.25	<0.25
	8/28/2000	Dup	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.29** JB	<0.25	<0.25	<0.25	<0.25	**0.23** JB	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	**0.6** JB	<0.25	***0.64*** JB	<0.25	<0.25	**1.2** B	**0.3** JB	<0.25	<0.25	<0.25	***0.74*** JB	<0.1	***1.5*** B	<0.25	<0.25	<0.25
	4/5/2001		<1.9	<0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/20/2001		<1.9	<0.49	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	***0.28*** JB	<0.45	<0.18	<0.38	<0.23	**0.44** B	***3.2*** B	<0.38	<0.58	<0.35	<0.63	<0.39	**0.32** JB	<0.49	<0.46	<1.1
	11/21/2001		<1.9	<0.49	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	***0.27*** JB	<0.45	<0.18	<0.38	<0.23	**0.43** B	***0.99*** JB	<0.38	<0.58	<0.35	<0.63	<0.39	**0.32** JB	<0.49	<0.46	<1.1
	4/22/2002		**0.7** JB	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	***0.4*** JB	<0.25	<0.25	<0.25	<0.25	**1.1** B	<0.25 B	<0.25	<0.25	<0.25	***1*** B[e]	<0.1	***1.6*** B	<0.25	<0.25	<0.25
	4/23/2002		**0.52** JB	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	***0.37*** JB	<0.25	<0.25	<0.25	<0.25	**0.88** B	<0.25 B	<0.25	<0.25	<0.25	***1.4*** B	<0.1	***1.2*** B	<0.25	<0.25	<0.25
	11/19/2002		**2.6** B	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	**0.44** JB	<0.25	<0.25	**0.42** JB	***1.1*** B	<0.25	<0.25	<0.25	<0.25	<0.1 B	**0.27** JB	<0.25	<0.25	<0.25
	11/20/2002		**4.4** B	<0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/2003		<0.5	<0.5	<0.5	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	<0.25	<0.5	***0.75*** JB	<0.25	**0.54** JB	<0.25	<0.5	**1.6** B	<1 B	<0.5	<0.5	<0.25	***0.69*** JB	<0.25 B	***1.6*** B	<0.25	<0.5	<0.5
	4/24/2003		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/18/2003		<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	***0.8*** B[e]	<0.25	***0.77*** B	<0.2	<0.5	**1.5** B	<1	<0.5	<0.5	<0.25	***0.61*** JB	<0.2 B	***1.1*** B	<0.2	<0.2	<0.5
	11/19/2003	Dup	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	***0.78*** B[e]	<0.25	**0.37** JB	<0.2	<0.5	**1.4** B	<1	<0.5	<0.5	<0.25	***1.6*** JB	<0.2	***1.3*** B	<0.2	<0.2	<0.5
	4/20/2004		<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	***1.1*** B[e]	<0.25	***0.81*** B	<0.2	<0.5	**1.7** B	<1	<0.5	<0.5	<0.25	***0.75*** JB	<0.2	***1.8*** B	<0.2	<0.2	<0.5
	4/21/2004		<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trip Blank	8/28/2000		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***1.1*** B	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/4/2001		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25 B	<0.25	<0.25 B	<0.25	<0.25	<0.25 B	***1.5*** B	<0.25	<0.25	<0.25	<0.25 B	<0.1	<0.25 B	<0.25	<0.25	<0.25
	4/5/2001		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***0.97*** B	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	11/20/2001		**0.97** B	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***30*** JB[e]	<0.25	<0.25	<0.25	<0.25	**0.34** B	<0.25	<0.25	<0.25	<0.25
	11/21/2001		<1.9	<0.49	<0.25	<0.73	<0.28	<0.32	<0.2	<0.29	<0.33	<0.31	<0.32	<0.2	<0.45	<0.18	<0.38	<0.23	<0.1	***2*** JB	<0.38	<0.58	<0.35	<0.63	<0.39	<0.14	<0.49	<0.46	<1.1
	4/22/2002		<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25 B	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.25	<0.25
	4/23/2002		**2.5** B	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	**0.17** JB	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***23*** JB[e]	<0.25	<0.25	<0.25	<0.25	**0.52** B	<0.25	<0.25	<0.25	**0.42** JB
	11/19/2002		<0.25 B	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25 B	<0.25	<0.25	<0.25 B	**0.49** JB	<0.25	<0.25	<0.25	<0.25	**0.17** JB	<0.25 B	<0.25	<0.25	<0.25
	11/20/2002		<0.25 B	<0.25	<0.25	<0.25	<0.25	**0.13** JB	<0.25	<0.25	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	***2.6*** B	<0.25	<0.25	<0.25	<0.25	**0.49** B	<0.25	<0.25	<0.25	**0.34** JB
	4/23/2003		<0.5	<0.5	<0.5	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	<0.25	<0.5	<0.25 B	<0.25	<0.25 B	<0.25	<0.5	<0.25 B	***1.2*** JB	<0.5	<0.5	<0.25	<0.5 B	**0.61** JB	<0.25 B	<0.25	<0.5	<0.5
	4/24/2003		<0.5	<0.5	<0.5	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	<0.25	<0.5	<0.25	<0.25	<0.25	<0.25	<0.5	<0.25	***2.1*** JB	<0.5	<0.5	**0.26** JB	<0.5	**0.76** JB	<0.25	<0.25	<0.5	<0.5
	11/18/2003		<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	<0.5	<0.2 B	<1	<0.5	<0.5	<0.25	<0.5 B	**0.23** JB	<0.2 B	<0.2	<0.2	<0.5
	11/19/2003		<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	<0.5	<0.2 B	<1	<0.5	<0.5	<0.25	<0.5 B	<0.2	<0.2 B	<0.2	<0.2	<0.5
	4/20/2004		<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2 B	<0.25	<0.2 B	<0.2	<0.5	<0.2 B	<1	<0.5	<0.5	<0.25	<0.5 B	<0.2	<0.2 B	<0.2	<0.2	<0.5
	4/21/2004		<0.5 B	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.2	<0.25	<0.2	<0.2	<0.5	<0.2	<1	<0.5	<0.5	<0.25	<0.5	<0.2	<0.2	<0.2	<0.2	<0.5
NR 140 ES			50	1000	850	7	60	480	5	5	480	5	NE	0.6	NE	6	3	70	60	5	700	3490	40	5	1000	4.4	5	0.2	10000
NR 140 PAL			10	200	85	0.7	12	96	0.5	0.5	96	0.5	NE	0.06	NE	0.6	0.3	7	6	0.5	140	698	8	0.5	200	0.44	0.5	0.02	1000

ABBREVIATIONS:
-- = Not Analyzed NE = No Standard Established

NOTES:
Table shows only detected parameters.
Bold values indicate a detection
Bold Italic values exceed NR 140 preventive action limits (PAL)
Shaded values exceed NR 140 enforcement standards (ES)

LABORATORY NOTES:
J = Value less than the Limit of Quantitation (LOQ)
B = Detected in a quality control blank sample
M = Sample failed one or more laboratory quality control checks

Prepared By: MOB
Date: 6/28/04
Checked By: RL

I:\1764\Reports\5 Yr Eval.Report\[AllData_060623_tbl.xls]VOCs

Table 2
Groundwater Monitoring Results - Metals
Stoughton City Landfill / BT^2 Project #1764

Point Name	Sample Date	Dup	Metals																
			Antimony, total (ug/l Sb)	Arsenic, total (ug/l As)	Barium, total (ug/l Ba)	Beryllium, total (ug/l as Be)	Boron, total (mg/l as B)	Cadmium, total (ug/l as Cd)	Chromium, total (ug/l Cr)	Cobalt, total (ug/l Co)	Copper, total (ug/l Cu)	Lead, total (ug/l Pb)	Mercury, total (ug/l Hg)	Nickel, total (ug/l ni)	Selenium, total (ug/l as Se)	Silver, total (ug/l as Ag)	Thallium, total (ug/l Tl)	Vanadium, total (ug/l V)
MW03B	4/4/2001		<1.9	<1.8	30	<0.017	<0.017	<0.042	<3.4	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW03D	4/4/2001		2.6 J	<1.8	17	<0.017	0.017	<0.042	<3.4	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW03S	4/4/2001		3.1 J	<1.8	150	0.26	0.042 J	2.1	3.4	17	4.4 J	2.2 J	<0.056	26	<1.5	<1.3	<1.4	46
MW04D	4/4/2001		<1.9	7.7	43	<0.017	0.035 J	0.072 J	<3.4	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW04S	4/4/2001		<1.9	<1.8	95	0.13	0.02 J	1.5	14	12 J	23 J	2.5 J	<0.056	20	<1.5	<1.3	<1.4	16
MW05D	4/4/2001		<1.9	7.7	<0.017	0.05	<0.042	<3.4	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5	
MW05S	4/4/2001		<1.9	<1.8	230	0.24	0.035 J	0.44	52	54	100	2.2 J	<0.056	130	<1.5	<1.3	<1.4	71
MW07I	4/5/2001		<1.9	<1.8	25	<0.017 B	<0.017	0.058 J	<3.4	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW07S	4/5/2001		2.7 J	2.3 J	130	0.23 B	0.021 J	2.7	--	12 J	52	2.5 J	<0.056	71	<1.5	<1.3	<1.4	33
MW08B	4/4/2001		<1.9	<1.8	28	<0.017	0.017	<0.042	16	<3.6	<13	<1.2	<0.056	900	<1.5	<1.3	<1.4	<2.5
MW08I	4/4/2001		<1.9	<1.8	48	<0.017	0.02 J	<0.042	12	<3.6	25 J	<1.2	<0.056	29	<1.5	<1.3	<1.4	<2.5
MW08S	4/4/2001		<1.9	<1.8	21	<0.017	<0.017	5.7	3.7 J	<3.6	<13	2 J	<0.056	4.3 J	<1.5	<1.3	<1.4	<2.5
MW09B	4/4/2001		<1.9	<1.8	25	<0.017	<0.017	<0.042	4.4 J	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW09I	4/4/2001		<1.9	<1.8	42	<0.017	0.064	<0.042	<3.4	8.9 J	<13	<1.2	<0.056	3.6	<1.5	<1.3	<1.4	2.5
MW09S	4/4/2001		<1.9	<1.8	34	<0.017	0.12	0.35	10 J	5.6 J	<13	<1.2	0.062 J	3.4	<1.5	<1.3	<1.4	3.5 J
MW1D	4/4/2001		<1.9	<1.8	34	0.087	0.03 J	<0.042	3.5	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW10I	4/4/2001		<1.9	<1.8	31	<0.017	0.11	<0.042	<3.4	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	21.5 J	<2.5
MW10S	4/4/2001		<1.9	35.2	170	0.057 J	0.056	0.67	36	12 J	47	2.4 J	<0.056	25	<1.5	<1.3	<1.4	45
MW13D	4/4/2001		<1.9	8.2	23	<0.017	0.022 J	<0.042	<3.4	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW13I	4/4/2001		<1.9	<1.8	56	<0.017	0.018 J	<0.042	<3.4	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW13S	4/4/2001		<1.9	5.2 J	150	0.11	0.047 J	0.22	52	47	44 J	3 J	<0.056	39	<1.5	<1.3	<1.4	58
MW14D	4/4/2001		<1.9	<1.8	35	<0.017	0.024 J	<0.042	<3.4	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW14I	4/4/2001		<1.9	<1.8	60	<0.017	0.07	<0.042	<3.4	<3.6	<13	<1.2	<0.056	3.9 J	<1.5	<1.3	<1.4	<2.5
MW15D	4/5/2001		<1.9	<1.8	38	<0.017 B	<0.017	0.051 J	3.5 J	<3.6	<13	<1.2	<0.056	<3.6	<1.5	<1.3	<1.4	<2.5
MW15I	4/5/2001		<1.9	<1.8	27	<0.017 B	<0.017	0.06 J	3.4	<3.6	<13	<1.2	<0.056	4.4	<1.5	<1.3	<1.4	<2.5
MW15S	4/5/2001		<1.9	<1.8	52	0.056 JB	<0.017	5	9.4 J	<3.6	<13	1.8 J	<0.056	56 J	<1.5	<1.3	<1.4	3.2 J
NR 140 ES			6	10	2000	0.4	0.96	5	100	40	1300	15	2	100	50	50	2	30
NR 140 PAL			1.2	1	400	0.04	0.19	0.5	10	8	130	1.5	0.2	20	10	10	0.4	6

ABBREVIATIONS:
-- = Not Analyzed NE = No Standard Established

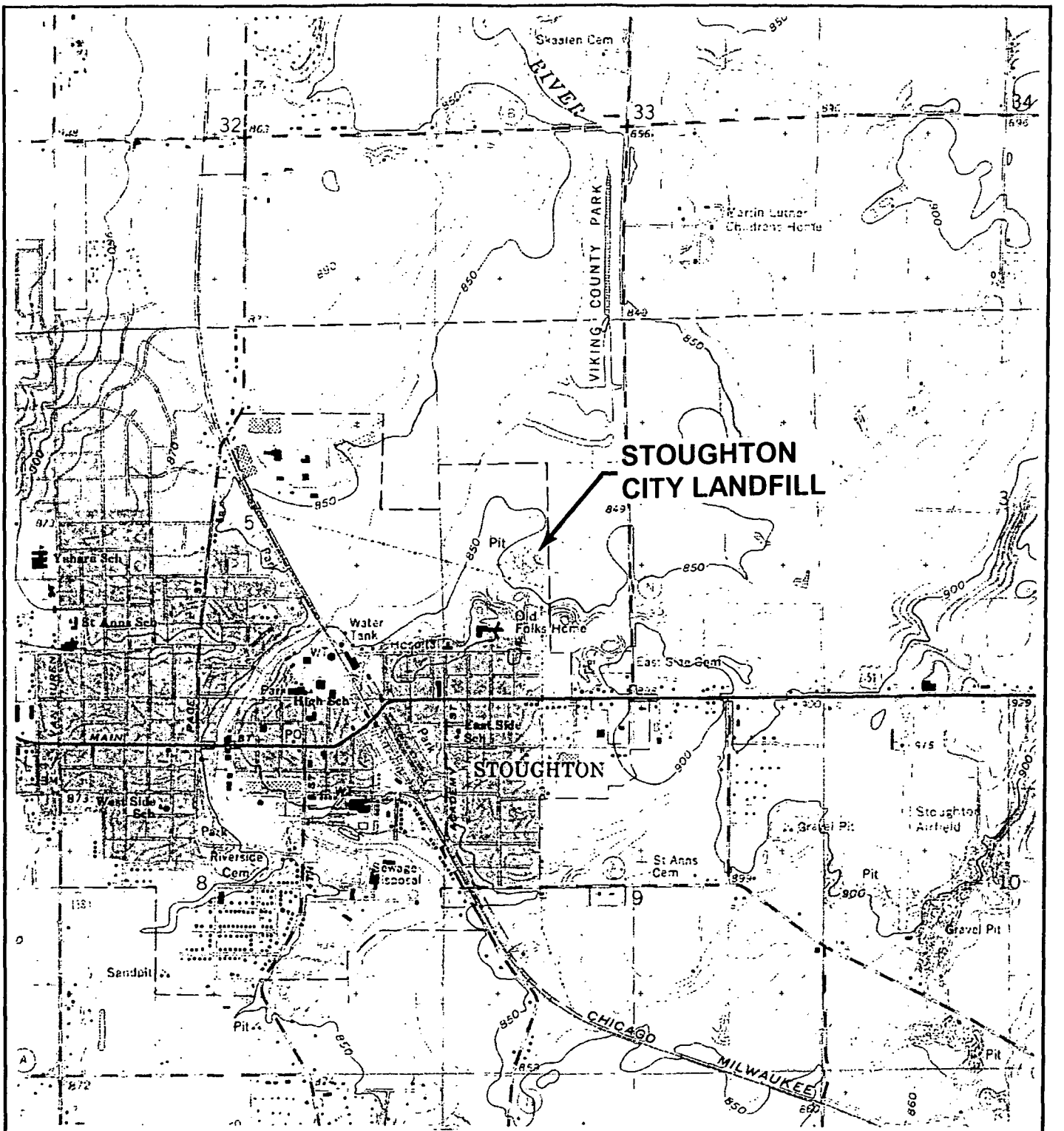
NOTES:
Table shows only detected parameters.
Bold values indicate a detection
Bold Italic values exceed NR 140 preventive action limits (PAL)
Shaded values exceed NR 140 enforcement standards (ES)

LABORATORY NOTES:
J = Value less than the Limit of Quantitation (LOQ)
B = Detected in a quality control blank sample
M = Sample failed one or more laboratory quality control checks

Prepared By: MOB
Date: 6/28/04
Checked By: RL

I:\1764\Reports\5 Yr Eval.Report\[AllData_060623_tbl.xls]Metals

FIGURES



STOUGHTON, WIS.

NW/4 STOUGHTON 15' QUADRANGLE

N4252.5—W8907.5/7.5

1961

• PHOTOREVISED 1982

DMA 3169 I NW—SERIES V861

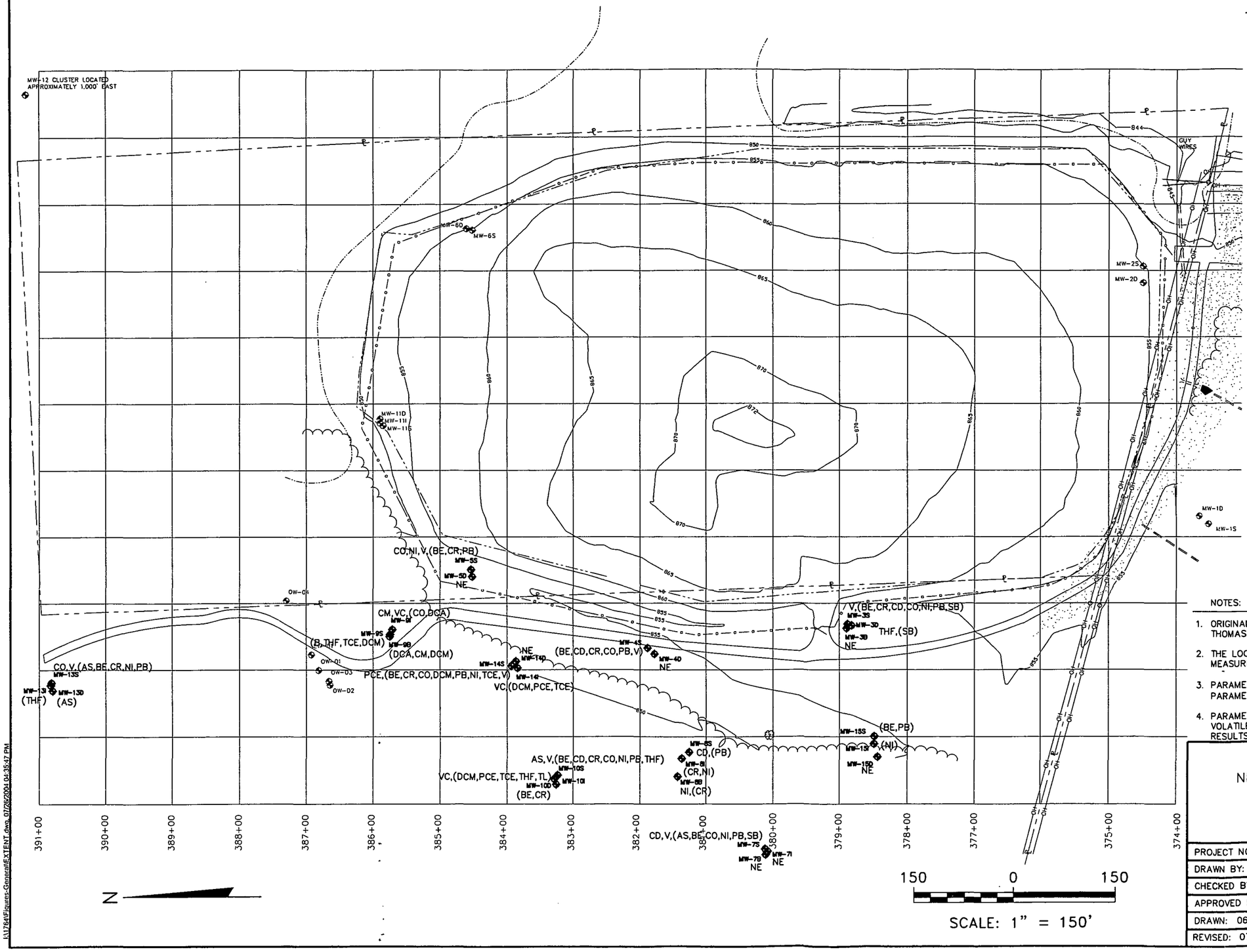
UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

PROJECT NO.	1764
DRAWN BY:	KP
CHECKED BY:	SS
DRAWN:	08/02/00
SCALE:	1" = 2,000'

FIGURE 1
SITE LOCATION MAP
STOUGHTON CITY LANDFILL
STOUGHTON, WISCONSIN

J:\1764\FIG1.DWG



LEGEND

- POWER POLE
- SEWER MANHOLE
- WATER VALVE
- CHAIN LINK FENCE
- PROPERTY LINE
- WETLAND BOUNDARY
- SANITARY SEWER LINE
- WATER LINE
- TELEPHONE LINE
- OVERHEAD UTILITY LINE
- CAPPING LIMITS
- TOPSOIL CONTOUR (1' INTERVAL)
- DECIDUOUS TREE
- TREE LINE
- WOOD FENCE
- CHAINLINK FENCE
- MONITORING WELL IN MONITORING PROGRAM
- MONITORING WELL NOT IN MONITORING PROGRAM
- FIRE HYDRANT

AS	ARSENIC
B	BENZENE
BE	BERYLLIUM
CM	CHLOROMETHANE
CD	CADMIUM
CO	COBALT
CR	CHROMIUM
DCA	DICHLOROETHANE
DCM	DICHLOROMETHANE
NI	NICKEL
PB	LEAD
PCE	TETRACHLOROETHYLENE
SB	ANTIMONY
THF	TETRAHYDROFURAN
TL	THALLIUM
V	VANADIUM
TCE	TRICHLOROETHYENE
NE	NO EXCEEDANCE

NOTES:

1. ORIGINAL MAP BASED ON REI SURVEYING MAP DRAWN 02/01/99 BY THOMAS A. RADENZ.
2. THE LOCATION OF UNDERGROUND UTILITIES ARE OBTAINED FROM FIELD MEASUREMENTS AND CITY OF STOUGHTON RECORDS. FIELD VERIFY.
3. PARAMETERS IN () EXCEED NR 140 PREVENTIVE ACTION LIMITS. PARAMETERS WITHOUT () EXCEED NR 140 ENFORCEMENT STANDARDS.
4. PARAMETER EXCEEDANCES BASED ON APRIL 2002 THROUGH APRIL 2004 VOLATILE ORGANIC COMPOUND AND APRIL 2001 METALS ANALYTICAL RESULTS.

FIGURE 2
NR 140 EXCEEDANCES IN GROUNDWATER
STOUGHTON CITY LANDFILL
STOUGHTON, WISCONSIN

PROJECT NO.	1764
DRAWN BY:	KP
CHECKED BY:	RL
APPROVED BY:	RBL
DRAWN:	06/29/04
REVISED:	07/26/04

BT² inc.

L:\1764\Figures-General\EXTENT.dwg, 07/26/2004 04:35:47 PM

APPENDIX A

USEPA Superfund Record of Decision

EPA/ROD/R05-91/181
1991

EPA Superfund
Record of Decision:

STOUGHTON CITY LANDFILL
EPA ID: WID980901219
OU 01
STOUGHTON, WI
09/30/1991

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
STOUGHTON CITY LANDFILL SITE

#SLD

I. SITE LOCATION AND DESCRIPTION

THE STOUGHTON CITY LANDFILL SITE IS LOCATED IN THE NORTHEAST PORTION OF STOUGHTON APPROXIMATELY 13 MILES SOUTHEAST OF MADISON, IN DANE COUNTY, WISCONSIN. (FIGURE 1-1.) THE PROPERTY CONTAINING THE LANDFILL SITE ENCOMPASSES APPROXIMATELY 27 ACRES AND OCCUPIES PORTIONS OF THE W 1/2 OF THE SW 1/4 AND THE SW 1/4 OF THE NW 1/4 OF SECTION 4, T.5N., R.11E. ALTHOUGH THE LANDFILL PROPERTY ORIGINALLY OCCUPIED APPROXIMATELY 40 ACRES, LANDFILLING HAS OCCURRED ON ONLY ABOUT 15 ACRES OF THE PROPERTY. SINCE 1982, LAND EXCHANGES BETWEEN THE CITY AND THE OWNER OF AN ADJACENT PROPERTY HAVE MODIFIED THE ORIGINAL PROPERTY BOUNDARIES (FIGURE 1-3).

FIGURES 1-4 AND 3-2 SHOW EXISTING SITE CONDITIONS AND TOPOGRAPHY, RESPECTIVELY. A WETLAND AREA THAT EXISTED IN THE SOUTHEAST PORTION OF THE CURRENT PROPERTY BOUNDARY WAS THE INITIAL AREA OF WASTE DISPOSAL. WETLANDS OCCUR ADJACENT TO THE SOUTHEAST PORTION OF THE SITE, IN THE NORTH PORTION OF THE SITE, AND WEST OF THE SITE ALONG THE YAHARA RIVER. THE YAHARA RIVER IS LOCATED WEST OF THE SITE AND COMES WITHIN APPROXIMATELY 400 FEET OF THE SITE AT ITS CLOSEST DISTANCE. THE 100-YEAR FLOOD STAGE NEAR THE SITE IS 843 FEET ABOVE MEAN SEA LEVEL. THE AREA OF THE SITE IN WHICH WASTE DISPOSAL PRACTICES TOOK PLACE IS ELEVATED WITH RESPECT TO THE FLOOD STAGE (SEE FIGURE 3-3). APPROXIMATELY 1/8 OF THE SITE (THE NORTHEASTERN SECTION WHICH CONSISTS OF WETLANDS) IS SITUATED WITHIN THE 100-YEAR FLOODPLAIN OF THE YAHARA RIVER (SEE FIGURE 3-2 WHICH SHOWS LOWLAND AREA OF SITE WITH RESPECT TO FLOOD STAGE, I.E., ELEVATION 843 ABOVE MSL). THE NEAREST DEVELOPED LAND OCCURS ALONG AMUNDSON PARKWAY, THE SITE ACCESS ROAD TO THE SOUTH, WHERE RESIDENTIAL HOMES HAVE BEEN BUILT. A MORE EXTENSIVE RESIDENTIAL AREA OCCURS APPROXIMATELY 1/4 MILE SOUTH OF THE SITE, WHERE THE CITY STREET GRID PATTERN BEGINS. THE LAND IMMEDIATELY ADJACENT TO THE SOUTHERN SITE BOUNDARY REMAINS UNDEVELOPED. THERE IS NO DEVELOPED LAND IN THE VICINITY OF THE SITE TO THE WEST, NORTH OR EAST.

SURFACE WATER FLOW PATTERNS INDICATE RADIAL FLOW OUTWARD FROM THE SITE. SURFACE WATER RUNOFF OVER MOST OF THE NORTHERN PORTION OF THE PROPERTY FLOWS TO THE DRAINAGE DITCH IN THE NORTH-CENTRAL PORTION OF THE SITE. THIS DRAINAGE DITCH ORIGINATES EAST OF THE SITE AND ALSO RECEIVES FLOW FROM THE WETLAND ADJACENT TO THE SOUTHEAST PORTION OF THE PROPERTY AND LAND EAST OF COUNTY HIGHWAY N. SURFACE WATER IN THE SOUTHWESTERN PORTION OF THE SITE FLOWS TOWARD THE DRAINAGE DITCH ALONG THE SOUTHERN PROPERTY BOUNDARY, WHICH DRAINS TOWARD THE WETLANDS ADJACENT TO THE SOUTHEASTERN PORTIONS OF THE SITE. SURFACE WATER IN THE SOUTH-CENTRAL AND SOUTHEASTERN PORTIONS OF THE PROPERTY DRAINS DIRECTLY TO THE WETLANDS. IN SUMMARY, MOST OF THE SURFACE WATER DRAINS TO WETLANDS EAST AND NORTH OF THE SITE AND EVENTUALLY FLOWS TO THE YAHARA RIVER VIA A DRAINAGE DITCH. A SMALL PORTION OF THE WEST-CENTRAL AREA OF THE SITE DRAINS DIRECTLY INTO THE WETLANDS ADJACENT TO THE YAHARA RIVER. (FIGURE 3-3).

SURFICIAL DEPOSITS IN THE VICINITY OF THE SITE INCLUDE ICE-CONTACT STRATIFIED DEPOSITS AND LACUSTRINE PLAIN SEDIMENTS (MICKELSON AND MCCARTNEY, 1979). ICE-CONTACT STRATIFIED DEPOSITS GENERALLY INCLUDE SIGNIFICANT SAND AND GRAVEL DEPOSITS AND LAND FORMS SUCH AS KAMES AND ESKERS. THESE DEPOSITS OCCUPY HIGHER GROUND WITHIN THE LANDFILL AND SOUTH OF IT. LACUSTRINE PLAIN OR GLACIAL LAKE-BOTTOM SEDIMENTS ARE GENERALLY COMPOSED OF FINE-GRAINED SILT AND CLAY. SOME SAND IS PRESENT NEAR FORMER SHORELINES AND STREAM INLETS. THESE AREAS ARE OFTEN FLAT, POORLY DRAINED, AND SHOW EVIDENCE OF PEAT ACCUMULATION. LACUSTRINE PLAIN DEPOSITS OCCUPY THE SOUTHEAST PORTION OF THE CURRENT PROPERTY BOUNDARY, WHICH WAS INITIALLY DEVELOPED FOR WASTE DISPOSAL, AND THE LOW-LYING GROUND ADJACENT TO THE EAST, NORTH, AND WEST PORTION OF THE SITE. LACUSTRINE PLAIN SEDIMENTS ARE GENERALLY OVERLAIN BY YOUNGER MARSH DEPOSITS.

SURFICIAL DEPOSITS IN THE VICINITY OF THE SITE ARE UNDERLAIN BY GLACIAL OUTWASH THAT WAS DEPOSITED IN THE PREGLACIAL YAHARA RIVER VALLEY. APPROXIMATELY 150 TO 250 FEET OF UNCONSOLIDATED GLACIAL SEDIMENTS ARE REPORTED TO OVERLIE CAMBRIAN SANDSTONE BEDROCK IN THE VICINITY OF THE SITE (CLINE 1965). THESE UNCONSOLIDATED SEDIMENTS CONSIST MOSTLY OF STRATIFIED AND SORTED SAND AND GRAVEL. SOME OF THE OUTWASH IN THE EASTERN TWO-THIRDS OF THE COUNTY IS REPORTED BY CLINE TO CONTAIN BOULDERS.

REGIONAL GROUNDWATER FLOW IS TOWARD THE YAHARA RIVER, WHICH SERVES AS A GROUNDWATER DISCHARGE. GROUNDWATER FLOW IN THE SURFICIAL AQUIFER IS RADIAL BENEATH THE SITE. (FIGURE 3-6). AVERAGE AQUIFER CHARACTERISTICS OF

THE SURFICIAL AQUIFER ARE: 1. HORIZONTAL FLOW GRADIENT = 1.36E-02 FT/FT; 2. VERTICAL FLOW GRADIENT = 2.79E-02 FT/FT (UPWARD); 3. HYDRAULIC CONDUCTIVITY = 15.6 FT/DAY; AND 4. HORIZONTAL GROUNDWATER VELOCITY = 0.604 FT/DAY. THERE ARE VARIATIONS AROUND THE SITE FROM LOCATION TO LOCATION. FOR INSTANCE, THE HYDRAULIC CONDUCTIVITY AT MONITORING WELL CLUSTERS 3 AND 4 IS APPROXIMATELY 20.6 FT/DAY, THE AVERAGE HORIZONTAL GRADIENT IS 9.11E-03 FT/FT, AND THE AVERAGE VERTICAL GRADIENT IS VIRTUALLY ZERO. ALONG THE SOUTHEASTERN SECTION OF THE SITE, AT MONITORING WELL CLUSTER 2, THERE IS AN UPWARD VERTICAL GRADIENT OF 0.13 FT/FT.

THE TWO AQUIFERS ARE HYDRAULICALLY CONNECTED. MUNICIPAL WELL #3 IS SITUATED ABOUT 3000 FT WEST OF THE SITE AND IS SET IN THE SANDSTONE BEDROCK, AS AN OPEN PIPE FROM ROUGHLY 210 FT BELOW GROUND SURFACE TO 940 FT BELOW GROUND SURFACE.

#SH

II. SITE HISTORY

THE CITY OF STOUGHTON PURCHASED THE ORIGINAL 40-ACRE SITE IN JULY 1952, AND ANNEXED IT IN SEPTEMBER 1952, WHEN LANDFILL OPERATION BEGAN AT THE SITE. BETWEEN 1952 AND 1969, THE SITE WAS OPERATED AS AN UNCONTROLLED DUMP SITE. DURING THIS TIME, REFUSE WAS USUALLY BURNED OR COVERED BY DIRT. IN 1969, THE SITE BEGAN OPERATION AS A STATE-LICENSED LANDFILL. IN 1977, THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES (WDNR) REQUIRED THAT THE SITE BE CLOSED ACCORDING TO STATE REGULATIONS. CLOSURE ACTIVITIES INCLUDED CONSTRUCTION OF A TRASH TRANSFER STATION, PLACEMENT OF COVER MATERIAL BORROWED FROM THE NORTHWEST PORTION OF THE SITE AND FROM AGRICULTURAL AREAS, APPLICATION OF TOPSOIL ALSO DERIVED FROM AN AGRICULTURAL AREA, AND SEEDING. FROM 1978 TO 1982 ONLY BRICK, RUBBLE, AND SIMILAR CONSTRUCTION MATERIALS WERE ACCEPTED AT THE SITE WHILE CLOSURE WORK WAS PERFORMED. THE LANDFILL WAS OFFICIALLY CLOSED IN 1982.

COMMON MUNICIPAL WASTE AND BOTH DRY AND LIQUID WASTES WERE DISPOSED AT THE STOUGHTON CITY LANDFILL. DRY WASTE INCLUDED SLUDGE MATERIALS, EMPTY REJECTED METAL SPRAY CONTAINERS (USED FOR STORING MULTI-PURPOSE LUBRICANTS), AND USED APPLIANCES. SOME SLUDGE MATERIALS CONTAINING 2-BUTANONE, ACETONE, TETRAHYDROFURAN, TOLUENE, AND XYLENE MIXTURES, WERE DISPOSED AT THE SITE FROM 1954 UNTIL 1962. DURING THIS PERIOD, THE LIQUID WASTES WERE COMMONLY POURED OVER GARBAGE AND BURNED. IT WAS ALSO REPORTED THAT SOME LIQUID WASTES WERE POURED DOWN HOLES DRILLED TO TEST AUGER DRILLING EQUIPMENT IN THE WEST-CENTRAL PORTION OF THE LANDFILL.

THE STOUGHTON CITY LANDFILL IS CURRENTLY AN INACTIVE FACILITY. VEHICULAR ACCESS TO THE SITE IS CONTROLLED BY A SET OF GATES THAT ARE KEPT LOCKED AT ALL TIMES. IN ADDITION, SNOW-FENCING WAS INSTALLED ALONG THE SOUTHERN PROPERTY BOUNDARY UPON INITIATION OF THE RI. WARNING SIGNS WERE PLACED ALONG THE SNOW-FENCING AND ON SIGNPOSTS INSTALLED ON THE WEST, NORTH, AND EAST PROPERTY BOUNDARIES.

THE SITE WAS PLACED ON THE NATIONAL PRIORITIES LIST (NPL) IN JUNE 1986. IN MARCH 1988, UNIROYAL PLASTICS, INC. AND THE CITY OF STOUGHTON (THE POTENTIALLY RESPONSIBLE PARTIES OR PRPS) ENTERED INTO AN ADMINISTRATIVE ORDER BY CONSENT ("AOC" OR "THE ORDER") WITH USEPA AND WDNR FOR THE CONDUCT OF A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS). ERM - NORTH CENTRAL WAS ORIGINALLY CONTRACTED BY THE PRP'S TO CONDUCT ALL WORK RELATED TO THE RI/FS. ERM WAS REPLACED BY ENSR CONSULTING AND ENGINEERING IN 1990 TO COMPLETE ALL REMAINING TASKS OF THE RI/FS.

RI FIELD ACTIVITIES BEGAN IN MARCH 1989. THE FIRST ROUND OF GROUNDWATER MONITORING OCCURRED IN MAY AND JUNE 1989. ROUTINE ANALYSES WERE RUN FOR TARGET COMPOUND LIST (TCL) INORGANICS AND ORGANICS AS WELL AS FOR NON-STANDARD VOLATILE ORGANICS, TETRAHYDROFURAN (THF), TRICHLOROFLOUROMETHANE AND DICHLORODIFLUOROMETHANE. A SECOND ROUND OF GROUNDWATER SAMPLING OCCURRED IN MAY AND JUNE 1990. AT THAT TIME, BACKGROUND SURFACE WATER AND SEDIMENT SAMPLES WERE TAKEN FROM THE WETLANDS EAST OF THE SITE AND FROM THE AREA BETWEEN THE YAHARA RIVER AND WESTERN EDGE OF THE SITE. THE RESULTS OF THE RI FIELD SAMPLING ARE SUMMARIZED IN TABLE 5-1.

AN ECOLOGICAL SITE ASSESSMENT WAS CONDUCTED BY USEPA IN MAY 1991. A PRELIMINARY ECOLOGICAL ASSESSMENT WAS SUBSEQUENTLY PREPARED IN JULY 1991. THE RESULTS OF THAT PRELIMINARY ASSESSMENT ARE AS FOLLOWS:

"THE WETLANDS SURROUNDING THE LANDFILL ARE THE MAIN POINTS OF EXPOSURE FOR ECOLOGICAL RECEPTORS; THEY CURRENTLY RECEIVE LEACHATE DISCHARGE AND IN THE PAST RECEIVED SURFACE WATER RUNOFF FROM THE LANDFILL. BECAUSE THE SITE OCCURS IN A RELATIVELY UNDEVELOPED AREA, A WIDE VARIETY AND NUMBER OF TERRESTRIAL AND AQUATIC ORGANISMS MAY BE EXPOSED TO THE SITE CONTAMINANTS. THE WETLANDS AND WOODS SURROUNDING THE SITE

PROVIDE EXCELLENT HABITAT FOR MANY SPECIES OF BIRDS, MAMMALS, REPTILES, AMPHIBIANS, AND INVERTEBRATES. COMPARISON OF UNFILTERED SURFACE WATER SAMPLES WITH CRITERIA AND OTHER DATA INDICATE POTENTIAL RISKS TO AQUATIC LIFE FROM SITE-RELATED CONTAMINATION AT SL-1 AND SL-2, IMMEDIATELY ADJACENT TO THE SOUTHEAST PART OF THE LANDFILL IN LEACHATE DISCHARGE AREAS, AND POSSIBLE RISKS TO SEDIMENT-DWELLING ORGANISMS AT SL-1, SL-2, SL-7, AND SL-8."

THE PRELIMINARY REPORT GOES ON TO RECOMMEND THAT AQUATIC AND WHOLE-SEDIMENT TOXICITY TESTS AND COMMUNITY SURVEYS BE CONDUCTED TO ASSESS THE ACTUAL IMPACT TO ORGANISMS IN THE WETLANDS EAST OF THE SITE. THE REPORT ALSO STATES, "REMEDIAL ACTIONS PLANNED OR SUGGESTED FOR THE LANDFILL THAT ADEQUATELY CONTROL CONTAMINATED GROUNDWATER RELEASE FROM THE SITE SHOULD BE SUFFICIENTLY PROTECTIVE OF AQUATIC BIOTA." FEASIBILITY STUDY (FS) ACTIVITIES BEGAN IN NOVEMBER 1989 WITH THE SUBMITTAL OF THE ALTERNATIVES ARRAY DOCUMENT. A DRAFT FS WAS SUBMITTED ON JANUARY 17, 1991. THE FINAL FS WAS SUBMITTED TO USEPA AND WDNR IN JUNE 1991. THE FINAL FS WAS PLACED INTO THE SITE REPOSITORY PRIOR TO THE START OF THE PUBLIC COMMENT PERIOD. ATTACHED TO THE FS WERE COMMENTS PROVIDED BY USEPA AND WDNR WHICH HIGHLIGHTED DEFICIENCIES WITH THE DOCUMENT IN THE AREAS OF PRESENTATION OF CURRENT SITE CONDITIONS, HUMAN HEALTH RISKS, RISKS TO THE ENVIRONMENT, AND RATIONALE FOR REMEDY SELECTION.

#EH

III. ENFORCEMENT HISTORY

USEPA SENT INFORMATION REQUEST LETTERS PURSUANT TO SECTION 104 OF CERCLA ON AUGUST 1, 1987 TO THE CITY OF STOUGHTON, UNIROYAL, BJOIN TRANSFER, IKI, AND CITY DISPOSAL. BASED ON THE RESPONSES AND OTHER EVIDENCE, ONLY UNIROYAL, A GENERATOR AND TRANSPORTER, AND THE CITY OF STOUGHTON, THE OWNER/OPERATOR, WERE ISSUED SPECIAL NOTICE UNDER SECTION 122 OF CERCLA FOR THE RI/FS. NO FURTHER EVIDENCE HAS BEEN DISCOVERED WHICH WOULD INDICATE THAT ANYONE OTHER THAN THESE TWO ENTITIES SHOULD BE SENT SPECIAL NOTICE LETTERS (SNL'S) FOR RD/RA.

ON MARCH 29, 1988 AND APRIL 15, 1988, THE SECRETARY OF THE WDNR AND DIRECTOR OF USEPA REGION V'S WASTE MANAGEMENT DIVISION, RESPECTIVELY, SIGNED A CERCLA 106 ADMINISTRATIVE ORDER BY CONSENT WITH UNIROYAL AND THE CITY OF STOUGHTON STIPULATING THE UNDERTAKING OF A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS) FOR THE PURPOSES OF DETERMINING THE NATURE AND EXTENT OF THE THREAT TO THE PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT DUE TO THE RELEASE OR THREATENED RELEASE OF HAZARDOUS SUBSTANCES OR CONTAMINANTS FROM THE SITE AND TO EVALUATE APPROPRIATE REMEDIAL ACTION ALTERNATIVES TO PREVENT OR MITIGATE THE MIGRATION OR RELEASE OF HAZARDOUS SUBSTANCES OR CONTAMINANTS FROM THE SITE.

THE SIGNED ORDER UNDERWENT A MANDATORY 30 DAY PUBLIC COMMENT PERIOD SHORTLY THEREAFTER. NO COMMENTS WERE RECEIVED DURING PUBLIC COMMENT AND THE ORDER BECAME EFFECTIVE ON MAY 2, 1988.

#CP

IV. COMMUNITY PARTICIPATION

PURSUANT TO SECTIONS 113(K)(2)(B)(I-V) AND 117 OF CERCLA, THE STOUGHTON COMMUNITY HAS PARTICIPATED IN THE REMEDY SELECTION PROCESS, IN THAT:

PRIOR TO ANY PUBLIC MEETING, A PRESS RELEASE WAS SENT OUT TO THE LOCAL MEDIA AND AN ADVERTISEMENT ANNOUNCING THE MEETING WAS PLACED IN THE STOUGHTON HUB COURIER, A LOCAL PAPER OF GENERAL CIRCULATION;

A PUBLIC MEETING ("KICK-OFF") WAS HELD IN NOVEMBER 1988, ANNOUNCING THE SCOPE OF THE RI/FS;

THE THREE SITE INFORMATION REPOSITORIES HAVE BEEN KEPT UP TO DATE WITH SITE DOCUMENTS. AN ADMINISTRATIVE RECORD CONTAINING THE RI AND FS REPORTS AND OTHER DOCUMENTS WAS PLACED IN A SITE REPOSITORY AT THE STOUGHTON PUBLIC LIBRARY.

A PROPOSED PLAN FOR REMEDIAL ACTION WAS RELEASED FOR PUBLIC COMMENT AND PLACED INTO THE ADMINISTRATIVE RECORD ON JULY 12, 1991 WITH THE 30-DAY COMMENT PERIOD ENDING AUGUST 12, 1991. A NOTICE OF AVAILABILITY OF THE PROPOSED PLAN WAS PUBLISHED IN THE STOUGHTON HUB COURIER PRIOR TO THE RELEASE OF THE PROPOSED PLAN;

A PUBLIC MEETING WAS HELD ON JULY 24, 1991, IN THE SITE PROXIMITY, AT WHICH THE USEPA AND THE WDNR PRESENTED

THE PROPOSED PLAN, AS WELL AS THE FINDINGS OF THE RI/FS TO THE COMMUNITY AND RECEIVED ORAL COMMENTS (WHICH ARE ADDRESSED IN THE ATTACHED RESPONSIVENESS SUMMARY). A TRANSCRIPT WAS KEPT OF THE PUBLIC MEETING AND PLACED IN THE ADMINISTRATIVE RECORD AND SITE REPOSITORIES;

THE USEPA HAS RECEIVED WRITTEN COMMENTS REGARDING THE PROPOSED PLAN WHICH ARE ADDRESSED IN THE RESPONSIVENESS SUMMARY.

#SRRA

V. SCOPE AND ROLE OF REMEDIAL ACTIVITIES

DUE TO THE COMPLEXITY OF THE ENVIRONMENTAL SETTING AND THE POTENTIAL FOR THE PRIMARY CONTAMINANT, TETRAHYDROFURAN (THF), TO MOVE THROUGHOUT THE AQUIFER, THE RESPONSE ACTION WILL FOCUS ON CONTROLLING THE SOURCE OF CONTAMINATION (I.E., THE LANDFILL CONTENTS), EXTRACTING AND TREATING THE CONTAMINATED GROUNDWATER UNLESS USEPA DETERMINES AFTER FURTHER INVESTIGATION IT IS NOT NECESSARY TO MEET CLEAN-UP GOALS, AND PROTECTING THE ADJACENT WETLANDS BY REDUCING THE LEACHING OF IRON AND OTHER METALS INTO THEM.

THE LANDFILLED WASTE IS CLASSIFIED AS A LOW LEVEL THREAT WASTE, WHICH WILL BE CONTAINED ON SITE. TREATMENT OF THE LANDFILL CONTENTS IS INAPPROPRIATE BECAUSE OF THE SIZE OF THE LANDFILL AND THE ABSENCE OF KNOWN "HOT SPOTS" (I.E., AREAS OF CONCENTRATED HAZARDOUS SUBSTANCES) THAT REPRESENT A PRINCIPAL THREAT. CONTAMINATED GROUNDWATER WILL BE TREATED PRIOR TO DISCHARGE TO THE YAHARA RIVER, UNLESS FURTHER INVESTIGATIVE WORK INDICATES THAT GROUNDWATER EXTRACTION AND TREATMENT WILL NOT BE NECESSARY.

THE GOAL OF THE SUPERFUND REMEDY SELECTION PROCESS IS TO SELECT REMEDIES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, THAT MAINTAIN PROTECTION OVER TIME, AND THAT MINIMIZE UNTREATED WASTE. THE SITE-SPECIFIC CLEAN-UP GOALS FOR THE SCL SITE ARE:

* TO MINIMIZE DIRECT CONTACT WITH THE WASTES;
* TO MINIMIZE THE FURTHER MOVEMENT OF CONTAMINANTS TO GROUNDWATER BY REDUCING THE AMOUNT OF PRECIPITATION WHICH INFILTRATES THE LANDFILL;
* TO CONTAIN THE MOVEMENT OF CONTAMINANTS IN THE GROUNDWATER IN ORDER TO PREVENT CONTAMINANTS FROM LEAVING THE SITE BOUNDARY;
* TO EXTRACT AND TREAT GROUNDWATER TO MEET STATE WATER QUALITY DISCHARGE LIMITS;
* TO RESTORE THE GROUNDWATER TO STATE GROUNDWATER QUALITY STANDARDS.

A TOTAL OF EIGHT REMEDIAL ALTERNATIVES, INCLUDING THE NO ACTION ALTERNATIVE, WERE DEVELOPED FOR THE FINAL VERSION OF THE FS. THESE ALTERNATIVES WERE SCREENED AND COMPARED TO EACH OTHER AND EVALUATED WITH RESPECT TO THE NINE EVALUATION CRITERIA SET FORTH IN THE NCP. THE PROPOSED PLAN PRESENTED AN EVALUATION OF NINE ALTERNATIVES, WHICH INCLUDED USEPA'S PREFERRED REMEDY. THIS DECISION DOCUMENT REFLECTS THE AGENCY'S SELECTED ALTERNATIVE WHICH IS THE PREFERRED REMEDY IDENTIFIED IN THE PROPOSED PLAN WITH A CONTINGENCY REGARDING THE GROUNDWATER COMPONENT OF THE REMEDY (SEE SECTION IX OF THIS ROD).

#SSC

VI. SUMMARY OF SITE CHARACTERISTICS

THE BOUNDARIES OF THE LANDFILL WERE DEFINED USING GEOPHYSICAL SURVEYS AND INFORMATION OBTAINED FROM A REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS. THE SOUTH BOUNDARY WAS MODIFIED BASED ON DRILLING PERFORMED LATER IN THE RI. FIGURE 1-4 SHOWS THE LANDFILL BOUNDARY DEFINED AS PART OF THE RI. AN ESTIMATED 218,000 CUBIC YARDS OF WASTE ARE IN PLACE AT THE LANDFILL.

A VARIETY OF VOCS WERE MEASURED IN THE SOIL GAS SURVEY CONDUCTED ACROSS THE LANDFILL. DICHLORODIFLUOROMETHANE WAS DETECTED AT GREATEST CONCENTRATIONS AND WAS MOST WIDELY DISTRIBUTED ACROSS THE

LANDFILL. OTHER VOCS, INCLUDING TRANS-1,2-DICHLOROETHENE, TRICHLOROETHENE, TOLUENE, TETRAHYDROFURAN, BENZENE, AND TOTAL XYLENES, WERE ALSO DETECTED. MANY OF THESE CONSTITUENTS WERE CONCENTRATED IN THE WEST-CENTRAL PORTION OF THE LANDFILL; HOWEVER, HIGH CONCENTRATIONS OF THE VARIOUS COMPOUNDS WERE LOCALIZED IN OTHER AREAS ACROSS THE LANDFILL.

REFUSE WAS APPARENTLY INITIALLY DEPOSITED IN WETLANDS IN THE SOUTHEAST PORTION OF THE SITE, AND THEN LATER IN THE EXTREME NORTH PORTION OF THE LANDFILL. IN THE SOUTHEAST AREA, THE REFUSE IS SATURATED TO A MAXIMUM THICKNESS OF APPROXIMATELY 5 FEET. THE DEGREE OF REFUSE SATURATION IS LESS IN THE NORTH PORTION OF THE SITE.

THE LANDFILL WAS CLOSED IN 1982 ACCORDING TO THEN APPLICABLE STATE REGULATIONS. CLOSURE ACTIVITIES INCLUDED THE PLACEMENT OF COVER MATERIAL. COVER MATERIALS ENCOUNTERED DURING WELL INSTALLATION AND THE SOIL GAS SURVEY WERE CLAY OR SILTY CLAY; HOWEVER, A DETAILED CAP STUDY WAS NOT CONDUCTED AS PART OF THE RI. IN GENERAL, THE CONDITION OF THE COVER MATERIAL APPEARS TO BE SOUND. AN EXCEPTION TO THIS IS ALONG A SMALL PORTION OF THE EAST LANDFILL BOUNDARY WHERE ANIMAL HOLES EXIST. SOME METALLIC WASTE IS VISIBLE IN THESE ANIMAL HOLES.

A TOTAL OF THREE ROUNDS OF GROUNDWATER SAMPLING AND ANALYSIS WERE PERFORMED AT MONITORING WELL LOCATIONS SHOWN ON FIGURE 1-8; HOWEVER, METALS WERE DETERMINED ONLY FOR ONE SAMPLING ROUND (ROUND 1) AND TARGET COMPOUND LIST (TCL) ORGANICS FOR TWO SAMPLING ROUNDS (ROUNDS 1 AND 2). ALL MONITORING WELLS ARE SCREENED IN SAND AND GRAVEL DEPOSITS WITH THE EXCEPTION OF MW-2S WHICH IS SCREENED IN REFUSE AND LACUSTRINE PLAIN SEDIMENTS (SILTY AND SANDY CLAY). THE PRESENCE OF POTENTIAL CONTAMINATION IN THE BEDROCK AQUIFER WAS NOT PREVIOUSLY EVALUATED AS PART OF THE RI. SUCH AN EVALUATION WILL TAKE PLACE DURING THE ADDITIONAL WORK ACTIVITIES.

RESULTS OF THE RI INDICATED THAT GROUNDWATER TO THE WEST OF THE SITE IS CONTAMINATED WITH TETRAHYDROFUAN (THF) IN CONCENTRATIONS WHICH EXCEED THE STATE ENFORCEMENT STANDARD BY MORE THAN ONE ORDER OF MAGNITUDE (660 MICROGRAM/L VS. 50 MICROGRAM/L). LIMITED SAMPLING AND ANALYSES WERE CONDUCTED ON THE WASTE ITSELF, AND THE RESULTS DID INDICATE THE PRESENCE OF POLYNUCLEAR AROMATIC HYDROCARBONS (PAH'S) AND PHTHALATES. PAH'S WERE FOUND WITHIN SEVERAL TIMES THE CONTRACT REQUIRED QUANTIFICATION LIMIT (CRQL) FOR A VARIETY OF COMPOUNDS. BIS(2-ETHYLHEXYL)PHTHALATE, (BEHP), WAS DETECTED IN WASTE IN CONCENTRATIONS AS HIGH AS 600,000 MICROGRAM/KG. SEDIMENTS IN THE EASTERN WETLANDS WERE FOUND TO CONTAIN ELEVATED LEVELS OF ALUMINUM, CALCIUM AND MAGNESIUM. PAH'S, PHTHALATES, BENZOIC ACID, CADMIUM AND LEAD WERE FOUND IN LOW CONCENTRATIONS IN SEDIMENT SAMPLES TAKEN FROM THE WETLANDS SOUTHEAST OF THE SITE.

TETRAHYDROFURAN WAS MEASURED AT MW-3D AT CONCENTRATIONS ABOVE THE WISCONSIN ENFORCEMENT STANDARD (50 MICROGRAM/L) DURING ALL THREE SAMPLING ROUNDS. TETRAHYDROFURAN WAS ALSO MEASURED IN ONE SAMPLING ROUND AT MW-4D AND MW-5S ABOVE THE WISCONSIN PREVENTIVE ACTION LIMIT (PAL) CONCENTRATION (10 MICROGRAM/L). THERE ARE PRESENTLY NO FEDERAL DRINKING WATER STANDARDS FOR THF.

TRICHLOROFLUOROMETHANE WAS MEASURED IN MW-5S AND MW-5D DURING ALL SAMPLING ROUNDS AT CONCENTRATIONS BELOW THE WISCONSIN PAL (698 MICROGRAM/L).

DICHLORODIFLUOROMETHANE WAS DETECTED IN MW-3D, MW-5S, AND MW-5D IN CONCENTRATIONS FROM 16 MICROGRAM/L TO 240 MICROGRAM/L DURING SOME SAMPLING ROUNDS. NO FEDERAL GROUNDWATER STANDARDS EXIST FOR DICHLORODIFLUOROMETHANE. THE STATE DOES HAVE AN INTERIM RECOMMENDED PAL OF 300 MICROGRAM/L FOR THIS COMPOUND.

BIS(2-ETHYLHEXYL)PHTHALATE WAS MEASURED DURING SOME SAMPLING ROUNDS AT MW-3D AND MW-4D AT LOW CONCENTRATIONS. PENTACHLOROPHENOL AND BENZOIC ACID WERE DETECTED AT VERY LOW CONCENTRATIONS IN MW-6S AND MW-6D, RESPECTIVELY, DURING ONE SAMPLING ROUND.

ELEVATED CONCENTRATIONS OF METALS WERE DETECTED IN VARIOUS SHALLOW AND DEEP MONITORING WELLS LOCATED IN ALL DIRECTIONS AWAY FROM THE SITE, EXCLUDING THE NORTHEAST DIRECTION. THE CONCENTRATION OF ARSENIC (5.2 MICROGRAM/L) WAS MARGINALLY ABOVE THE PAL OF 5 MICROGRAM/L IN MW-2S IN ONE REPLICATE SAMPLE. THE HIGHEST CONCENTRATION OF BARIUM IN MW-2S (293 MICROGRAM/L) WAS ALSO ABOVE THE PAL OF 200 MICROGRAM/L. THE HYDRAULIC GRADIENT IS VERTICALLY UPWARD AT MW-2S AND MW-2D, TOWARD THE ADJACENT WETLANDS. THE CONCENTRATION OF BARIUM WAS ABOVE THE PAL AT MW-1S; HOWEVER, THIS CONCENTRATION WAS NOT SIGNIFICANTLY ABOVE BACKGROUND. SELENIUM WAS DETECTED ABOVE THE PAL IN UPGRADIENT WELL MW-1S. CHROMIUM WAS MEASURED IN MW-4D BELOW THE LIMIT OF

QUANTIFICATION BUT ABOVE THE PAL. CONCENTRATIONS OF THE FOLLOWING CONSTITUENTS WERE ABOVE THE WISCONSIN GROUNDWATER QUALITY STANDARDS: IRON (IN MW-2S, MW-3S, MW-4D, AND MW-5D) AND MANGANESE (ALL, INCLUDING THE BACKGROUND WELL). IRON WAS ALSO ABOVE THE STANDARD IN THE PRIVATE WELL SAMPLED FOR BACKGROUND PURPOSES. THESE PUBLIC WELFARE STANDARDS ARE NOT HEALTH RELATED, BUT RATHER ARE FOR AESTHETICS (E.G., COLOR AND FIXTURE STAINING).

IN THE WETLANDS EAST OF THE SITE, ZINC, LEAD, COPPER AND IRON ARE PRESENT IN CONCENTRATIONS WHICH EXCEED THE STATE CHRONIC TOXICITY CRITERIA FOR SURFACE WATER.

SOIL GAS SURVEY RESULTS INDICATED THE PRESENCE OF LOW LEVEL VOLATILE ORGANICS. (FIGURES 4-2 TO 4-5).

FOUR VOCS WERE DETECTED AT LOW CONCENTRATIONS AT ONE AMBIENT AIR SAMPLING POINT LOCATED JUST NORTH OF MW-2 (SEE FIGURES 4-7 AND 4-8). THESE VOCS WERE NOT DETECTED IN A REPLICATE SAMPLE AT THIS LOCATION. THE VOCS DETECTED AND THEIR RESPECTIVE CONCENTRATIONS IN PARTS PER MILLION (PPM) WERE: 1,2-DICHLOROETHENE (0.06 PPM); ETHYL BENZENE (0.02 PPM); XYLENE (0.08 PPM); AND TOLUENE (0.04 PPM).

GROUNDWATER FLOW IN THE SURFICIAL AQUIFER IS RADIAL BENEATH THE SITE. REGIONAL GROUNDWATER FLOW IS WEST TOWARD THE YAHARA RIVER. GROUNDWATER FLOW IN THE BEDROCK AQUIFER IS TOWARD THE WEST.

#SHHR

VII. SUMMARY OF HUMAN HEALTH RISKS

PURSUANT TO THE NCP, A BASELINE RISK ASSESSMENT WAS PERFORMED BASED ON UNALTERED CONDITIONS AT THE SITE, AS CONTEMPLATED BY THE NO-ACTION ALTERNATIVE. THE NO-ACTION ALTERNATIVE ASSUMES THAT NO CORRECTIVE ACTION WILL TAKE PLACE AND THAT NO SITE USE RESTRICTIONS, SUCH AS FENCING, ZONING, AND DRINKING WATER RESTRICTIONS, WILL BE IMPOSED. THE RISK ASSESSMENT THEN DETERMINES ACTUAL OR POTENTIAL RISKS OR TOXIC EFFECTS THE CHEMICAL CONTAMINANTS AT THE SITE POSE UNDER CURRENT AND FEASIBLE FUTURE LAND-USE ASSUMPTIONS. THE RISK ASSESSMENT WAS APPROVED BY USEPA, IN CONSULTATION WITH WDNR. SUBSEQUENT TO THIS APPROVAL IT WAS DETERMINED THAT THE REFERENCE DOSE (RFD) FOR THF AS USED IN THE BRA WAS INCORRECT, THEREBY RESULTING IN UNDER-CALCULATED SITE RISKS. THE RISKS WERE SUBSEQUENTLY RECALCULATED USING THE RFD AS PROVIDED BY THE ENVIRONMENTAL CRITERIA AND ASSESSMENT OFFICE (ECAO), WHICH IS 0.002 MG/KG-DAY (VERSUS THE 0.068 MG/KG-DAY RFD USED IN THE ORIGINAL RISK ASSESSMENT). THE REVISED RISK CALCULATIONS INCLUDED THE FOLLOWING ASSUMPTIONS:

* NO REMEDIAL ACTIONS WILL BE TAKEN;

* ADJACENT OFF-SITE DEVELOPMENT MAY OCCUR IN THE FUTURE; AND,

* GROUNDWATER CONTAMINANT CONCENTRATIONS WILL NOT DECREASE OVER TIME AND THE FUTURE RESIDENTIAL SCENARIO WOULD INVOLVE THE CONSUMPTION OF CONTAMINATED WATER FROM MW-3D (WHERE THE HIGHEST CONCENTRATIONS OF THF WERE DETECTED) OVER AN ADULT LIFETIME.

AN ASSESSMENT OF THE HEALTH RISKS ASSOCIATED WITH TARGET COMPOUNDS IDENTIFIED IN THE RI WAS CARRIED OUT AND PRESENTED IN THE RISK ASSESSMENT, WHICH WAS SUBMITTED IN FINAL FORM IN JUNE 1991. VARIOUS EXPOSURE SCENARIOS WERE EVALUATED. THE MAXIMUM CARCINOGENIC RISKS FROM THE SITE (CONSIDERED FOR BOTH THE SINGLE, WORST-CASE WELL APPROACH AND REASONABLE MAXIMUM RISK ASSOCIATED WITH THE 95 PERCENT UPPER CONFIDENCE LEVEL [UCL]) WERE WITHIN THE AGENCY ALLOWABLE RISK RANGE. THE HIGHEST TOTAL SITE RISK FOR THE WORST WELL APPROACH WAS 9.7E-05. THE CUMULATIVE LIFETIME ADULT HAZARD INDEX WAS DETERMINED TO BE 1.4, OF WHICH 1.2 WAS AS A RESULT OF INHALATION OF VOLATILE ORGANIC COMPOUNDS IN THE AIR ABOVE THE SITE. BECAUSE OF AN ERROR IN THE INGESTION REFERENCE DOSE USED FOR THF, THE FINAL BASELINE RISK ASSESSMENT SUBMITTED BY THE PRPS UNDERESTIMATED POTENTIAL NON-CARCINOGENIC SITE RISKS.

THE HAZARD INDEX, AN EXPRESSION OF NON-CARCINOGENIC TOXIC EFFECTS, MEASURES WHETHER A PERSON IS BEING EXPOSED TO ADVERSE LEVELS OF NON-CARCINOGENS. ANY HAZARD INDEX VALUE GREATER THAN 1 SUGGESTS THAT A NON-CARCINOGEN POTENTIALLY PRESENTS AN UNACCEPTABLE TOXIC EFFECT.

BASED ON THE RISK ASSUMPTIONS AND ROUTES OF EXPOSURE, INGESTION OF THE WASTE, DIRECT SKIN CONTACT AND INGESTION OF CONTAMINANTS IN THE SURFACE WATER AND SEDIMENT, DIRECT SKIN CONTACT WITH AND INGESTION OF CONTAMINATED SOIL, DRINKING CONTAMINATED GROUNDWATER AT THE LANDFILL, AND BREATHING AIR AT THE LANDFILL), THE CONTAMINANTS AT THE STOUGHTON CITY LANDFILL COULD RESULT IN UNACCEPTABLE NON-CARCINOGENIC RISKS SUCH AS IMPAIRED ORGAN FUNCTION IN BOTH ADULTS AND CHILDREN.

USING THE CORRECT REFERENCE DOSE FOR THF, THE MAXIMUM CUMULATIVE NON-CARCINOGENIC RISK WAS DETERMINED BY USEPA TO BE 9.5 (ADULT HI), WHICH IS OUTSIDE THE ACCEPTABLE RANGE FOR NON-CARCINOGENIC RISK. THESE RISKS WERE BASED ON FUTURE RESIDENTIAL LAND USE SCENARIOS WITHIN CLOSE PROXIMITY TO THE SITE AND ON FUTURE GROUNDWATER USE AT THE SITE. IN ADDITION TO BEING OUTSIDE OF USEPA'S ACCEPTABLE RISK RANGE, THERE ARE ALSO CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENT (ARAR) EXCEEDANCES AT THE SITE.

TOXIC SUBSTANCES MAY POSE CERTAIN TYPES OF HAZARDS TO HUMAN AND/OR ANIMAL POPULATIONS. TYPICALLY, HAZARDS TO HUMAN HEALTH ARE EXPRESSED AS CARCINOGENIC RISKS AND NON-CARCINOGENIC TOXIC EFFECTS. CARCINOGENIC RISK, NUMERICALLY PRESENTED AS AN EXPONENTIAL FACTOR (E.G., 1 X (10-6)), IS THE INCREASED CHANCE A PERSON MAY HAVE IN CONTRACTING CANCER IN HIS OR HER LIFETIME DUE TO EXPOSURE TO A CHEMICAL OF CONCERN OVER HIS OR HER LIFETIME. FOR EXAMPLE, A 1 X (10-6) RISK DUE TO A LIFETIME OF DRINKING WATER WITH A CHEMICAL OF CONCERN IN IT MEANS THAT THE A PERSON'S CHANCE OF CONTRACTING CANCER DUE TO DRINKING THE WATER OVER HIS/HER LIFETIME IS INCREASED BY 1 IN 1 MILLION. USEPA CONSIDERS RISKS AT SUPERFUND SITES IN EXCESS OF 1 X (10-4) TO BE UNACCEPTABLE.

UNDER CURRENT CONDITIONS, THE GROUP MOST LIKELY TO COME INTO CONTACT WITH SITE CONTAMINANTS WOULD BE INDIVIDUALS INVOLVED IN RECREATIONAL ACTIVITIES IN THE WETLANDS. THESE INDIVIDUALS COULD BE EXPOSED TO CONTAMINANTS IN THE SURFACE WATER AND SEDIMENT THROUGH DIRECT SKIN CONTACT AND INGESTION. THE ESTIMATES OF POTENTIAL RISK WERE BASED ON THE FOLLOWING SCENARIOS. ADULTS WERE ASSUMED TO BE EXTENSIVELY EXPOSED TO THE CONTAMINATION FOR FOUR DAYS ANNUALLY FOR 30 YEARS. CHILDREN WERE ASSUMED TO BE EXTENSIVELY EXPOSED FOR SEVEN DAYS ANNUALLY FOR FIVE YEARS. CHILDREN ARE ESPECIALLY VULNERABLE TO CONTAMINATED SOIL AND WATER FOR SEVERAL REASONS. THEY SPEND MORE TIME OUTSIDE PLAYING, AND THEY ARE MORE LIKELY TO PUT DIRTY OBJECTS OR FINGERS IN THEIR MOUTHS, THEREBY INGESTING CONTAMINATED SOIL. THEIR BODIES ARE STILL DEVELOPING, AND BECAUSE OF THEIR LOWER BODY WEIGHT, A SMALLER AMOUNT OF CONTAMINATION CAN HAVE AN EFFECT.

DIRECT SKIN CONTACT WITH SEDIMENT COULD CAUSE A POTENTIAL INCREASE IN THE RISK OF CANCER OF FOUR POTENTIAL ADDITIONAL CASES OF CANCER IN EVERY ONE MILLION PEOPLE EXPOSED. INGESTING SEDIMENT AND DIRECT SKIN CONTACT WITH SURFACE WATER ON SITE WOULD NOT POSE AN UNACCEPTABLE RISK TO EXPOSED INDIVIDUALS.

IF PEOPLE WERE TO BE INVOLVED IN RECREATIONAL ACTIVITIES AT THE LANDFILL, THEY COULD POTENTIALLY BE EXPOSED TO SITE CONTAMINANTS THROUGH INGESTION OF OR DIRECT SKIN CONTACT WITH THE WASTE AND CONTAMINATED SOIL, AND BREATHING CONTAMINATED AIR AT THE LANDFILL. HOWEVER, THE RISKS FROM SUCH EXPOSURE IS LESS THAN USEPA'S LEVEL OF CONCERN.

ADDITIONALLY, IF PEOPLE WERE TO DRINK THE CONTAMINATED GROUNDWATER AT THE LANDFILL, THE POTENTIAL INCREASE IN THE RISK OF CANCER POSED WOULD AMOUNT TO EIGHT ADDITIONAL CASES OF CANCER IN EVERY 100,000 PEOPLE EXPOSED.

THE HIGHEST CANCER RISK AT THE STOUGHTON CITY LANDFILL SITE IS EIGHT POTENTIAL ADDITIONAL CASES OF CANCER IN 100,000 PEOPLE EXPOSED TO IT.

THEREFORE, THE LIFETIME CANCER RISKS ASSOCIATED WITH THE SCL SITE ARE NOT CONSIDERED UNACCEPTABLE.

HOWEVER, THE SITE DOES POSE UNACCEPTABLE NON-CANCEROUS RISKS, AS GROUNDWATER INGESTION FROM MONITORING WELL 3-D OVER THE COURSE OF AN ADULT LIFETIME WILL RESULT IN A HAZARD INDEX OF 9.5.

FOR A SUMMARY OF CARCINOGENIC AND NON-CARCINOGENIC SITE RISKS, REFER TO TABLE STO-SUMS.WK1.
#RFA

VIII. RATIONALE FOR ACTION

DURING THE COURSE OF AN RI/FS, THE USEPA REQUIRES THAT A RISK ASSESSMENT BE PREPARED ACCORDING TO USEPA POLICY AND GUIDELINES. FOR THE SCL SITE, PRP CONTRACTORS PREPARED A BASELINE RISK ASSESSMENT UNDER THE 1988

RI/FS ADMINISTRATIVE ORDER. THIS RISK ASSESSMENT PROVIDES THE AGENCY WITH A BASIS FOR TAKING A RESPONSE ACTION TO PROTECT HUMAN HEALTH AND WELFARE, AND THE ENVIRONMENT. THE RISK ASSESSMENT WHICH INCORPORATED AVAILABLE SITE INFORMATION IS CONSISTENT WITH USEPA POLICY AND GUIDANCE, ALTHOUGH AS NOTED ABOVE, SOME REVISION TO THE RISK TABLES HAVE BEEN MADE BY THE AGENCY SUBSEQUENT TO THE RECEIPT AND APPROVAL OF THE DOCUMENT. THE RISK ASSESSMENT AND REVISED RISK CALCULATIONS PROVIDE AN ESTIMATE OF THE HUMAN HEALTH PROBLEMS WHICH COULD POTENTIALLY RESULT IF CONTAMINATED GROUNDWATER IS LEFT UNTREATED. AS NOTED BELOW, THE SITE DOES POSE UNACCEPTABLE NON-CARCINOGENIC RISKS TO POPULATIONS WHICH MAY BE EXPOSED TO THF IN GROUNDWATER AT THE SITE.

A. RISK SUMMARY

ADDITIVE HAZARD INDICES EXCEED 1.0 IN MW-3D, DUE TO THE PRESENCE OF THF AT HIGH LEVELS. THE MAXIMUM WORST-CASE WELL RESULTED IN A LIFETIME HI OF 9.5. HAZARD INDICES ABOVE 1.0 ARE UNACCEPTABLE.

ADDITIVE EXCESS LIFETIME CARCINOGENIC RISKS CALCULATED FOR INGESTION OF CONTAMINATED GROUNDWATER WERE FOUND TO BE WITHIN THE ACCEPTABLE RISK RANGE. OVERALL EXCESS LIFETIME CARCINOGENIC RISKS FOR ALL EXPOSURE ROUTES WERE DETERMINED FOR REASONABLE WORST CASE (I.E., 95 PERCENT UPPER-BOUND CONFIDENCE INTERVAL) AND SINGLE WORST-CASE WELL APPROACHES. IN EACH APPROACH, CUMULATIVE SITE RISKS DID NOT EXCEED 1 X (10-4), THEREFORE CANCER RISKS ARE NOT UNACCEPTABLE.

IN ADDITION, AN ECOLOGICAL ASSESSMENT WAS CONDUCTED BY USEPA REGION V WHICH INDICATED POTENTIAL ADVERSE EFFECTS TO AQUATIC ORGANISMS AS A RESULT OF CONTAMINANTS LEACHING INTO THE WETLANDS ADJACENT TO THE SITE'S EASTERN BORDER.

B. ENVIRONMENTAL STANDARDS NOT MET AT THE SITE

IN ADDITION TO POSING UNACCEPTABLE RISKS TO RECEPTORS, THE STOUGHTON SITE DOES NOT MEET CERTAIN APPLICABLE OR RELEVANT AND APPROPRIATE FEDERAL OR STATE ENVIRONMENTAL STANDARDS AT THIS TIME.

1. CAP

THE EXISTING LANDFILL CAP DOES NOT MEET SECTION NR 504.07, WAC, THE CURRENT STATE LANDFILL CLOSURE REQUIREMENTS, WHICH HAVE BEEN DETERMINED TO BE RELEVANT AND APPROPRIATE FOR THIS SITE. IN PART, SECTION NR 504.07, WAC REQUIRES THAT THE CAP BE COMPOSED OF A 2-FOOT LAYER OF COMPACTED CLAY OVERLAIN BY A FROST-PROTECTIVE SOIL LAYER.

2. GROUNDWATER

STATE GROUNDWATER QUALITY STANDARDS ARE EXCEEDED IN THE SURFICIAL AQUIFER BENEATH THE WESTERN BORDER OF THE SITE. ONE SAMPLE COLLECTED DURING THE RI INDICATED A HIGH THF CONCENTRATION AT MW-3D OF 660 MICROGRAM/L, COMPARED TO THE STATE'S ENFORCEMENT STANDARD (ES) OF 50 MICROGRAM/L, AND PREVENTIVE ACTION LIMIT (PAL) OF 10 MICROGRAM/L.

C. GROUNDWATER PROTECTION GOALS

1. THE NATIONAL CONTINGENCY PLAN

THE USEPA'S GROUNDWATER PROTECTION GOAL HAS BEEN SET FORTH IN THE NCP: "THE NATIONAL GOAL OF THE REMEDY SELECTION PROCESS IS TO SELECT REMEDIES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, THAT MAINTAIN PROTECTION OVER TIME, AND THAT MINIMIZE UNTREATED WASTE" (SECTION 300.430(A)(1)(I)).

THE NCP DETAILS THAT THE USEPA

"EXPECTS TO RETURN USABLE GROUNDWATERS TO THEIR BENEFICIAL USES WHEREVER PRACTICABLE, WITHIN A TIME FRAME THAT IS REASONABLE GIVEN THE PARTICULAR CIRCUMSTANCES OF THE SITE. WHENEVER RESTORATION OF GROUNDWATERS IS NOT PRACTICABLE, (THE US) EPA EXPECTS TO PREVENT FURTHER MIGRATION OF THE PLUME, PREVENT EXPOSURE TO THE

CONTAMINATED GROUNDWATER, AND EVALUATE FURTHER RISK REDUCTION" (SECTION 300.430(A)(1)(III)(F)).

ALSO, THE NCP CONSIDERS THE USE OF INSTITUTIONAL CONTROLS TO LIMIT EXPOSURES TO HAZARDOUS SUBSTANCES IN THE GROUNDWATER:

"(THE US) EPA EXPECTS TO USE INSTITUTIONAL CONTROLS SUCH AS WATER USE AND DEED RESTRICTIONS TO SUPPLEMENT ENGINEERING CONTROLS AS APPROPRIATE FOR SHORT- AND LONG-TERM MANAGEMENT TO PREVENT OR LIMIT EXPOSURE TO HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS... THE USE OF INSTITUTIONAL CONTROLS SHALL NOT SUBSTITUTE FOR ACTIVE RESPONSE MEASURES AS THE SOLE REMEDY UNLESS SUCH RESPONSE MEASURES ARE DETERMINED NOT TO BE PRACTICABLE..." (SECTION 300.430(A)(1)(III)(D)).

2. STATE OF WISCONSIN

THE STATE'S GROUNDWATER PROTECTION GOALS ARE SET FORTH IN CHAPTER 160, WISCONSIN STATUTES (WIS. STATS.), WHICH APPLIES TO ALL GROUNDWATER IN THE STATE. (THE STATE'S GROUNDWATER QUALITY STANDARDS ARE SET FORTH IN CH. NR 140, WAC.) CHAPTER 160, WIS. STATS., AND CH. NR 140, WAC, ARE UTILIZED BY ALL STATE AGENCIES WHICH REGULATE FACILITIES, PRACTICES, OR ACTIVITIES THAT MAY AFFECT GROUNDWATER QUALITY. CONSISTENT WITH THESE STATUTES, THE REMEDIAL ALTERNATIVES EVALUATED IN THE FS MUST ACHIEVE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT (WHEN IMPLEMENTED), AND PROTECT THE GROUNDWATER RESOURCES OF THE STATE.

3. CLEAN-UP STANDARDS

THE CLEAN-UP STANDARDS FOR GROUNDWATER ARE THE STATE PREVENTIVE ACTION LIMITS (PALS), AS SET FORTH IN CH. NR 140, WIS. ADM. CODE. ADDITIONAL CLEAN-UP STANDARDS CONSISTENT WITH THE NCP AND THE ROD MAY BE SPECIFIED BY USEPA, IN CONSULTATION WITH WDNR, FOR OTHER CONTAMINANTS DETECTED DURING MONITORING WHICH LACK A NR 140 NUMERIC STANDARD. THESE CLEAN-UP STANDARDS APPLY TO THOSE CONTAMINANTS FOUND DURING THE RI PHASE WHICH EXCEEDED PALS, AS WELL AS ANY CONTAMINANTS WHICH ARE FOUND TO EXCEED PALS DURING GROUNDWATER MONITORING. THE PAL FOR THF IS 10 MICROGRAM/L; THE ES FOR THF IS 10 MICROGRAM/L.

SECTION NR 140.28, WAC, PROVIDES FOR ESTABLISHING A WISCONSIN ALTERNATIVE CONCENTRATION LIMIT (WACL) IF (1) BACKGROUND CONCENTRATIONS EXCEED PREVENTIVE ACTION LIMITS (PALS) AND/OR ENFORCEMENT STANDARDS (ESS) OR (2) IF IT IS DETERMINED THAT IT IS NOT TECHNICALLY OR ECONOMICALLY FEASIBLE TO ACHIEVE PALS. EXCEPT WHERE THE BACKGROUND CONCENTRATION OF A COMPOUND EXCEEDS THE STATE ENFORCEMENT STANDARD (ES), THE WACL ESTABLISHED MAY NOT EXCEED THE ES FOR THE CONTAMINANT.

THE NCP PROVIDES THAT REMEDIATION LEVELS SHOULD GENERALLY BE ATTAINED AT OR BEYOND THE EDGE OF THE WASTE MANAGEMENT AREA WHEN WASTE IS LEFT IN PLACE. IN ORDER TO DETERMINE WHETHER OR NOT GROUNDWATER EXTRACTION WILL BE REQUIRED TO ACHIEVE COMPLIANCE WITH STATE NR 140 GROUNDWATER QUALITY STANDARDS, SAMPLE RESULTS FROM ALL WELLS IN THE MONITORING PROGRAM SHALL BE CONSIDERED WHEN EVALUATING THE GROUNDWATER QUALITY OF THE SITE.

D. SUMMARY

ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES FROM THIS SITE, IF NOT ADDRESSED BY IMPLEMENTATION OF THE RESPONSE ACTION SELECTED BY THIS RECORD OF DECISION, MAY PRESENT AN IMMINENT AND SUBSTANTIAL ENDANGERMENT TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT. THEREFORE, BASED ON THE FINDINGS IN THE RI REPORT AND THE DISCUSSION ABOVE, A FEASIBILITY STUDY (FS) WAS PERFORMED TO FOCUS THE DEVELOPMENT OF ALTERNATIVES TO ADDRESS THE RISKS AT THE SITE. THE FS REPORT DOCUMENTS THE EVALUATION OF THE MAGNITUDE OF SITE RISKS, SITE-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS), AND THE REQUIREMENTS OF CERCLA AND THE NCP IN THE DERIVATION OF REMEDIAL ALTERNATIVES FOR THE STOUGHTON SITE.

#DSC

IX. DOCUMENTATION OF SIGNIFICANT CHANGES

THE RESPONSIVENESS SUMMARY ATTACHED HERETO ADDRESSES THE COMMENTS RECEIVED DURING THE 30 DAY PUBLIC COMMENT PERIOD ON THE PROPOSED PLAN. THE PROPOSED PLAN RECOMMENDED EXCAVATION AND CONSOLIDATION OF SATURATED WASTE ALONG THE EASTERN BOUNDARY OF THE SITE, PLACEMENT OF AN NR 504 SOLID WASTE CAP OVER THE LANDFILL, GROUNDWATER EXTRACTION, TREATMENT AND DISCHARGE TO THE YAHARA RIVER, LAND USE RESTRICTIONS AND LONG-TERM GROUNDWATER

MONITORING AS THE PRINCIPAL ELEMENTS OF THE REMEDIAL ACTION. THIS ALTERNATIVE IS LISTED AS ALTERNATIVE 7 IN THE DESCRIPTION OF ALTERNATIVES, SECTION X.

IN RESPONSE TO PUBLIC COMMENTS, USEPA, IN CONSULTATION WITH THE STATE, HAS CONCLUDED THAT ADDITIONAL INVESTIGATION OF THE EXTENT OF THE THF CONTAMINANT PLUME AND FURTHER SAMPLING TO DETERMINE CURRENT CONCENTRATIONS OF THF IN THE GROUNDWATER IS WARRANTED. THE INFORMATION OBTAINED FROM THE ADDITIONAL INVESTIGATIONS WILL BE USED TO ASSESS WHETHER THE EXTRACTION AND TREATMENT OF GROUNDWATER AS PROPOSED IN ALTERNATIVE 7 IS REQUIRED TO MEET STATE GROUNDWATER QUALITY STANDARDS AND TO COMPLY WITH THE REQUIREMENTS OF THE NCP. THEREFORE, THIS RECORD OF DECISION SELECTS A RESPONSE ACTION WHICH WILL CONSIST OF THE FOLLOWING COMPONENTS: NR 504 CAP; GROUNDWATER EXTRACTION AND TREATMENT TO ACHIEVE NR 140 GROUNDWATER QUALITY STANDARDS, UNLESS (AFTER FURTHER INVESTIGATION OF THE EXTENT OF THE CONTAMINANT PLUME AND THE CONCENTRATIONS OF CONTAMINANTS) USEPA, IN CONSULTATION WITH THE STATE, DETERMINES THAT GROUNDWATER EXTRACTION AND TREATMENT IS NOT REQUIRED TO MEET STATE GROUNDWATER QUALITY STANDARDS AND TO COMPLY WITH THE REQUIREMENTS OF THE NCP; EXCAVATION OF ALL THE SATURATED WASTE AND ITS CONSOLIDATION WITH THE OTHER LANDFILL WASTE; CONTINUED MONITORING OF THE GROUNDWATER; FENCING; AND LAND-USE RESTRICTIONS AS FAR AS PRACTICABLE. THIS ALTERNATIVE IS IDENTIFIED AS ALTERNATIVE 7A IN SECTION X, DESCRIPTION OF ALTERNATIVES.

BECAUSE OF SITE-SPECIFIC CIRCUMSTANCES AT THE STOUGHTON CITY LANDFILL SITE, THE FOLLOWING CRITERIA WILL BE USED TO DETERMINE WHETHER OR NOT GROUNDWATER EXTRACTION AND TREATMENT IS REQUIRED:

1.STATE GROUNDWATER QUALITY STANDARDS WILL BE PRESUMED TO BE MET WITHOUT GROUNDWATER EXTRACTION AND TREATMENT IF, WITHIN 12 MONTHS AFTER THE EFFECTIVE DATE OF THIS ROD, NO SAMPLE FROM ANY MONITORING WELL INDICATES THE ATTAINMENT OR EXCEEDANCE OF ANY PAL.

2.IF THERE IS AN ATTAINMENT OR EXCEEDANCE OF AN ES IN ANY SAMPLE COLLECTED DURING THE 12-MONTH PERIOD AFTER THE EFFECTIVE DATE OF THIS ROD, GROUNDWATER EXTRACTION AND TREATMENT WILL BE INITIATED IN COMPLIANCE WITH A SCHEDULE TO BE DETERMINED BY USEPA, IN CONSULTATION WITH THE STATE, UNLESS A GROUNDWATER ASSESSMENT REPORT IS SUBMITTED TO USEPA AND THE STATE BY THE PRPS WITHIN 12 MONTHS AFTER THE EFFECTIVE DATE OF THIS ROD WHICH EVALUATES ALL NEW AND PRE-EXISTING GROUNDWATER MONITORING DATA FOR THE SITE, AND USEPA, IN CONSULTATION WITH THE STATE, DETERMINES THAT: (1) IT IS PROBABLE THAT NO PAL WILL BE ATTAINED OR EXCEEDED AT OR BEYOND THE EDGE OF THE NR 140 DESIGN MANAGEMENT ZONE (DMZ) OR THE PROPERTY BOUNDARY, WHICHEVER IS CLOSER TO THE WASTE BOUNDARY, TEN (10) YEARS AFTER THE EFFECTIVE DATE OF THIS ROD; AND (2) IN THE ABSENCE OF GROUNDWATER EXTRACTION AND TREATMENT, THE REMEDY SELECTED IN THIS ROD WILL STILL BE PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT, TAKING INTO ACCOUNT ANY CONTAMINANTS DETECTED IN THE GROUNDWATER AT AND BEYOND THE WASTE BOUNDARY. IF USEPA DETERMINES, IN CONSULTATION WITH THE STATE, THAT THE CRITERIA SET FORTH IN THIS PARAGRAPH ARE MET, GROUNDWATER MONITORING WILL CONTINUE AS OTHERWISE REQUIRED, FOR AT LEAST THIRTY YEARS AFTER WASTE CONSOLIDATION AND THE COMPLETION OF CAP CONSTRUCTION. AT ANY TIME DURING, OR AT THE END OF, THE FIRST FIVE (5) YEARS OF GROUNDWATER MONITORING, FOLLOWING WASTE CONSOLIDATION AND COMPLETION OF CAP CONSTRUCTION, USEPA, IN CONSULTATION WITH THE STATE, MAY REQUIRE SUBSEQUENT GROUNDWATER ASSESSMENT REPORT(S) WHICH SHALL EVALUATE ALL MONITORING RESULTS OBTAINED TO DATE, TO DETERMINE WHETHER OR NOT STATE GROUNDWATER QUALITY STANDARDS, INCLUDING SOURCE CONTROL REQUIREMENTS, WILL BE COMPLIED WITH, WITHIN TEN (10) YEARS AFTER THE EFFECTIVE DATE OF THIS ROD. IF AT ANY TIME USEPA, IN CONSULTATION WITH THE STATE, DETERMINES THAT, BASED ON MONITORING RESULTS, THAT STATE GROUNDWATER QUALITY STANDARDS WILL NOT BE MET UNLESS ADDITIONAL ACTION IS TAKEN, GROUNDWATER EXTRACTION AND TREATMENT WILL BE INITIATED AND WILL CONTINUE UNTIL PALS ARE NO LONGER ATTAINED OR EXCEEDED AT ANY MONITORING POINT AT OR BEYOND THE WASTE BOUNDARY, OR UNTIL AN ALTERNATIVE CONCENTRATION LIMIT (ACL) ESTABLISHED PURSUANT TO NR 140.28, IS NO LONGER ATTAINED OR EXCEEDED AT ANY MONITORING POINT AT OR BEYOND THE WASTE BOUNDARY.

3. IF A PAL IS ATTAINED OR EXCEEDED BUT THERE IS NO ATTAINMENT OR EXCEEDANCE OF ANY ES WITHIN 12 MONTHS AFTER THE EFFECTIVE DATE OF THIS ROD, GROUNDWATER EXTRACTION AND TREATMENT WILL NOT BE REQUIRED AT THAT TIME. HOWEVER, GROUNDWATER MONITORING WILL CONTINUE AS OTHERWISE REQUIRED, FOR A MINIMUM OF THIRTY (30) YEARS AFTER WASTE CONSOLIDATION AND COMPLETION OF CAP CONSTRUCTION. IF AT ANY TIME MONITORING REVEALS THAT STATE GROUNDWATER QUALITY STANDARDS WILL NOT BE MET WITHIN TEN (10) YEARS AFTER THE EFFECTIVE DATE OF THIS ROD UNLESS ADDITIONAL ACTION IS TAKEN, GROUNDWATER EXTRACTION AND TREATMENT WILL BE INITIATED AND CONTINUE UNTIL PALS ARE NO LONGER ATTAINED OR EXCEEDED AT ANY MONITORING POINT AT OR BEYOND THE WASTE BOUNDARY, OR UNTIL AN ACL ESTABLISHED PURSUANT TO NR 140.28, IS NO LONGER ATTAINED OR EXCEEDED.

#DA

X. DESCRIPTION OF ALTERNATIVES

THE MAJOR OBJECTIVE OF THE FS AND THE PROPOSED PLAN WAS TO EVALUATE REMEDIAL ALTERNATIVES CONSISTENT WITH THE GOALS AND OBJECTIVES OF CERCLA, AS AMENDED BY SARA.

1. ALTERNATIVE 1: NO-ACTION

THE NO ACTION INCLUDES NO FURTHER ACTIVITIES AT THE SITE OTHER THAN A LONG-TERM PROGRAM OF GROUNDWATER MONITORING. THE FREQUENCY OF GROUNDWATER MONITORING WOULD BE ON A QUARTERLY BASIS AND WOULD INVOLVE THE MONITORING WELLS INSTALLED DURING THE RI/FS. THE GROUNDWATER SAMPLES COLLECTED WOULD BE ANALYZED FOR THE CURRENT PARAMETERS AS WELL AS TARGET COMPOUND LIST (TCL) VOLATILE AND SEMIVOLATILE ORGANICS, TARGET ANALYTE LIST (TAL) INORGANICS, TETRAHYDROFURAN, DICHLOROFLUOROMETHANE, AND TRICHLOROFLUOROMETHANE. THIS GROUNDWATER MONITORING PROGRAM WOULD BE IMPLEMENTED AS PART OF ALL SIX ALTERNATIVES ON A QUARTERLY BASIS.

UNDER THE NO-ACTION ALTERNATIVE, NO ACTIVE RESPONSE WOULD OCCUR, OTHER THAN LONG-TERM GROUNDWATER MONITORING. THE CURRENT RATE OF PRECIPITATION INFILTRATION, THROUGH THE CAP AND LANDFILL WASTE TOWARDS THE GROUNDWATER AND SURFACE WATER, IS PROJECTED TO INCREASE IN THE FUTURE AS FROST DAMAGE, ANIMAL BURROWING, AND EROSION CONTINUES. NO REDUCTION OF THE RATE OF LEACHING OF CONTAMINANTS TO THE GROUNDWATER WOULD BE PROVIDED BY THIS ALTERNATIVE, THUS NO RISK REDUCTION WOULD RESULT FROM THIS ACTION. MONITORING OF THE GROUNDWATER CONTAMINANT PLUME WOULD BE IMPLEMENTED TO MONITOR POTENTIALLY SIGNIFICANT IMPACTS TO THE CITY WELLS AND POTENTIAL DISCHARGES OF CONTAMINANTS TO THE SURFACE WATER AND SEDIMENTS OF THE YAHARA RIVER AND ADJACENT WETLANDS.

INITIAL CAPITAL COSTS ARE ESTIMATED TO BE $5,000. OPERATION AND MAINTENANCE (O&M). COSTS ASSOCIATED WITH SAMPLING EVENTS AND ANALYTICAL WORK ARE ESTIMATED AT $134,600 ANNUALLY. THEREFORE, OVER 30 YEARS, THIS ALTERNATIVE WOULD COST $2.1 MILLION TO IMPLEMENT, ON A NET PRESENT VALUE (NPV) BASIS.

2. ALTERNATIVE 2: CAP REPAIR AND UPGRADE

THIS ALTERNATIVE WOULD COMBINE REPAIR AND UPGRADE OF THE EXISTING CAP WITH FENCING OF THE LANDFILL BOUNDARY TO RESTRICT ACCESS, AND DEED RESTRICTIONS TO PREVENT THE INSTALLATION OF WELLS IN THE AFFECTED AREA AND TO PROHIBIT CONSTRUCTION OVER THE COMPLETED LANDFILL CAP. FENCING, USE RESTRICTIONS AND ADDITIONAL GROUNDWATER MONITORING ARE COMMON ELEMENTS IN ALL OF THE ALTERNATIVES EXCEPT THE NO ACTION ALTERNATIVE. THESE ACTIONS WOULD REDUCE THE POTENTIAL FOR EXPOSURE TO SOILS AND SOLID WASTE IN THE LANDFILL. THE UPGRADED CAP WOULD ALSO MINIMIZE THE AMOUNT OF PRECIPITATION INFILTRATION THROUGHOUT THE LANDFILL.

PRIOR TO REPAIR, THE CAP WOULD HAVE TO BE INVESTIGATED TO ASSESS ITS OVERALL CONDITION. SOIL BORINGS TO DETERMINE THE THICKNESS AND MATERIALS USED IN CONSTRUCTION OF THE CAP WOULD BE REQUIRED AS PART OF THIS INVESTIGATION. ANY EROSION, DEPRESSIONS, CRACKS, OR ANIMAL HOLES WOULD ALSO BE DOCUMENTED.

AFTER ASSESSMENT OF ITS CONDITION, AFFECTED AREAS OF THE CAP WOULD BE REPAIRED OR UPGRADED TO ENSURE THAT ALL AREAS WHERE WASTE DISPOSAL OCCURRED WERE COVERED WITH 2 FEET OF COMPACTED CLAY AND 6 INCHES OF TOPSOIL CONSISTENT WITH WAC NR 506.08(3) REGULATIONS. THE COMPACTED CLAY WOULD HAVE A PERMEABILITY OF 1 X (10-7) CM/SEC. THE PERMEABILITY AND THICKNESS OF THIS LAYER WOULD BE EQUIVALENT TO THE HYDRAULIC BARRIER LAYER REQUIRED UNDER CURRENT WISCONSIN REGULATIONS FOR SOLID WASTE FACILITIES. THE EAST EDGE OF THE LANDFILL EXTENDS TO THE PROPERTY BOUNDARY. WHEN REPAIRING THE CAP IN THIS AREA, IT WILL BE NECESSARY TO EXTEND THE CAP PAST THE LANDFILL PROPERTY BOUNDARY. THE POTENTIAL NEED FOR A GAS VENTING SYSTEM FOLLOWING CAP REPAIR WILL ALSO BE CONSIDERED. THE TOTAL AREA OF CAP REPAIR UNDER THIS ALTERNATIVE IS 17.6 ACRES. REGRADING IN SOME AREAS USING IMPORTED FILL WILL BE REQUIRED INCLUDING THE RELATIVELY FLAT AREA IN THE VICINITY OF THE LANDFILL SHELTER THAT HAS BEEN IDENTIFIED AS THE PRIMARY GROUNDWATER RECHARGE AREA. THE REPAIRED CAP WOULD ALSO BE REVEGETATED.

ACCEPTABLE SECTIONS OF THE EXISTING CAP DISTURBED DURING CAP REPAIR WOULD ALSO BE REVEGETATED. FENCING WOULD BE INSTALLED AROUND THE CAPPED AREA TO PREVENT ACCESS, FURTHER MINIMIZING THE POTENTIAL FOR CONTACT WITH SOILS AND WASTE IN THE LANDFILL.

CYCLONE FENCING, WITH A LOCKING GATE AT THE LANDFILL ENTRANCE, WOULD BE USED. BY RESTRICTING ACCESS, WEAR ON THE CAP COULD ALSO BE REDUCED.

GROUNDWATER USE IN THE AREA WOULD BE PREVENTED BY OBTAINING DEED RESTRICTIONS ON THE USE AND PLACEMENT OF WELLS IN THE AFFECTED AREA.

THIS ALTERNATIVE WOULD COST $2.2 MILLION FOR INITIAL CAPITAL COSTS, AND $146,600 ANNUALLY FOR O&M. THEREFORE, OVER 30 YEARS, THIS ALTERNATIVE WOULD COST $4.4 MILLION (NPV) TO IMPLEMENT.

3. ALTERNATIVE 3: SOLID WASTE CAP

THIS ALTERNATIVE WOULD INCLUDE PLACING A NEW MULTILAYER CLAY CAP OVER THE ENTIRE LANDFILL AREA. THIS CAP WOULD MEET THE REQUIREMENTS FOR THE WISCONSIN NR 504.07 REGULATIONS CONCERNING COVER SYSTEMS FOR SOLID WASTE DISPOSAL FACILITIES. REGRADING OF CERTAIN PARTS OF THE LANDFILL USING IMPORTED FILL WOULD BE REQUIRED. THE AREA TO BE CAPPED IS SEEN IN FIGURE 4-2. NO PORTION OF THE SITE SITUATED WITHIN THE FLOOD PLAIN WOULD BE CAPPED; ONLY THE ELEVATED WASTE DISPOSAL AREA WOULD BE CAPPED. AFTER PREPARING THE SURFACE, A MULTILAYER CLAY CAP WOULD BE INSTALLED. THE AREAL EXTENT OF THE CAP WOULD BE THE SAME AS FOR THE REPAIRED OR UPGRADED CAP DESCRIBED IN ALTERNATIVE 2. THE CAP TO BE INSTALLED WOULD CONSIST OF A 0.5-FOOT GRADING LAYER, A 2-FOOT CLAY BARRIER LAYER, A MINIMUM 1.5-FOOT COVER LAYER, AND A VEGETATED 0.5-FOOT TOPSOIL LAYER. THE GRADING LAYER WOULD BE CONSTRUCTED FROM THE EXISTING CAP. THE CLAY BARRIER LAYER IS REQUIRED TO HAVE A COMPACTED PERMEABILITY OF 1 X (10-7) CM/SEC OR LESS. (FIGURE 4-3).

A PASSIVE GAS EXTRACTION SYSTEM TO COLLECT GAS FROM BENEATH THE CAP WOULD BE REQUIRED. THE NEED FOR TREATMENT OF AIR EMISSIONS FROM THIS SYSTEM CAN ONLY BE DETERMINED BASED ON ACTUAL SITE DATA WHEN THE SYSTEM IS INSTALLED. FOR THE PURPOSE OF THIS EVALUATION, IT IS ASSUMED THAT MINIMAL AIR EMISSION CONTROLS WILL BE REQUIRED. ALTHOUGH THIS ASSUMPTION MAY IMPACT THE COST TO OPERATE AND MAINTAIN A CAPPING SYSTEM, IT IS ASSUMED THAT EQUAL COST IMPACT WILL BE ENCOUNTERED BY ALL CAPPING ALTERNATIVES. THUS COMPARISON OF COSTS BETWEEN ALTERNATIVES IS NOT AFFECTED AND THE POTENTIAL FOR AN OVERINFLATED OPERATING COST IS AVOIDED.

THE LANDFILL BOUNDARY WOULD BE FENCED TO RESTRICT ACCESS. GROUNDWATER MONITORING AND USE DEED RESTRICTIONS, AS DESCRIBED UNDER ALTERNATIVES 1 AND 2, RESPECTIVELY, WOULD ALSO BE IMPLEMENTED AS PART OF THIS ALTERNATIVE.

THIS ALTERNATIVE WOULD COST $3 MILLION FOR INITIAL CAPITAL COSTS AND $146,600 ANNUALLY FOR O&M COSTS. THEREFORE, OVER 30 YEARS, THIS ALTERNATIVE WOULD COST $5.2 MILLION (NPV) TO IMPLEMENT.

4. ALTERNATIVE 4A: SOLID WASTE CAP WITH PHYSICAL BARRIER

THE DETAILS OF CAP CONSTRUCTION AND RELATED ISSUES WOULD BE THE SAME AS THOSE DISCUSSED FOR ALTERNATIVE 3, HOWEVER, THE AREA OF THE CAP WOULD BE LESS UNDER THIS ALTERNATIVE. GAS CONTROL WOULD BE AS DESCRIBED FOR ALTERNATIVE 3. TWO PRIMARY AREAS OF THE LANDFILL CONTAIN SATURATED SOLID WASTE. TO PREVENT THE DISCHARGE OF LEACHATE FROM SATURATED SOLID WASTE TO THE ADJACENT WETLANDS, AN INTERCEPTOR TRENCH AND SLURRY WALL WOULD BE CONSTRUCTED BETWEEN THESE AREAS AND THE WETLANDS. FIGURE 4-4 SHOWS THE LOCATION OF THE INTERCEPTOR TRENCHES AND SLURRY WALLS. THE INTERCEPTOR TRENCHES WOULD BE APPROXIMATELY 10 TO 15 FEET DEEP AND BE BACKFILLED WITH POROUS GRANULAR MATERIAL. THE TRENCHES WOULD BE DEWATERED BY EXTRACTION WELLS INSTALLED IN THE TRENCH BACKFILL MATERIAL. RECOVERED LEACHATE WOULD BE TREATED IN A LEACHATE TREATMENT SYSTEM. TREATABILITY STUDIES WOULD BE REQUIRED TO CHARACTERIZE THE LEACHATE AND DESIGN A TREATMENT SYSTEM.

A CAP CONSISTING OF COMPACTED CLAY WOULD BE CONSTRUCTED OVER THE SLURRY WALL TO PREVENT DESICCATION AND CRACKING. A CONCEPTUAL DRAWING OF THE INTERCEPTOR TRENCH AND SLURRY WALL IS DEPICTED IN FIGURE 4-5.

PRIOR TO THE CONSTRUCTION OF THE INTERCEPTOR TRENCHES AND SLURRY WALLS, A SUBSURFACE INVESTIGATION WOULD BE CONDUCTED. THE INVESTIGATION WOULD DEFINE THE LIMITS OF THE SATURATED REFUSE, DEFINE THE GEOLOGY OF THE SITE UNDERLYING THE REFUSE, AND DETERMINE THE PHYSICAL CHARACTERISTICS OF THE SOILS UNDER THE REFUSE. THIS INFORMATION WOULD BE USED TO COMPLETE THE DETAILED ENGINEERING DESIGN OF THE TRENCHES AND WALLS.

THIS ALTERNATIVE WOULD COST $6.9 MILLION FOR INITIAL CAPITAL COSTS AND $351,600 ANNUALLY FOR O&M COSTS. THEREFORE, OVER 30 YEARS, THIS ALTERNATIVE WOULD COST $12.4 MILLION (NPV) TO IMPLEMENT.

5. ALTERNATIVE 4B: SOLID WASTE CAP WITH CONSOLIDATION OF WASTE AND PHYSICAL BARRIER

THIS ALTERNATIVE IS SIMILAR TO ALTERNATIVE 4A, BUT INCLUDES AN OPTION FOR EXCAVATING SATURATED SOLID WASTE AND CONSOLIDATING IT IN OTHER AREAS ON THE LANDFILL WHERE IT WOULD BE CAPPED ALONG WITH THE REST OF THE WASTE WITHIN THE DISPOSAL AREA. FOR AN APPROXIMATE AREA OF WASTE RELOCATION, SEE FIGURE 4-6. EXCAVATION OF THIS MATERIAL PRIOR TO INSTALLATION OF THE INTERCEPTOR TRENCHES AND SLURRY WALLS MAY DECREASE FURTHER THE AMOUNT OF LEACHATE DISCHARGING TO THE ADJACENT WETLAND COMPARED TO INSTALLING THE TRENCHES AND SLURRY WALLS WITHOUT EXCAVATION.

PRIOR TO EXCAVATION, FACILITIES AND EQUIPMENT WOULD BE CONSTRUCTED TO DEWATER THE SATURATED REFUSE. THE FACILITIES WOULD CONSIST OF TEMPORARY IMPERMEABLE BASINS INTO WHICH THE EXCAVATED REFUSE WOULD BE PLACED. THE REFUSE WOULD BE ALLOWED TO DRAIN, AND THE WATER COLLECTED FOR TREATMENT IN THE SAME LEACHATE TREATMENT SYSTEM CONSTRUCTED TO TREAT LEACHATE FROM THE INTERCEPTOR TRENCHES. THE DEWATERED REFUSE WOULD THEN BE RELOCATED TO THE TOP OF THE LANDFILL, AND EVENTUALLY CAPPED ALONG WITH THE REST OF THE LANDFILL. THE TOTAL AREA OF THE LANDFILL REQUIRING A CAP WOULD BE REDUCED BY EXCLUDING AREAS FROM WHICH WASTE WAS REMOVED. AFTER COMPLETION OF THE SOLID WASTE DEWATERING, THE TEMPORARY BASINS WOULD BE REMOVED.

INSTALLATION OF TRENCHES AND SLURRY WALLS WOULD BE COMPLETED AFTER EXCAVATION OF SATURATED WASTES, WITH THESE STRUCTURES BEING LOCATED AT THE EDGE OF THE EXCAVATION FARTHEST FROM THE WETLAND. FILL WOULD BE IMPORTED TO THE SITE TO BACKFILL THE EXCAVATED AREA ON THE NORTH OF THE LANDFILL AND TO FILL AND SLOPE THE EXCAVATION FACE IN THE SOUTHEAST PART OF THE LANDFILL. THE FILL ALONG THE SOUTHEASTERN EXCAVATION FACE WOULD BE GRADED SUCH THAT THE MAXIMUM SLOPE WOULD BE 25 PERCENT.

THIS ALTERNATIVE WOULD COST $8.4 MILLION FOR INITIAL CAPITAL COSTS AND $351,600 ANNUALLY FOR O&M COSTS. THEREFORE, OVER 30 YEARS, THIS ALTERNATIVE WOULD COST $13.8 MILLION (NPV) TO IMPLEMENT.

6. ALTERNATIVE 5: SOLID WASTE CAP WITH GROUNDWATER PUMP AND TREAT

THE DETAILS OF CAP CONSTRUCTION AND RELATED ISSUES WOULD BE THE SAME AS THOSE DISCUSSED FOR ALTERNATIVE 3. GAS CONTROL WOULD BE AS DESCRIBED FOR ALTERNATIVE 3.

A GROUNDWATER COLLECTION AND TREATMENT SYSTEM WOULD BE A COMPONENT OF THIS ALTERNATIVE. THE EXACT NUMBER OF WELLS, THEIR LOCATIONS, DEPTHS, AND THEIR PUMPING RATES WOULD BE DETERMINED BASED ON TREATABILITY STUDIES. HOWEVER, FOR COST ESTIMATION PURPOSES, IT WAS ASSUMED THAT TWO GROUNDWATER RECOVERY WELLS WOULD BE INSTALLED DOWNGRADIENT (WEST) OF MW-3D. THE WELLS WOULD COLLECTIVELY PUMP GROUNDWATER TO COLLECTION PIPING AT A RATE OF APPROXIMATELY 75 GPM, WHICH WOULD CARRY THE WATER TO THE ON-SITE TREATMENT FACILITY. WELL CONSTRUCTION AND PUMP INSTALLATION STANDARDS, AS OUTLINED IN WAC NR 112, WOULD BE COMPLIED WITH. AN EFFLUENT DISCHARGE PERMIT WOULD HAVE TO BE OBTAINED, UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES), IF TREATED GROUNDWATER IS DISCHARGED OFF-SITE. SUBSTANTIVE STATE EFFLUENT DISCHARGE STANDARDS WOULD HAVE TO BE COMPLIED WITH, IF THE TREATMENT GROUNDWATER IS DISCHARGED ON-SITE.

FOR COST ESTIMATE PURPOSES, IT WAS ASSUMED THAT SURFACE BIOLOGICAL TREATMENT WOULD BE USED TO REMOVE TETRAHYDROFURAN FROM THE GROUNDWATER. THE MOST EFFECTIVE PROCESS FOR THIS SITE WILL BE DETERMINED BASED ON TREATABILITY STUDIES. HOWEVER, FOR COST ESTIMATION PURPOSES, A FIXED-FILM, PLUG FLOW REACTOR CONFIGURATION HAS BEEN SELECTED.

TREATABILITY STUDIES WILL BE CONDUCTED DURING REMEDIAL DESIGN IN ORDER TO DETERMINE THE OPTIMUM TREATMENT PROCESS FOR REMOVING THF AND OTHER CONTAMINANTS OF CONCERN FROM THE GROUNDWATER BENEATH THE SITE. FOR COST ESTIMATION PURPOSES, THE FS ASSUMED THAT THE THF PLUME WOULD BE MANAGED VIA ABOVE GROUND BIOLOGICAL TREATMENT.

THIS ALTERNATIVE WOULD COST $3.7 MILLION FOR INITIAL CAPITAL COSTS, $210,800 ANNUALLY FOR THE O&M COSTS FIRST FIVE YEARS, AND $146,600 ANNUALLY THEREAFTER. THEREFORE, OVER 30 YEARS, THIS ALTERNATIVE WOULD COST $6.2 MILLION (NPV) TO IMPLEMENT.

7.ALTERNATIVE 6A: SOLID WASTE CAP WITH PHYSICAL BARRIER AND GROUNDWATER PUMP AND TREAT

THE CAP WOULD BE AS DESCRIBED IN ALTERNATIVE 3. THE DETAILS OF CONSTRUCTION AND RELATED ISSUES WOULD BE THE SAME AS THOSE DISCUSSED FOR ALTERNATIVE 3. GAS CONTROL WOULD BE AS DESCRIBED FOR ALTERNATIVE 3. THE DETAILS OF INSTALLATION AND OPERATION OF THE GROUNDWATER INTERCEPTOR/BARRIER TRENCHES, AND OPTIONAL RELOCATION OF SATURATED SOLID WASTE IS AS DESCRIBED FOR ALTERNATIVE 4. THE DETAILS OF GROUNDWATER COLLECTION AND TREATMENT WOULD BE AS DESCRIBED FOR ALTERNATIVE 5.

THIS ALTERNATIVE WOULD COST $7.7 MILLION FOR INITIAL CAPITAL COSTS, $393,800 ANNUALLY FOR THE O&M COSTS FIRST FIVE YEARS, AND $146,600 ANNUALLY THEREAFTER. THEREFORE, OVER 30 YEARS, THIS ALTERNATIVE WOULD COST $13.4 MILLION (NPV) TO IMPLEMENT.

8.ALTERNATIVE 6B: SOLID WASTE CAP WITH CONSOLIDATION OF WASTE, PHYSICAL BARRIER, AND GROUNDWATER PUMP AND TREAT

THIS ALTERNATIVE IS SIMILAR TO ALTERNATIVE 6A BUT INCLUDES THE WASTE EXCAVATION AND CONSOLIDATION OPTION ALONG WITH THE CONSTRUCTION OF A PHYSICAL BARRIER.

THIS ALTERNATIVE WOULD COST $9.1 MILLION FOR INITIAL CAPITAL COSTS, $393,800 ANNUALLY FOR THE FIRST FIVE YEARS, AND $146,600 ANNUALLY THEREAFTER. THEREFORE, OVER 30 YEARS, THIS ALTERNATIVE WOULD COST $14.8 MILLION (NPV) TO IMPLEMENT.

9.ALTERNATIVE 7: SOLID WASTE CAP WITH CONSOLIDATION OF WASTE AND GROUNDWATER PUMP AND TREAT

THIS IS THE ALTERNATIVE IDENTIFIED IN THE PROPOSED PLAN AS THE AGENCY'S PREFERRED ALTERNATIVE.

THE CAP WOULD MEET REQUIREMENTS OF WAC NR 504 FOR FINAL COVER SYSTEMS FOR SOLID WASTE DISPOSAL FACILITIES. THE DETAILS OF CONSTRUCTION AND RELATED ISSUES WOULD BE THE SAME AS THOSE DISCUSSED FOR ALTERNATIVE 3. GAS CONTROL WOULD BE AS DESCRIBED FOR ALTERNATIVE 3.

THIS ALTERNATIVE WOULD ALSO CONSIST OF EXCAVATING WASTES IN CONTACT WITH GROUNDWATER ALONG THE LANDFILL'S NORTHEASTERN AND SOUTHEASTERN BOUNDARIES, AND CONSOLIDATION ALONG THE SITE'S WESTERN BOUNDARY. THIS WOULD REMOVE THE DIRECT CONTACT OF WASTES AND GROUNDWATER AND WILL RESULT IN LESS IMPACT TO THE WETLANDS ADJACENT TO THE SITE'S EASTERN BORDER.

THE CONTAMINATED GROUNDWATER PLUME TO THE WEST OF THE SITE WOULD BE EXTRACTED VIA A SYSTEM OF EXTRACTION WELLS AND TREATED ABOVE GROUND TO COMPLY WITH NUMERIC WPDES AND BEST AVAILABLE TREATMENT (BAT) REQUIREMENTS. THE METHOD OF TREATMENT WILL BE DETERMINED DURING REMEDIAL DESIGN, DEPENDING ON THE RESULTS OF TREATABILITY STUDIES DURING DESIGN. FOR FS COST ESTIMATE PURPOSES, IT WAS ASSUMED THAT SURFACE BIOLOGICAL TREATMENT WOULD BE EMPLOYED. TREATED GROUNDWATER WILL BE DISCHARGED TO THE YAHARA RIVER.

THIS ALTERNATIVE WOULD COST $5.2 MILLION FOR INITIAL CAPITAL COSTS, $393,800 ANNUALLY FOR O&M COSTS FOR THE FIRST FIVE YEARS, AND $146,600 ANNUALLY THEREAFTER. THEREFORE, OVER 30 YEARS, THIS ALTERNATIVE WOULD COST $8.5 MILLION (NPV) TO IMPLEMENT.

10. ALTERNATIVE 7A: SOLID WASTE CAP WITH CONSOLIDATION OF WASTE AND CONTINGENCY GROUNDWATER PUMP AND TREAT

THIS ALTERNATIVE IS A MODIFICATION TO ALTERNATIVE 7, THE PREFERRED ALTERNATIVE IDENTIFIED IN THE PROPOSED PLAN, AND THIS ALTERNATIVE COMPRISES THE SOLID WASTE CAP AND WASTE CONSOLIDATION COMPONENTS OF ALTERNATIVE 7. AS DESCRIBED IN SECTION IX, THE GROUNDWATER COMPONENT OF THIS REMEDY IS SUBJECT TO CONTINGENCIES.

A GROUNDWATER EXTRACTION AND TREATMENT SYSTEM WOULD BE REQUIRED UNLESS THE RESULTS OF ADDITIONAL INVESTIGATION OF THE SAND AND GRAVEL AQUIFER AND THE BEDROCK AQUIFER INDICATE THAT NR 140 GROUNDWATER QUALITY STANDARDS WILL BE MET WITHOUT GROUNDWATER EXTRACTION AND TREATMENT. THIS DETERMINATION WILL BE MADE AS DESCRIBED IN SECTION IX.

THE EXACT NUMBER OF EXTRACTION WELLS, THEIR LOCATIONS, DEPTHS, AND THEIR PUMPING RATES WILL BE DETERMINED BY USEPA, IN CONSULTATION WITH WDNR, BASED ON PUMP TESTS. HOWEVER, FOR COST ESTIMATION PROPOSES, IT WAS ASSUMED THAT TWO GROUNDWATER EXTRACTION WELLS WOULD BE INSTALLED DOWNGRADIENT (WEST) OF MW-3D. THE WELLS

WOULD COLLECTIVELY PUMP GROUNDWATER TO COLLECTION PIPING AT A RATE OF APPROXIMATELY 75 GPM, WHICH WOULD CARRY THE WATER TO THE ON-SITE TREATMENT FACILITY. WELL CONSTRUCTION AND PUMP INSTALLATION STANDARDS, AS OUTLINED IN WAC NR 112, WOULD BE COMPLIED WITH. AN EFFLUENT DISCHARGE PERMIT WOULD HAVE TO BE OBTAINED, UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES), IF TREATED GROUNDWATER IS DISCHARGED OFF-SITE. SUBSTANTIVE STATE EFFLUENT DISCHARGE STANDARDS WOULD HAVE TO BE COMPLIED WITH, IF THE TREATMENT GROUNDWATER IS DISCHARGED ON-SITE.

IF GROUNDWATER PUMP AND TREAT IS REQUIRED, THE COST OF THIS ALTERNATIVE, IN TERMS OF CAPITAL COST, ANNUAL OPERATING COSTS AND NET PRESENT WORTH ARE IDENTICAL TO THAT OF ALTERNATIVE 7. IN THE EVENT THAT GROUNDWATER PUMP AND TREAT IS DETERMINED NOT TO BE REQUIRED, THE CAPITAL COST OF THIS ALTERNATIVE WOULD BE APPROXIMATELY $4.5 MILLION; ANNUAL OPERATING COSTS WOULD BE APPROXIMATELY $329,600 FOR THE FIRST FIVE YEARS AND $146,600 THEREAFTER; AND OVER 30 YEARS, THE NPV WOULD AMOUNT TO $7.5 MILLION.

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XI. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

A. THE NINE EVALUATION CRITERIA

THE FS EXAMINED EIGHT ALTERNATIVES, INCLUDING THE NO ACTION ALTERNATIVE, AND EVALUATED THEM ACCORDING TO TECHNICAL FEASIBILITY, ENVIRONMENTAL PROTECTION, PUBLIC HEALTH PROTECTION AND INSTITUTIONAL ISSUES. IN ADDITION TO THESE EIGHT, THE PROPOSED PLAN PRESENTED A NINTH ALTERNATIVE WHICH WAS A "HYBRID" OF ALTERNATIVES 4B AND 5, EXCLUDING THE PHYSICAL BARRIER. THE USEPA CARRIED FORTH EACH OF THESE ALTERNATIVES FOR EVALUATION IN ITS PROPOSED PLAN. IN RESPONSE TO PUBLIC CONCERNS OVER LIMITED GROUNDWATER CONTAMINATION DATA, USEPA, IN CONSULTATION WITH WDNR, HAS PROPOSED A TENTH ALTERNATIVE WHICH COMPRISES THE COMPONENTS OF ALTERNATIVE 7, BUT ALLOWS FOR GROUNDWATER EXTRACTION AND TREATMENT ON A CONTINGENCY BASIS, AS IDENTIFIED IN SECTION IX ABOVE. THE ALTERNATIVES WERE EVALUATED ACCORDING TO THE FOLLOWING NINE CRITERIA WHICH ARE USED BY THE USEPA TO PROVIDE THE RATIONALE FOR THE SELECTION OF THE FINAL REMEDIAL ACTION AT A SITE:

THRESHOLD CRITERIA

1) OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT ADDRESSES WHETHER OR NOT A REMEDY PROVIDES ADEQUATE PROTECTION AND DESCRIBES HOW RISKS POSED THROUGH EACH PATHWAY ARE ELIMINATED, REDUCED OR CONTROLLED THROUGH TREATMENT, ENGINEERING CONTROLS, OR INSTITUTIONAL CONTROLS.

2) COMPLIANCE WITH STATE AND FEDERAL REGULATIONS (ARAR'S) ADDRESSES WHETHER OR NOT A REMEDY WILL MEET ALL THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OF FEDERAL AND STATE ENVIRONMENTAL STATUTES AND/OR PROVIDES GROUNDS FOR INVOKING A WAIVER.

PRIMARY BALANCING CRITERIA

3) REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT IS THE ANTICIPATED PERFORMANCE OF THE TREATMENT TECHNOLOGIES A REMEDY MAY EMPLOY.

4) SHORT-TERM EFFECTIVENESS ADDRESSES THE PERIOD OF TIME NEEDED TO ACHIEVE PROTECTION, AND ANY ADVERSE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY BE POSED DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD UNTIL CLEAN-UP GOALS ARE ACHIEVED.

5) LONG-TERM EFFECTIVENESS AND PERMANENCE REFERS TO THE ABILITY OF A REMEDY TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT OVER TIME ONCE CLEAN-UP GOALS HAVE BEEN MET.

6) IMPLEMENTABILITY IS THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF A REMEDY, INCLUDING THE AVAILABILITY OF MATERIALS AND SERVICES NEEDED TO IMPLEMENT A PARTICULAR OPTION.

7) COST INCLUDES ESTIMATED CAPITAL AND OPERATION AND MAINTENANCE COSTS, AND NET PRESENT WORTH COSTS.

MODIFYING CRITERIA

8) STATE ACCEPTANCE INDICATES WHETHER, BASED ON ITS REVIEW OF THE RI/FS AND THE PROPOSED PLAN, THE STATE CONCURS, OPPOSES, OR HAS NO COMMENT ON THE PREFERRED ALTERNATIVE AT THE PRESENT TIME.

9) COMMUNITY ACCEPTANCE ARE ASSESSED IN THE RECORD OF DECISION FOLLOWING A REVIEW OF THE PUBLIC COMMENTS RECEIVED ON THE RI/FS REPORT AND THE PROPOSED PLAN.

B. COMPARATIVE ANALYSES OF ALTERNATIVES

IN ACCORDANCE WITH THE NCP, THE RELATIVE PERFORMANCE OF EACH ALTERNATIVE IS EVALUATED USING THE NINE CRITERIA (SECTION 300.430(E)(9)(III) AS A BASIS FOR COMPARISON. AN ALTERNATIVE PROVIDING THE "BEST BALANCE" OF TRADEOFFS WITH RESPECT TO THE NINE CRITERIA IS DETERMINED FROM THIS EVALUATION.

EACH ALTERNATIVE WAS EVALUATED USING THE NINE CRITERIA. THE REGULATORY BASIS FOR THESE CRITERIA COMES FROM THE NATIONAL CONTINGENCY PLAN AND SECTION 121 OF CERCLA (CLEAN-UP STANDARDS). SECTION 121(B)(1) STATES THAT, "REMEDIAL ACTIONS IN WHICH TREATMENT WHICH PERMANENTLY AND SIGNIFICANTLY REDUCES THE VOLUME, TOXICITY OR MOBILITY OF THE HAZARDOUS SUBSTANCES, POLLUTANTS, AND CONTAMINANTS IS A PRINCIPAL ELEMENT, ARE TO BE PREFERRED OVER REMEDIAL ACTIONS NOT INVOLVING SUCH TREATMENT. THE OFF-SITE TRANSPORT AND DISPOSAL OF HAZARDOUS SUBSTANCES OR CONTAMINANT MATERIALS WITHOUT SUCH TREATMENT SHOULD BE THE LEAST FAVORED ALTERNATIVE REMEDIAL ACTION WHERE PRACTICABLE TREATMENT TECHNOLOGIES ARE AVAILABLE." SECTION 121 OF CERCLA ALSO REQUIRES THAT THE SELECTED REMEDY BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, COST EFFECTIVE, AND USE PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE.

EACH ALTERNATIVE IS COMPARED TO THE NINE CRITERIA IN THE FOLLOWING SECTION:

1) OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT ADDRESSES WHETHER A REMEDY ELIMINATES, REDUCES, OR CONTROLS THREATS TO HUMAN HEALTH AND TO THE ENVIRONMENT. THE MAJOR EXPOSURE PATHWAYS OF CONCERN AT THE STOUGHTON SITE ARE THE POTENTIAL INGESTION OF CONTAMINATED GROUNDWATER, EXPOSURE TO OR INGESTION OF CONTAMINATED SURFACE WATER AND/OR SEDIMENTS IN THE YAHARA RIVER AND THE WETLANDS ADJACENT TO THE SITE, AND INHALATION OF AIRBORNE VOLATILE ORGANIC CONTAMINANTS. BASED UPON THESE PATHWAYS OF CONCERN, THE REMEDIAL ACTION ALTERNATIVES WERE EVALUATED ON THEIR ABILITY TO: 1. REDUCE PRECIPITATION INFILTRATION THROUGH THE LANDFILL, WHICH REDUCES THE LEVELS OF CONTAMINANTS LEACHING INTO THE GROUNDWATER; 2. MEET CLEAN-UP STANDARDS, AND; 3. REDUCE THE LEVELS OF HAZARDOUS SUBSTANCES DISCHARGING INTO THE WETLANDS.

ALTERNATIVES 1 AND 2 ARE NOT PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. ALTERNATIVES 3, 4A AND 4B WILL PREVENT DIRECT CONTACT WITH WASTE, AND ALTERNATIVES 4A AND 4B WILL PREVENT OR MINIMIZE FURTHER CONTACT BETWEEN GROUNDWATER AND CONTAMINANTS ALONG THE EASTERN SITE BOUNDARY. HOWEVER, NONE OF THESE ALTERNATIVES ADDRESS THE GROUNDWATER CONTAMINATION TO THE WEST OF THE SITE. ALTERNATIVES 6A, 6B, 7 AND 7A WILL PREVENT DIRECT CONTACT WITH THE WASTE, PREVENT OR MINIMIZE FURTHER CONTACT BETWEEN GROUNDWATER AND CONTAMINANTS ALONG THE EASTERN SITE BOUNDARY, AND WILL REMOVE CONTAMINANTS FROM GROUNDWATER TO THE WEST OF THE SITE, UNLESS ADDITIONAL MONITORING INDICATES THAT GROUNDWATER EXTRACTION IS NOT REQUIRED. ALTERNATIVE 5 WILL PREVENT DIRECT CONTACT WITH THE WASTE, WILL REMOVE CONTAMINANTS FROM THE GROUNDWATER WEST OF THE SITE, UNLESS ADDITIONAL MONITORING INDICATES THAT GROUNDWATER EXTRACTION IS NOT REQUIRED, BUT WILL NOT PREVENT OR MINIMIZE FURTHER CONTACT WITH GROUNDWATER AND CONTAMINATION ALONG THE EASTERN BOUNDARY.

ONLY ALTERNATIVES 6A, 6B, 7 AND 7A WILL ACHIEVE THE THREE OBJECTIVES STATED IN THE ABOVE PARAGRAPH, AND THEREFORE ONLY ALTERNATIVES 6A, 6B, 7 AND 7A ARE CONSIDERED PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. ALTERNATIVES 1 THROUGH 5 ARE THEREFORE NOT PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT FOR REASONS STATED IN THIS PARAGRAPH.

2) COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS).

THIS CRITERION EVALUATES WHETHER AN ALTERNATIVE MEETS APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS SET FORTH IN FEDERAL, OR MORE STRINGENT STATE, ENVIRONMENTAL STANDARDS PERTAINING TO CONTAMINANTS FOUND AT THE SITE (CHEMICAL SPECIFIC), SITING REQUIREMENTS ITSELF (LOCATION SPECIFIC) OR PROPOSED ACTIONS AT THE SITE

(ACTION SPECIFIC). THE STATUTORY DETERMINATIONS SECTION, SECTION XIII, DISCUSSES ALL THE POTENTIAL ARARS FOR THE SITE. THIS SECTION ONLY NOTES THOSE ARARS WITH WHICH A PARTICULAR ALTERNATIVE DOES NOT COMPLY.

ALTERNATIVES 1 AND 2 FAIL TO MEET ANY OF THE CHEMICAL-SPECIFIC ARARS DESCRIBED IN SECTION XII, NOR DO THEY MEET THE NR 504.07, WAC LANDFILL REQUIREMENTS FOR LANDFILL CLOSURE, WHICH ARE RELEVANT AND APPROPRIATE FOR THIS SITE.

ALTERNATIVE 3 WOULD NOT MEET NR 140 REQUIREMENTS PERTAINING TO THE PAL FOR THF BECAUSE IT WOULD NOT PREVENT THE CONTINUED RELEASE OF CONTAMINANTS ALREADY PRESENT IN THE GROUNDWATER DETECTED AT THE WASTE BOUNDARY ABOVE WISCONSIN GROUNDWATER QUALITY STANDARDS. IT ALSO FAILS TO MEET STATE WATER QUALITY CRITERIA FOR WETLANDS, NR 103, AND THE STATE WETLANDS ANTIDEGRADATION REGULATIONS, NR 105, BECAUSE IT DOES NOT ADDRESS THE CONTINUING LEACHING OF METALS FROM THE SATURATED WASTE AND THEIR DISCHARGE INTO THE WETLANDS.

ALTERNATIVE 4 WOULD COMPLY WITH THE STATE WATER QUALITY STANDARDS ARAR BUT NOT THE NR 140 GROUNDWATER STANDARDS.

ALTERNATIVE 4B WOULD NOT COMPLY WITH NR 140 GROUNDWATER STANDARDS.

ALTERNATIVE 5 WOULD NOT COMPLY WITH THE STATE WATER QUALITY STANDARDS.

ALTERNATIVES 6A, 6B, 7 AND 7A WOULD COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS.

BECAUSE THEY ARE NOT PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND DO NOT MEET ALL ARARS, AND THEREFORE DO MEET THE THRESHOLD CRITERIA, ALTERNATIVES 1 THROUGH 5 WILL NOT BE CONSIDERED FOR FURTHER EVALUATION.

3) REDUCTION OF TOXICITY, MOBILITY, OR VOLUME (TMV) THROUGH TREATMENT.

NONE OF THE ALTERNATIVES CONSIDERED WILL REDUCE THE TOXICITY, MOBILITY OR VOLUME OF SOLID WASTE THROUGH TREATMENT. ALTERNATIVES 6A, 6B, 7 AND 7A WILL OFFER SOME REDUCTION IN THE AMOUNT OF CONTAMINANTS CURRENTLY FOUND IN THE GROUNDWATER THROUGH TREATMENT. DUE TO THE LOW RISKS POSED FROM CONTACT WITH OR INGESTION OF THE SITE WASTE, AND BECAUSE OF THE LARGE VOLUME OF WASTES IN PLACE, THE BENEFIT OF TREATING THE SOURCE OF THE CONTAMINATION AT THE SITE WOULD BE MARGINAL AND EXTREMELY EXPENSIVE.

4) SHORT-TERM EFFECTIVENESS.

BECAUSE WASTES WILL BE EXCAVATED AND RELOCATED, ALTERNATIVES 6A 7 AND 7A WOULD PRESENT THE POTENTIAL FOR WORKERS TO INHALE OR INGEST SITE CONTAMINANTS. THE ADDITIONAL AMOUNT OF PROTECTION WILL HAVE TO BE EVALUATED TAKING INTO ACCOUNT THE DISADVANTAGES OF ADDITIONAL WASTE HANDLING, POTENTIAL INCREASED EXPOSURE TO WASTE, AND INCREASED HANDLING OF LEACHATE FROM DEWATERING EXCAVATED WASTES. SITE WORKERS WOULD BE TRAINED AND REQUIRED TO WEAR PERSONAL PROTECTION EQUIPMENT DURING EXCAVATION ACTIVITIES. BECAUSE OF THE PROXIMITY OF HOUSES TO THE SITE, THERE IS A POTENTIAL FOR SITE CONTAMINANTS TO BECOME AIRBORNE AND WIND BLOWN, AND INHALED BY NEARBY RESIDENTS. HOWEVER, AIR MONITORING STATIONS WOULD BE SET UP AROUND THE ENTIRE SITE TO DETERMINE THE LEVELS OF CONTAMINANTS IN THE AIR AND TO ENSURE THAT THESE LEVELS ARE SAFE. PLACEMENT OF THE CAP CAN BE COMPLETED IN LESS THAN ONE YEAR. FOR ALTERNATIVES 6A AND 6B, THE INSTALLATION OF A PHYSICAL BARRIER ALONG THE SOUTHEASTERN AND NORTHEASTERN SECTIONS WOULD REQUIRE ADDITIONAL TIME TO COMPLETE. FOR ALTERNATIVES 6A, 6B, 7 AND 7A, GROUNDWATER RESTORATION MEASURES WEST OF THE SITE WILL TAKE MANY YEARS TO COMPLETE.

5) LONG-TERM EFFECTIVENESS AND PERMANENCE.

ALTERNATIVES 6A, 6B, 7 AND 7A WOULD PROVIDE LONG-TERM PROTECTION FROM DIRECT CONTACT WITH WASTES AND REDUCE THE INFILTRATION OF WATER INTO THE LANDFILL AREA.. THE EFFECTIVENESS OF THESE ALTERNATIVES IS DEPENDENT ON PROPER MAINTENANCE OF THE CAP.

ALTERNATIVES 6B, 7 AND 7A INVOLVE THE EXCAVATION AND RELOCATION OF DISPOSED WASTE FOLLOWED BY CONSOLIDATION ONTO THE WESTERN PORTION OF THE LANDFILL. BECAUSE WASTES CURRENTLY IN CONTACT WITH GROUNDWATER ALONG THE EASTERN PORTION OF THE SITE WILL BE REMOVED, THESE ALTERNATIVES WOULD OFFER A MORE SECURE LONG-TERM SOLUTION

TO THIS PROBLEM THAN ALTERNATIVE 6A. THE LONG-TERM EFFECTIVENESS OF ALTERNATIVE 6A WOULD BE DEPENDENT ON THE PROPER MAINTENANCE OF THE PHYSICAL BARRIER TO BE INSTALLED.

ALTERNATIVES 6A, 6B, 7 AND 7A WOULD OFFER A PERMANENT SOLUTION TO GROUNDWATER CONTAMINATION BY PUMPING CONTAMINATED GROUNDWATER WEST OF THE SITE AND TREATING IT PRIOR TO DISCHARGE TO THE YAHARA RIVER.

6) IMPLEMENTABILITY.

CONSTRUCTION EQUIPMENT NECESSARY FOR INSTALLATION OF THE MULTILAYER CAP IS READILY AVAILABLE AND CAP CONSTRUCTION DOES NOT PRESENT DIFFICULT TECHNICAL OR ENGINEERING CHALLENGES. ALTERNATIVES 6B, 7 AND 7A WOULD REQUIRE THE EXCAVATION, RELOCATION AND CONSOLIDATION OF WASTES. THIS WOULD PRESENT SOME TECHNICAL DIFFICULTY BUT IS STILL TECHNICALLY FEASIBLE. ALTERNATIVE 6A MAY CAUSE IMPACTS ON THE WETLANDS ADJACENT TO THE SITE AND EAST OF THE LANDFILL AS A RESULT OF CONSTRUCTION OF THE PHYSICAL BARRIER. THIS PHYSICAL BARRIER WOULD BE DESIGNED IN SUCH A WAY AS TO MINIMIZE ADVERSE IMPACTS ON THE WETLANDS. SURFACE WATER LEVELS IN THE WETLANDS MAY BE AFFECTED AS A RESULT OF THE PHYSICAL BARRIER. THIS SITUATION WOULD BE EVALUATED AND A SYSTEM WOULD BE DESIGNED TO MAINTAIN PROPER SURFACE-WATER LEVELS. ALTERNATIVES 6A, 6B, 7 AND 7A WOULD REQUIRE A GROUNDWATER PUMPING SYSTEM DESIGNED IN SUCH A WAY AS TO NOT RESULT IN LOWERING OF THE WETLANDS WATER LEVELS.

7) COST.

THE COST OF THE SELECTED ALTERNATIVE, IF GROUNDWATER EXTRACTION AND TREATMENT IS REQUIRED, IS ESTIMATED TO BE $8.5 MILLION, NET PRESENT WORTH, OVER A 30 YEAR LIFE. IF GROUNDWATER EXTRACTION AND TREATMENT IS NOT REQUIRED, THE 30 YEAR NPV IS $7.5 MILLION. WHEN COMPARED TO ALTERNATIVES 6A AND 6B, THE SELECTED ALTERNATIVE MEETS THE THRESHOLD CRITERIA AT SIGNIFICANTLY LOWER COSTS. FOR A COMPARISON OF COSTS OF ALTERNATIVES AT VARYING DISCOUNT FACTORS, REFER TO TABLE "COST EST."

8) STATE ACCEPTANCE.

THE STATE OF WISCONSIN CONCURS WITH THE SELECTED REMEDY. THE WDNR IS A SIGNATORY TO THE RI/FS CONSENT ORDER WITH THE CITY OF STOUGHTON AND UNIROYAL, AND HAS BEEN AN ACTIVE AND SUPPORTING PARTICIPANT IN THE REMEDIAL PROCESS FOR THIS SITE.

9) COMMUNITY ACCEPTANCE.

THE SPECIFIC COMMENTS RECEIVED AND USEPA'S RESPONSES ARE OUTLINED IN THE ATTACHED RESPONSIVENESS SUMMARY.

#SR

XII. THE SELECTED REMEDY

USEPA AND WDNR BELIEVE THAT ALTERNATIVE 7A IS THE MOST APPROPRIATE SOLUTION FOR THE SCL SITE BECAUSE OF ITS PERFORMANCE AGAINST THE NINE EVALUATION CRITERIA PREVIOUSLY DISCUSSED. THE MAJOR COMPONENTS OF THE SELECTED ALTERNATIVE INCLUDE THE FOLLOWING: NR 504 CAP; GROUNDWATER EXTRACTION AND TREATMENT FOR REMOVAL OF THE THF PLUME WEST OF THE LANDFILL, UNLESS ADDITIONAL MONITORING INDICATES THAT EXTRACTION IS NOT REQUIRED TO ACHIEVE COMPLIANCE WITH STATE GROUNDWATER QUALITY STANDARDS; AND EXCAVATION AND CONSOLIDATION OF SATURATED WASTES. ALTERNATIVE 7A ALSO INCLUDES THE INSTALLATION OF A FENCE AROUND THE SITE; THE PLACEMENT OF INSTITUTIONAL CONTROLS SUCH AS DEED RESTRICTIONS TO CONTROL FUTURE LAND USE; AND THE USE OF LONG-TERM GROUNDWATER MONITORING TO DETERMINE THE EFFECTIVENESS OF THE CAP AND GROUNDWATER EXTRACTION SYSTEM, IF REQUIRED.

THE SELECTED REMEDY IS THE FINAL REMEDIAL ALTERNATIVE TO BE IMPLEMENTED AT THE STOUGHTON SITE, ENCOMPASSING ALL AREAS OF CONCERN AT THE LANDFILL. THE AREAS OF CONCERN ARE CONSIDERED TO BE THE GROUNDWATER CONTAMINANT PLUME LOCATED TO THE WEST OF THE LANDFILL BOUNDARY AND LEACHATE GENERATION ALONG THE EASTERN BOUNDARY OF THE SITE WHICH IS IMPACTING THE ADJACENT WETLANDS AREA. THE LANDFILL ITSELF IS CONSIDERED TO BE A LOW-LEVEL, LONG-TERM THREAT TO HUMAN HEALTH AND THE ENVIRONMENT, PRIMARILY AS A FURTHER SOURCE OF GROUNDWATER CONTAMINATION.

THE ALTERNATIVE RECOMMENDED BY USEPA, AFTER CONSULTATION WITH WDNR, FOR THE STOUGHTON CITY LANDFILL SITE,

ALTERNATIVE 7A, PROVIDES THE BEST BALANCE WITH RESPECT TO THE NINE CRITERIA. BASED ON INFORMATION AVAILABLE AT THIS TIME, USEPA BELIEVES THAT THE RECOMMENDED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, COMPLIES WITH ARAR'S AND IS COST EFFECTIVE.

THE EVALUATION OF THE OTHER ALTERNATIVES FOUND THAT:

*ALTERNATIVES 1, 2, 3, 4A, 4B AND 5 ARE NOT PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND/OR DO NOT COMPLY WITH ARARS.

*ALTERNATIVE 6A WILL ADDRESS THE POTENTIAL FOR FURTHER GROUNDWATER CONTAMINATION EAST OF THE SITE BY PLACING A PHYSICAL BARRIER ALONG THE SOUTHEAST AND NORTHEAST SECTIONS OF THE LANDFILL, THEREBY LIMITING THE MOVEMENT OF CONTAMINANTS AWAY FROM THE SITE. THIS ALTERNATIVE WOULD ALSO EFFECTIVELY LIMIT CONTAMINANT MOVEMENT THROUGH THE WASTE AND TREAT GROUNDWATER CONTAMINATION WEST OF THE SITE. HOWEVER, THE BARRIER WOULD POSE MAINTENANCE PROBLEMS AND WOULD NOT OFFER THE LONG-TERM RELIABILITY THAT ALTERNATIVES 7 AND 7A WOULD OFFER.

ALTERNATIVE 6B WOULD ADDRESS GROUNDWATER CONTAMINATION PROBLEMS AND WOULD ALSO EFFECTIVELY LIMIT CONTAMINATION MOVEMENT THROUGH THE WASTE. HOWEVER, THIS ALTERNATIVE IS MORE COSTLY THAN THE RECOMMENDED ALTERNATIVE.

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XIII. STATUTORY DETERMINATIONS SUMMARY

1. PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THE SELECTED REMEDY WILL PREVENT DIRECT CONTACT WITH WASTES AND REDUCE CONTAMINANT LEVELS IN THE AQUIFER TO THE STATE'S NR 140 STANDARDS. IN ADDITION, THE SELECTED REMEDY WILL PROVIDE FOR PROTECTION OF THE EASTERN WETLANDS BY PREVENTING OR MITIGATING FURTHER EFFECTS FROM LEACHATE GENERATION FROM WASTES SITUATED IN THE WATER TABLE IN THE SOUTHEASTERN AND NORTHEASTERN SECTIONS OF THE SITE.

2. ATTAINMENT OF ARARS

THE SELECTED REMEDY WILL ATTAIN ALL FEDERAL AND STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AS PRESENTED IN THE FS AND IN THIS RECORD OF DECISION. IN ADDITION, THE SELECTED REMEDY WILL ATTAIN ALL FEDERAL AND STATE "TO BE CONSIDERED" REQUIREMENTS AS DESCRIBED IN THE FS AND IN THIS RECORD OF DECISION.

1. CHEMICAL SPECIFIC ARARS

CHEMICAL SPECIFIC ARARS REGULATE THE RELEASE TO THE ENVIRONMENT OF SPECIFIC SUBSTANCES HAVING CERTAIN CHEMICAL CHARACTERISTICS. THESE REQUIREMENTS GENERALLY SET HEALTH OR RISK-BASED CONCENTRATION LIMITS OR DISCHARGE LIMITATIONS AFTER TREATMENT IN VARIOUS ENVIRONMENTAL MEDIA FOR SPECIFIC HAZARDOUS SUBSTANCES. THE SELECTED REMEDY WOULD ACHIEVE COMPLIANCE WITH THE FOLLOWING CHEMICAL SPECIFIC ARARS RELATED TO GROUNDWATER, SURFACE WATER DISCHARGES AND AMBIENT AIR QUALITY AT THE SITE.

A. FEDERAL

1. MAXIMUM CONTAINMENT LEVELS (MCLS) AND MAXIMUM CONTAINMENT LEVEL GOALS (MCLGS), 40 CFR PART 141. THESE ARE ENFORCABLE DRINKING WATER STANDARDS ESTABLISHED BY USEPA UNDER THE SAFE DRINKING WATER ACT (SDWA), 40 USC S 300 ET. SEQ. MCLS ARE APPLICABLE WHEN THE WATER WILL BE PROVIDED DIRECTLY TO 25 OR MORE PEOPLE OR WILL BE SUPPLIED TO 15 OR MORE SERVICE CONNECTIONS AND ARE TO BE MEASURED AT THE TAP. BECAUSE THE GROUNDWATER AT THE SCL SITE IS NOT CURRENTLY A SOURCE OF DRINKING WATER, MCLS ARE NOT APPLICABLE. AT THE STOUGHTON SITE, MCLS AND MCLGS ARE RELEVANT AND APPROPRIATE, SINCE THE SAND AND GRAVEL AQUIFER IS A CLASS IIA AQUIFER (A POTENTIAL DRINKING WATER SOURCE) WHICH COULD POTENTIALLY BE IMPACTED BY THE CONTAMINANT PLUME. MCLGS ARE RELEVANT AND APPROPRIATE WHEN THE STANDARD IS SET AT A LEVEL GREATER THAN ZERO (FOR NON-CARCINOGENS). THE POINT OF COMPLIANCE FOR MCLS AND MCLGS IS AT THE BOUNDARY OF THE LANDFILLED-WASTES. AT THE SCL SITE NO MCLS OR ABOVE-ZERO MCLGS ARE CURRENTLY EXCEEDED.

2. AMBIENT WATER QUALITY CRITERIA, 40 CFR PART 131, DEVELOPED UNDER THE CLEAN WATER ACT (CWA), 33 USC S 1251

ET. SEQ. FOR PROTECTION OF HUMAN HEALTH AND AQUATIC LIFE. THE FEDERAL AMBIENT WATER QUALITY CRITERIA (AWQC) ARE NON-ENFORCEABLE GUIDELINES THAT SET POLLUTANT CONCENTRATION LIMITS TO PROTECT SURFACE WATERS THAT ARE APPLICABLE TO POINT SOURCE DISCHARGES, SUCH AS FROM INDUSTRIAL OR MUNICIPAL WASTEWATER STREAMS. AT THE SCL SITE, THE TREATED GROUNDWATER WILL BE DISCHARGED TO THE YAHARA RIVER. CERCLA SECTION 121(D)(1) REQUIRES THE USEPA TO CONSIDER WHETHER AWQC WOULD BE RELEVANT AND APPROPRIATE UNDER THE CIRCUMSTANCES OF A RELEASE OR THREATENED RELEASE, DEPENDING ON THE DESIGNATED OR POTENTIAL USE OF GROUNDWATER OR SURFACE WATER, THE ENVIRONMENTAL MEDIA AFFECTED, AND UPON THE LATEST INFORMATION AVAILABLE. AT A SUPERFUND SITE, THE FEDERAL AWQC WOULD NOT BE APPLICABLE SINCE THEY ARE NON-ENFORCEABLE GUIDELINES, BUT THEY ARE RELEVANT AND APPROPRIATE FOR PRETREATMENT REQUIREMENTS FOR DISCHARGE OF TREATED WATER TO A PUBLICLY OPERATED TREATMENT WORKS (POTW). SINCE TREATED WATER WILL BE DISCHARGED TO THE YAHARA RIVER, AQWC ADOPTED FOR DRINKING WATER AND AWQC FOR PROTECTION OF FRESHWATER AQUATIC ORGANISMS ARE RELEVANT AND APPROPRIATE TO THE POINT SOURCE DISCHARGE OF THE TREATED WATER INTO THE YAHARA RIVER. AWQC ADOPTED FOR DRINKING WATER AND AWQC FOR PROTECTION OF FRESHWATER AQUATIC ORGANISMS ARE RELEVANT AND APPROPRIATE TO THE DISCHARGE OF THE TREATED GROUNDWATER INTO THE YAHARA RIVER.

3. NATIONAL AMBIENT AIR QUALITY STANDARDS, 40 CFR PART 50. MAY BE APPLICABLE TO AIR STRIPPING, FUGITIVE DUST RAISED FROM EXCAVATION, GRADING AND OTHER CONSTRUCTION ACTIVITIES. EVERY AVAILABLE PRECAUTION WILL BE TAKEN DURING CONSTRUCTION TO MINIMIZE FUGITIVE DUST EMISSIONS. IN THE EVENT AIR STRIPPING IS USED TO TREAT GROUNDWATER PRIOR TO DISCHARGE TO THE YAHARA RIVER, ANY EMISSIONS FOR WHICH THERE ARE STANDARDS WILL BE MONITORED. HOWEVER, IT IS NOT ANTICIPATED THAT AIR STRIPPING OF THF WILL RELEASE ANY LISTED CONTAMINANTS.

B. STATE

1. THE STATE OF WISCONSIN IS AUTHORIZED TO ADMINISTER THE IMPLEMENTATION OF THE FEDERAL SDWA. THE STATE HAS ALSO PROMULGATED GROUNDWATER QUALITY STANDARDS IN CH. NR 140, WAC, WHICH THE WDNR IS CONSISTENTLY APPLYING TO ALL FACILITIES, PRACTICES, AND ACTIVITIES WHICH ARE REGULATED BY THE WDNR AND WHICH MAY AFFECT GROUNDWATER QUALITY IN THE STATE. CHAPTER 160, WIS. STATS., DIRECTS THE WDNR TO TAKE ACTION TO PREVENT THE CONTINUING RELEASE OF CONTAMINANTS AT LEVELS EXCEEDING STANDARDS AT THE POINT OF STANDARDS APPLICATION. GROUNDWATER QUALITY STANDARDS ESTABLISHED PURSUANT TO CH. NR 140, WAC, INCLUDE PREVENTIVE ACTION LIMITS (PALS), ENFORCEMENT STANDARDS (ESS), AND/OR (WISCONSIN) ALTERNATIVE CONCENTRATION LIMITS (WACLS). BECAUSE STATE PALS ARE MORE STRINGENT THAN FEDERAL MCLS, AND BECAUSE THERE ARE NO MCLS FOR CERTAIN OF THE CONTAMINANTS OF CONCERN, NOTABLY THF, STATE PALS ARE APPLICABLE TO THE STOUGHTON SITE AS GROUNDWATER CLEAN-UP STANDARDS.

CONSISTENT WITH THE EXEMPTION CRITERIA OF SECTION NR 140.28, WAC, A WISCONSIN ALTERNATIVE CONCENTRATION LIMIT (WACL) MAY BE ESTABLISHED TO REPLACE THE PREVENTIVE ACTION LIMIT (PAL), AS THE GROUNDWATER CLEAN-UP STANDARD IF IT IS DETERMINED THAT IT IS NOT TECHNICALLY AND ECONOMICALLY(1) FEASIBLE TO ACHIEVE THE PAL FOR A SPECIFIC SUBSTANCE. EXCEPT WHERE THE BACKGROUND CONCENTRATION OF A COMPOUND EXCEEDS THE ENFORCEMENT STANDARD (ES) CONSISTENT WITH THE CRITERIA IN SECTION NR 140.28(4)(B), THE WACL THAT IS ESTABLISHED MAY NOT EXCEED THE ES FOR THAT COMPOUND.

THE IMPLEMENTATION OF THE SELECTED REMEDY AT THE STOUGHTON SITE WILL BE IN COMPLIANCE WITH CH. NR 140, WAC, IN THAT PREVENTIVE ACTION LIMITS (PALS) WILL BE MET AT AND BEYOND THE EDGE OF THE WASTE MANAGEMENT AREA UNLESS WACLS ARE ESTABLISHED PURSUANT TO THE CRITERIA IN SECTION NR 140.28, WAC, IN WHICH CASE THE WACLS WILL BE MET.

2. SECTION 303 OF THE CWA REQUIRES THE STATE TO PROMULGATE STATE WATER QUALITY STANDARDS FOR SURFACE WATER BODIES, BASED ON THE DESIGNATED USES OF THE SURFACE WATER BODIES. CERCLA REMEDIAL ACTIONS INVOLVING SURFACE WATER BODIES MUST ENSURE THAT APPLICABLE OR RELEVANT AND APPROPRIATE.

(1) A DETERMINATION OF TECHNICAL OR ECONOMIC INFEASIBILITY MAY BE MADE, NO EARLIER THAN FIVE YEARS AFTER OPERATION OF THE GROUND WATER EXTRACTION SYSTEM BEGINS, IF IT BECOMES APPARENT THAT THE CONTAMINANT LEVEL HAS CEASED TO DECLINE OVER TIME AND IS REMAINING CONSTANT AT A STATISTICALLY SIGNIFICANT CONCENTRATIONS) IN A DISCRETE PORTION OF THE AREA OF ATTAINMENT, AS VERIFIED BY MULTIPLE MONITORING WELLS.

STATE WATER QUALITY STANDARDS ARE MET. THE STATE HAS PROMULGATED WISCONSIN WATER QUALITY CRITERIA (WWQC) UNDER CH. NR 105, WAC, BASED ON THE FEDERAL AWQC DEVELOPED BY USEPA. THE YAHARA RIVER IS DESIGNATED AS A WARM WATER SPORT FISH COMMUNITY UNDER CH. NR 105, WAC. THE WARM WATER SPORT FISH WWQC ARE THEREFORE

APPLICABLE TO THE MAINTENANCE OF SURFACE WATER QUALITY IMPACTED BY THE DISCHARGE OF TREATED GROUNDWATER FROM THE SITE.

3. THE STATE IS AUTHORIZED TO IMPLEMENT THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PROGRAM. FOR DISCHARGE OF TREATED WATER, THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS ARE DEPENDENT ON THE POINT OF DISCHARGE. THE SUBSTANTIVE REQUIREMENTS OF A WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES) PERMIT, UNDER CH. NR 220, WAC, WOULD BE APPLIED TO THE DISCHARGE OF THE TREATED WATER INTO THE YAHARA RIVER, SINCE THE DISCHARGE POINT IS CONSIDERED TO BE ON-SITE. SUBJECT TO THE APPROVAL OF THE USEPA, EFFLUENT LIMITS FOR SURFACE WATER DISCHARGE WILL BE ESTABLISHED BY THE WDNR. CH. NR 220, WAC REQUIRES THAT THE EFFLUENT LIMITS BE BASED ON THE APPLICATION OF BEST AVAILABLE TREATMENT TECHNOLOGY (BAT) PRIOR TO DISCHARGE.

2. ACTION SPECIFIC ARARS

ACTION SPECIFIC ARARS ARE TECHNOLOGY OR ACTIVITY BASED REQUIREMENTS OR LIMITATIONS ON ACTIONS TAKEN WITH RESPECT TO HAZARDOUS WASTE. THEY INDICATE HOW A SELECTED REMEDY MUST BE ACHIEVED.

A. FEDERAL

1. CLEAN WATER ACT SECTION 404 PROHIBITS THE DEPOSIT OF DREDGED OR FILL MATERIAL IN WETLANDS WITHOUT A PERMIT. THE SUBSTANTIVE PROHIBITION WILL BE OBSERVED DURING SITE ACTIVITIES PERTAINING TO REMEDY IMPLEMENTATION.

2. EXECUTIVE ORDER 11990 - PROTECTION OF WETLANDS, IS AN APPLICABLE REQUIREMENT TO PROTECT AGAINST THE LOSS OR DEGRADATION OF WETLANDS. THE SELECTED REMEDY WILL COMPLY WITH THIS ORDER IN THE DESIGN OF THE GROUNDWATER EXTRACTION SYSTEM, WHEN EXCAVATING THE SATURATED WASTE, WHEN CONSTRUCTING THE CAP AND WHEN DESIGNING OR IMPLEMENTING ANY OTHER COMPONENT OF THE REMEDY.

3. RCRA SUBTITLE C. RCRA IS NOT APPLICABLE AT THE SITE BECAUSE THE JURISDICTIONAL REQUIREMENT THAT THE FACILITY HAVE TREATED, STORED OR DISPOSED OF RCRA HAZARDOUS WASTE AFTER JULY 26, 1982 IS NOT MET. DISPOSAL CEASED AT THE SCL IN 1972 AND THE LANDFILL WAS CLOSED IN 1980. HOWEVER, CERTAIN OF THE RCRA REQUIREMENTS PERTAINING TO THE CAP AND FUTURE MONITORING OF THE FACILITY ARE RELEVANT AND APPROPRIATE.

4. RCRA SUBTITLE D. THE CAP PROPOSED FOR THE STOUGHTON SITE CONSISTS OF A GRADING LAYER, A MINIMUM 2-FOOT COMPACTED CLAY LAYER, A GRAVEL DRAINAGE LAYER, A FROST PROTECTIVE SOIL LAYER, AND A MINIMUM 6-INCH TOPSOIL LAYER. THESE COMPONENTS SATISFY THE REQUIREMENTS OF RCRA SUBTITLE D AND ALSO SECTION NR 504.07, WAC, WHICH IS THE RELEVANT AND APPROPRIATE REQUIREMENT FOR THIS SITE. (SEE DISCUSSION OF STATE ACTION SPECIFIC ARARS BELOW).

5. IF AIR STRIPPING IS CHOSEN AS THE METHOD FOR TREATING EXTRACTED GROUNDWATER PRIOR TO DISCHARGE, THAT ACTIVITY, AS WELL AS THE HANDLING OF CONTAMINATED SOIL DURING EXCAVATION, CONSOLIDATION OF WASTE AND CAP CONSTRUCTION COULD CAUSE AIR EMISSIONS IN EXCEEDANCES OF CLEAN AIR ACT STANDARDS. THE DESIGN OF THE SELECTED REMEDY WILL EITHER REDUCE SUCH EMISSIONS TO ACCEPTABLE LEVELS OR TREAT THEM TO COMPLY WITH STANDARDS.

B. STATE

1. CH. NR 102, WAC ESTABLISHES AN ANTIDEGRADATION POLICY FOR ALL WATERS OF THE STATE AND IT ESTABLISHES WATER QUALITY STANDARDS FOR USE CLASSIFICATIONS. CHAPTER NR 102, WAC WOULD BE APPLICABLE TO ACTIONS THAT INVOLVE DISCHARGES TO THE YAHARA RIVER IN THAT DISCHARGES MUST MEET WATER QUALITY STANDARDS.

2. CH. NR 103, WAC, ESTABLISHES WATER QUALITY STANDARDS FOR WETLANDS. CH. NR 103, WAC, WOULD BE APPLICABLE TO ACTIONS THAT AFFECT WETLANDS. THE IMPLEMENTATION OF THE SELECTED REMEDY WILL REDUCE CONTAMINATED GROUNDWATER DISCHARGE TO THE WETLANDS AND THUS COMPLY WITH THE ANTI-DEGRADATION PROVISIONS OF CH. NR 103, WAC, AND ASSURE THAT SIGNIFICANT ADVERSE IMPACTS TO THE WETLANDS WILL NOT OCCUR IN THE FUTURE.

3. CHAPTER NR 504, WAC IS NOT APPLICABLE TO THIS SITE BECAUSE IT REGULATES THE CLOSURE OF CURRENTLY PERMITTED SOLID WASTE LANDFILLS IN THE STATE. SINCE THE CH. NR 504, WAC CLOSURE REQUIREMENTS ARE SUFFICIENTLY SIMILAR TO THE REQUIREMENTS FOR CLOSURE OF THE STOUGHTON SITE, IN THAT A CAP OF SUFFICIENT INTEGRITY TO MINIMIZE

LIQUID INFILTRATION INTO THE WASTE IS NECESSARY TO RETARD FURTHER LEACHING OF CONTAMINANTS INTO THE GROUNDWATER, CH. NR 504, WAC REQUIREMENTS ARE RELEVANT FOR THE STOUGHTON SITE. CHAPTER NR 504, WAC REQUIREMENTS ARE WELL-SUITED FOR THE STOUGHTON SITE DUE TO THE REDUCTION OF PRECIPITATION INFILTRATION AND THE LONG-TERM EFFECTIVENESS OFFERED BY THE FROST PROTECTION LAYER. THUS, CH. NR 504, WAC, THE CURRENT SOLID WASTE LANDFILL CLOSURE REQUIREMENTS, ARE ALSO APPROPRIATE FOR THIS SITE. SECTION NR 504.07, WAC CALLS FOR THE LANDFILL COVER TO BE COMPOSED OF A GRADING LAYER, A MINIMUM 2-FOOT CLAY LAYER WITH A PERMEABILITY OF 1 X (10-7) CM/S, A FROST-PROTECTIVE SOIL LAYER, AND A MINIMUM 6-INCH TOPSOIL LAYER. THESE REQUIREMENTS WILL BE MET BY THE CAP COMPONENT OF THE SELECTED REMEDY.

4. THE STATE IS AUTHORIZED TO IMPLEMENT THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PROGRAM. FOR DISCHARGE OF TREATED WATER, THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS ARE DEPENDENT ON THE POINT OF DISCHARGE. THE SUBSTANTIVE REQUIREMENTS OF A WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES) PERMIT, UNDER CH. NR 220, WAC, WOULD BE APPLIED TO THE DISCHARGE OF THE TREATED WATER INTO THE YAHARA RIVER, SINCE THE DISCHARGE POINT IS CONSIDERED TO BE ON-SITE. SUBJECT TO THE APPROVAL OF THE USEPA, EFFLUENT LIMITS FOR SURFACE WATER DISCHARGE WILL BE ESTABLISHED BY THE WDNR. CH. NR 220, WAC REQUIRES THAT THE EFFLUENT LIMITS BE BASED ON THE APPLICATION OF BEST AVAILABLE TREATMENT TECHNOLOGY (BAT) PRIOR TO DISCHARGE.

5. CHAPTER 147, WISCONSIN STATUTES, IS ALSO APPLICABLE TO TREATED WATER TO BE DISCHARGED TO THE YAHARA RIVER. THESE REGULATIONS STATE THAT NO DISCHARGE SHALL CONTAIN QUANTITIES OF LISTED POLLUTANTS GREATER THAN THAT WOULD REMAIN AFTER SUBJECTING THE WATER TO BEST AVAILABLE TECHNOLOGY ECONOMICALLY ACHIEVABLE (BATEA).

6. CHAPTER NR 445, WAC REGULATES AIR EMISSIONS FROM TREATMENT TECHNOLOGIES AND IS APPLICABLE TO POINT SOURCE EMISSIONS FROM INDUSTRIAL FACILITIES. AIR STRIPPING MAY BE USED TO TREAT GROUNDWATER PRIOR TO DISCHARGE. SINCE AIR STRIPPERS MAY EMIT HAZARDOUS SUBSTANCES IN THE FORM OF VOCS, SECTION NR 445.04, WAC IS RELEVANT AND APPROPRIATE FOR THE REMEDY. THE NEED FOR EMISSION CONTROL TECHNOLOGY SHALL BE EVALUATED BASED ON REQUIREMENTS OF CH. NR 445, WAC.

7. CHAPTER NR 27, WAC, THE STATE ENDANGERED AND THREATENED SPECIES ACT, AND CH. NR 29, WAC, THE STATE FISH AND GAME ACT, ARE STATE ENDANGERED RESOURCE LAWS WHICH PROTECT AGAINST THE "TAKING" OR HARMING OF ENDANGERED OR THREATENED WILDLIFE RESOURCES IN THE AREA. THESE WOULD BE APPLICABLE TO THE REMEDIAL ACTION, IN THAT THE POISONING OF ENDANGERED OR THREATENED SPECIES BY SITE CONTAMINANTS COULD BE CONSIDERED BY THE WDNR TO BE A "TAKING." TO DATE, NO THREATENED OR ENDANGERED SPECIES HAVE BEEN FOUND AT THE SITE.

3. LOCATION SPECIFIC ARARS

LOCATION SPECIFIC ARARS ARE RESTRICTIONS PLACED ON THE CONCENTRATION OF HAZARDOUS SUBSTANCES OR THE CONDUCT OF ACTIVITIES SOLELY BECAUSE THEY ARE IN SPECIFIC LOCATIONS.

A. FEDERAL

1. EXECUTIVE ORDER 11988 - PROTECTION OF FLOOD PLAINS, ARE APPLICABLE TO THE SITE DUE TO ITS LOCATION WITHIN THE MAPPED 100-YEAR FLOOD PLAIN (843 FEET ABOVE MEAN SEA LEVEL) OF THE YAHARA RIVER. THIS ORDER WOULD BE MET BY DESIGNING THE GROUNDWATER TREATMENT SYSTEM TO BE LOCATED ABOVE THIS ELEVATION AND BE PROTECTED FROM EROSIONAL DAMAGE.

B. STATE

1. CHAPTER NR 112, WAC, WHICH REQUIRES THAT NO DRINKING WATER WELLS BE LOCATED WITHIN 1200 FEET OF A LANDFILL, UNLESS A VARIANCE IS OBTAINED FROM THE WDNR, IS APPLICABLE TO THE SITE.

3. COST-EFFECTIVENESS

COST-EFFECTIVENESS COMPARES THE EFFECTIVENESS OF AN ALTERNATIVE IN PROPORTION TO ITS COST OF PROVIDING ITS ENVIRONMENTAL BENEFITS. THE SELECTED REMEDY'S LONG-TERM EFFECTIVENESS AND ITS ABILITY TO REDUCE THE AMOUNT OF THF IN THE SURFICIAL AQUIFER WAS WEIGHED AGAINST ITS SHORT-TERM EFFECTIVENESS ASPECTS IN RELATION TO THE REMAINING ALTERNATIVES. IN GENERAL, THE SELECTED REMEDY DOES INVOLVE A SMALL DEGREE OF RISK TO SITE WORKERS AND TO THE COMMUNITY IN THAT THERE WOULD BE MOVEMENT AND TREATMENT OF HAZARDOUS SUBSTANCES DURING

IMPLEMENTATION IN ORDER TO MINIMIZE THE LONG-TERM EFFECTS THOSE SUBSTANCES WOULD HAVE ON HUMAN HEALTH AND THE ENVIRONMENT.

WITH RESPECT TO VOC EMISSIONS DURING TREATMENT OF THE GROUNDWATER AND MOVEMENT OF SATURATED WASTES, EFFECTIVE AIR MONITORING WOULD ENSURE THAT AIR STANDARDS ESTABLISHED TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT ARE MET. EMISSION CONTROLS MAY BE UTILIZED, IF NECESSARY, TO MEET THOSE STANDARDS. SHORT-TERM RISKS DUE TO THE DISCHARGE OF TREATED GROUNDWATER TO THE YAHARA RIVER WOULD BE MINIMIZED BY ENSURING THAT THE TREATED WATER MEETS DISCHARGE CRITERIA, WHICH ARE ESTABLISHED TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT AS WELL.

THE SELECTED REMEDY WILL ACHIEVE THE THRESHOLD CRITERIA BY ATTAINING ALL FEDERAL AND STATE ARAR'S AND PROVIDING PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT, AND AT LOWER COSTS THAN ALTERNATIVES 6A AND 6B.

4. UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

THE SELECTED ALTERNATIVE WILL PROVIDE FOR A PERMANENT SOLUTION TO THE THF CONTAMINANT PLUME WEST OF THE SITE BY EXTRACTING CONTAMINATED GROUNDWATER AND TREATING IT ABOVE GROUND. WASTES IN CONTACT WITH GROUNDWATER WILL BE EXCAVATED AND PLACED AWAY FROM THE EASTERN WETLANDS, THEREBY PROVIDING A LONG-TERM SOLUTION TO THE ENVIRONMENTAL IMPACTS TO THE WETLANDS.

5. PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

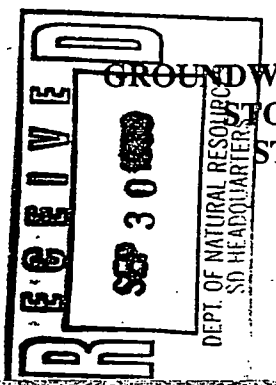
THERE ARE NO IDENTIFIABLE HOT SPOTS IN THE WASTE FOR WHICH TREATMENT IS VIABLE OR PRACTICAL. ALTHOUGH NO TEST PITS WERE CONDUCTED DURING THE RI, ANALYSES OF BORINGS OBTAINED DURING MONITORING WELL INSTALLATION DO NOT SHOW ELEVATED CONTAMINANT CONCENTRATIONS INDICATIVE OF HOT-SPOT DISPOSAL AREAS. DUE TO THE HETEROGENEITY OF THE WASTE, IT IS NOT FEASIBLE TO EXCAVATE AND TREAT A SPECIFIC PORTION OF THE LANDFILL.

EXTRACTION OF GROUNDWATER TO THE WEST OF THE SITE WILL REDUCE CONCENTRATIONS OF CONTAMINANTS TO LEVELS WHICH WILL MEET STATE GROUNDWATER QUALITY STANDARDS, IF THIS COMPONENT OF THE SELECTED REMEDY IS REQUIRED AS DESCRIBED IN SECTION IX ABOVE.

APPENDIX B

Roy F. Weston, Inc. Groundwater Monitoring Reports

ROY F. WESTON, INC.



GROUNDWATER SAMPLING MEMORANDUM
STOUGHTON CITY LANDFILL
STOUGHTON, WISCONSIN

September 1998

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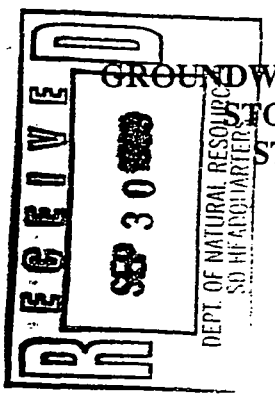
WESTON
MANAGERS DESIGNERS CONSULTANTS



GROUNDWATER SAMPLING MEMORANDUM
STOUGHTON CITY LANDFILL
STOUGHTON, WISCONSIN

September 1998

Prepared For:

U.S. Environmental Protection Agency
Superfund Division
Region V
77 West Jackson Boulevard
Chicago, Illinois 60604

This document was prepared in accordance with U.S. EPA Contract No. 68-W7-0026, WESTON Region V RAC.

Work Assignment No.: 001-RARA-05T2 Document Control No.: RFW001-2A-AATZ

Roy F. Weston, Inc.
Suite 400
3 Hawthorn Parkway
Vernon Hills, Illinois 60061-1450
847-918-4000 • Fax 847-918-4055

25 September 1998

Mr. Anthony Rutter (HSRW-6J)
U.S. Environmental Protection Agency
77 W. Jackson Blvd.
Chicago, IL 60604

U.S. EPA Contract No.:m 68-W7-0026
Work Assignment No.: 001-RARA-05T2
Document Control No.: RFW001-2A-AATZ
Re: Technical Memorandum/Groundwater Sampling Results

Dear Mr. Rutter:

Roy F. Weston, Inc. (WESTON®) is pleased to submit one copy of the Technical Memorandum for the Baseline Groundwater Sampling at Stoughton City Landfill.

If you should have any questions regarding this Technical Memorandum, please contact me at (847) 918-4042.

RECEIVED
SEP 30 1998
DEPT. OF NATURAL RESOURCES
SD HEADQUARTERS

Very truly yours,

ROY F. WESTON, INC.

William F. Karlovitz, P.E.
Site Manager

WFK:ieh

cc: Paul Kozol, WDNR
Pat Vogtman, U.S. EPA (cover letter)

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SECTION 1
INTRODUCTION

This memorandum presents the procedures and results of groundwater sampling conducted during the baseline groundwater monitoring (April 1998) at the Stoughton City Landfill (SCL) site in Stoughton, Wisconsin. Roy F. WESTON, Inc. (WESTON®) conducted the sampling in accordance with the Quality Assurance Project Plan Revision 1.

The objective of this sampling effort was to establish a baseline for site groundwater quality prior to the placement of the landfill cap. Prior to starting the field activities, WESTON prepared a Health and Safety Plan, Quality Assurance Project Plan (QAPP), and the Field Sampling Plan (FSP). The QAPP and FSP addendum were submitted to the United States Environmental Protection Agency (U.S. EPA) on 27 March 1998. The volatile organic compound analysis and metals analysis were scheduled through the U.S EPA Contract Laboratory Program (CLP) for routine analytical analysis. Due to the low detection limits for the three special volatile organic compounds (trichlorofluoromethane, dichlorodifluoromethane, and tetrahydrafuran) WESTON had to procure a lab to do a special analytical services request. WESTON procured the services of Chemtech, of Englewood, New Jersey to perform the special analysis.

The field procedures and groundwater sampling results are presented in Sections 2 and 3, respectively.

SECTION 2

FIELD PROCEDURES

This section describes the field procedures for the baseline groundwater sampling.

2.1 GROUNDWATER MONITORING WELL SAMPLING

Monitoring wells were sampled using a submersible Grundfos pump. Sampling equipment was decontaminated pursuant to protocols described in Subsection 2.2. Samples were collected using the following methodology:

Upon removing the protective cap to the monitoring well riser, the head space was monitored with a HNu (photoionization detector).

- The depth to the water level in the well and the total depth of the well was measured with an electrical sounding device (accuracy $\pm$ 0.01 feet). The reference point for these depths was the top of the well riser pipe.
- The volume of standing water in the well was calculated. Volume of water in a 2-inch diameter well (gallons) = water depth (feet) x 0.16 (gallons/foot). For a 4-inch diameter well (gallons) = water depth (feet) x 0.65 (gallons/foot). For a 6-inch diameter well (gallons) = length (feet) x 1.47 (gallons/foot).
- A Grundfos pump was used for purging and sampling, and was decontaminated prior to being used in the well. Well purging was done with the pump intake just above or within the screened interval. The pump was not lowered as far into the couple of wells that are artesian and free flowing. Field measurements of pH, temperature, conductivity, dissolved oxygen, and turbidity were taken over time. Stabilization of these well purging parameters ($\pm$.25 units for pH, $\pm$0.5C for temperature, $\pm$10 percent for conductivity, $\pm$0.1 mg/L for dissolved oxygen, and $\pm$1unit for turbidity) indicated equilibrated conditions. Well purging continued until the turbidity decreased to 5 NTU or less, or until five purge volumes were removed.
- Samples were collected directly from the pump after the well purging was completed. Three samples were collected at each location. One sample was collected for target compound list volatile organic compounds (VOC). One sample was collected for special VOC analysis (trichlorofluoromethane, dichlorodifluoromethane, and tetrahydrafuran). Both the VOC samples and the special VOCs were prepreserved with hydrochloric acid. The final sample was collected for the total analyte list of metals. Unfiltered and filtered metals samples were collected at each location. The

metal samples were filtered by connecting the pump discharge directly to a sterilized 0.45 micron disposable filter unit. The filtered metal samples were preserved with nitric acid within 15 minutes of sample collection. All samples were placed in a cooler on ice immediately following sample collection.

- The pH meter was not working on the first day of sample collection. Five monitoring wells were sampled on this day. The turbidity meter also stopped responding after the first two sample locations. The remaining field parameters were recorded to indicate equilibrated conditions.

Table 2-1 presents the sampling order, sampling date, and field parameters during monitoring well sampling.

A filtered metals sample could not be collected at MW7I due to a bend in the riser pipe approximately 8 inches from the top of the riser. The water was naturally flowing from this well but the back pressure was not enough for the water to pass through the in-line disposable 0.45 micron filter. The VOC, special VOC, and unfiltered metal samples were collected by putting a piece of decontaminated tubing (approximately two feet), down into the well and creating a suction so that water would flow.

2.2 DECONTAMINATION PROCEDURES

The submersible pump decontamination consisted of submerging the pump in a 5-gallon pail of tap water and detergent (alconox) solution. Tap water was obtained from a City of Stoughton water system connection located near the entrance to the Stoughton Landfill. Approximately 3 to 4 gallons of the alconox solution was pumped through the pump and tubing. This was followed by pumping approximately 3 to 4 gallons of deionized water through the pump and tubing. The pump casing was sprayed off using deionized water in a hand-held spray bottle. Alconox water solution followed by deionized water was poured over the outside of the tubing and the pump electrical cord.

2.3 MANAGEMENT OF INVESTIGATIVE DERIVED WASTE

Investigation derived wastes (IDWs) are defined as purge water and decontamination water generated during the groundwater sampling. Decontamination and purge water collected during

Table 2-1

Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal)	Temperature	pH (units)	Conductivity microsiemens/cm (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW13I	4/21/98	Naturally flowing	10.2	7.57	226	1.5	1.15
			9.9	7.67	223	1.6	0.22
			10.0	7.69	227	1.7	0.03
MW13D	4/21/98	15	10.7	7.45	292	4.1	47.6
		30	10.7	7.33	281	3.9	120.2
		45	10.9	7.38	513	4.2	35.3
		60	10.5	7.33	503	3.6	18.2
		75	10.8	7.40	481	4.3	13.33
MW13S	4/21/98	2	9.8	7.70	218	3.0	414
		4	9.8	7.67	217	1.5	333
		6	9.5	7.66	342	1.3	342
		8	9.6	7.69	420	1.4	354
		10	9.9	7.69	408	1.5	802

Note: --- indicates that a measurement was not recorded due to a meter not functioning.

Table 2-1

Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin

Monitoring Well No.	Date of Sample	Purged Vol. (Gal)	Temperature	pH (units)	Conductivity microsiemens/cm (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW15I	4/15/98	7	10.2	—	410	2.6	3.10
		12	10.4	—	456	2.0	3.23
		17	9.9	—	450	2.6	3.20
		23	10.1	—	454	2.8	1.68
MW15D	4/15/98	13	9.9	—	536	4.0	3.86
		23	9.9	—	317	5.1	3.86
		28	10.3	—	301	7.4	1.28
		33	9.8	—	330	7.8	1.79
MW15S	4/15/98	3	7.3	—	475	3.5	—
		6	7.3	—	472	3.0	—
		12	7.3	—	432	3.2	—
MW7I	4/15/98	Naturally flowing	9.6	—	538	4.4	—
			9.5	—	470	8.0	—
			9.5	—	454	8.1	—
			9.4	—	530	8.5	—
MW7D	4/15/98	15	9.2	—	364	2.1	—
		30	9.3	—	252	2.5	—
		50	9.2	—	360	1.9	—
MW3S	4/17/98	2	6.9	7.23	420	8.2	19.55
		5	7.2	7.27	430	7.0	40.3
		7	7.2	7.31	340	6.4	47.3
		10	7.7	7.26	440	6.2	169.4

Table 2-1

Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal)	Temperature	pH (units)	Conductivity microsiemens/cm (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW3D	4/17/98	10	9.7	7.57	584	1.4	37.2
		20	9.8	7.47	630	1.3	9.4
		30	9.8	7.43	640	1.1	2.89
		35	9.7	7.44	637	1.25	2.56
MW3B	4/17/98	15	10.1	7.27	335	3.04	0.11
		30	10.2	7.30	498	3.5	0.12
		35	10.1	7.32	509	3.5	0.02
		38	10.2	7.35	519	3.7	0.13
MW9I	4/17/98	7	10.2	7.42	282	1.5	10.2
		14	10.2	7.47	268	2.0	1.7
		21	10.0	7.50	250	1.8	0.42
MW9S	4/17/98	4.5	9.3	7.26	268	1.8	296
		10	10.1	7.41	487	2.0	165
		15	10.6	7.44	471	2.0	85.6
		20	10.8	7.45	488	2.0	41.9
		25	11.1	7.53	491	2.1	58.6
MW2D	4/17/98	5	10.6	7.71	319	2.2	64.9
		10	10.7	7.68	557	2.0	52.6
		15	10.6	7.65	559	1.2	40.2
		20	11.0	7.65	566	1.8	32.9
		25	10.7	7.63	565	1.9	19.0

Table 2-1

Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal)	Temperature	pH (units)	Conductivity microsiemens/cm (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW2S	4/17/98	2	8.6	7.17	273	3.8	1.29
		4	8.6	7.27	212	3.08	2.09
		6	8.2	7.21	236	2.15	2.20
		8	8.6	7.19	275	1.9	2.28
MW12D	4/18/98	12	11.0	7.19	312	5.5	124.5
		25	11.3	7.38	287	5.0	39.1
		35	10.7	7.35	281	4.2	32.5
		45	11.2	7.41	316	4.1	12.97
		55	10.9	7.36	317	3.6	7.36
MW12I	4/18/98	9	10.9	7.57	414	3.0	13.91
		18	10.8	7.59	385	1.7	26.8
		27	11.3	7.65	416	2.0	8.8
		33	11.2	7.64	411	2.0	4.92
MW12S	4/18/98	2	8.9	6.79	891	1.5	74.5
		5	8.9	6.84	667	1.5	11.94
		7	9.0	6.84	799	1.3	7.03
		10	8.7	6.92	794	1.3	3.55
MW14D	4/18/98	15	11.7	7.27	583	3.7	40.4
		30	11.5	7.27	532	3.5	13.81
		45	12.4	7.41	562	4.0	5.32
		50	11.7	7.38	543	4.1	3.96

Table 2-1

Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal)	Temperature	pH (units)	Conductivity microsiemens/cm (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW14I	4/18/98	8	11.6	7.34	277	1.7	1.89
		15	11.3	7.40	474	1.5	0.80
		20	11.8	7.39	501	1.0	0.55
		23	12.0	7.41	502	1.0	0.40
MW14S	4/18/98	3	11.1	7.44	389	1.7	7.22
		6	12.2	7.43	416	2.6	2.22
		9	12.8	7.47	383	2.5	1.99
MW11D	4/18/98	15	11.5	7.45	115	3.25	3.64
		30	11.0	7.48	98	3.5	8.47
		40	11.2	7.44	433	3.6	7.25
		50	10.9	7.35	450	3.7	567
		55	10.9	7.39	452	3.9	276
MW11I	4/18/98	8	10.7	7.38	502	3.1	2.07
		16	10.0	7.25	517	3.4	1.13
		22	10.2	7.34	477	3.9	0.43
MW11S	4/18/98	2	8.9	7.40	432	1.7	98.9
		5	8.8	7.44	333	2.0	98.3
		10	9.0	7.48	378	3.2	217
		12.5	8.7	7.45	356	2.8	1148
		15	8.7	7.44	358	3.2	395
		18	8.6	7.48	363	3.0	219

Table 2-1

Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal)	Temperature	pH (units)	Conductivity microsiemens/cm (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW8I	4/19/98	45	1.5	6.79	403	1.7	3.21
		60	10.9	6.77	332	1.9	1.60
		77	10.9	6.86	330	1.8	0.80
		91	10.8	6.89	4.0	1.1	0.65
MW8B	4/19/98	15	11.3	7.61	356	2.95	4.21
		29	11.2	7.51	326	2.85	2.26
		44	10.9	7.51	306	2.55	0.90
MW8S	4/19/98	5	11.6	7.50	488	3.35	0.73
		10	12.3	7.42	315	3.48	0.41
		15	11.5	7.49	275	3.2	0.17
		20	11.2	7.48	342	3.4	0.18
MW06D	4/19/98	10	11.2	7.50	496	2.5	60.0
		20	11.3	7.58	364	3.0	13.92
		30	11.0	7.58	478	3.0	9.65
		40	10.7	7.53	481	3.0	6.96
		45	10.8	7.31	464	3.0	4.83
MW6S	4/19/98	3	8.6	7.24	226	1.2	54.9
		5	8.6	7.28	222	2.1	35.6
		8	9.0	7.30	225	2.5	40.0
		10	9.1	7.33	240	2.2	48.6
		12	9.4	7.35	225	2.3	49.5

Table 2-1

Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal)	Temperature	pH (units)	Conductivity microsiemens/cm (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
EW01	4/19/98	Naturally flowing	9.9	7.36	305	2	4.26
			10.3	7.39	310	2.1	1.08
			9.8	7.42	360	1.9	0.95
MW1D	4/20/98	12	12.4	7.52	608	1.7	8.95
		24	12.6	7.46	638	1.8	27.8
		36	11.6	7.29	595	1.5	12.37
		48	11.6	7.26	626	1.3	9.78
		60	11.8	7.28	591	1.1	9.26
MW1S	4/20/98	2	9.8	6.87	178	2.7	12.04
		4	10.1	6.77	159	2.2	169.7
		6	9.8	6.73	153	2.0	128.1
		8	10.1	6.69	150	2.0	130.9
		10	10.0	6.65	133	2.0	124.4
MW4D	4/20/98	11	11.4	7.37	876	1.3	10.02
		22	11.2	7.42	461	1.0	3.41
		33	11.3	7.40	478	1.3	2.65
		37	11.2	7.35	470	1.25	2.60
MW4S	4/20/98	2.5	9.0	7.71	157	5.2	6.64
		5	8.6	7.68	241	5.8	16.05
		7.5	8.4	7.69	144	5.5	7.45
		10	8.4	7.65	144	5.9	4.68

Table 2-1

Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal)	Temperature	pH (units)	Conductivity microsiemens/cm (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW5D	4/20/98	13	11.1	7.38	342	1.3	32.2
		20	11.1	7.33	343	1.5	13.30
		30	11.0	7.34	348	1.4	9.25
		40	10.7	7.32	346	1.4	8.47
		50	10.4	7.34	339	1.4	5.20
MW5S	4/20/98	2	8.0	7.63	158	5.1	651
		4	8.0	7.63	163	6.0	204
		7	8.2	7.60	158	6.0	41.8
		10	8.1	7.56	162	6.0	14.36
		12	8.2	7.56	177	5.9	10.71
MW7S Purged dry twice	4/21/98	2	8.0	7.08	257	2.9	8.78
		3	8.5	7.46	263	3.0	280
MW10D	4/21/98	12	10.5	7.37	287	4.1	2.36
		15	10.6	7.36	287	3.45	0.52
		20	10.6	7.34	283	3.4	0.13
MW10I	4/21/98	6	10.8	7.26	319	2.0	0.52
		12	10.6	7.31	321	2.0	35.0
		18	10.8	7.26	321	2.0	4.99
MW10S Purged dry twice	4/21/98	2.5	9.4	7.30	254	1.2	277
		5	10.1	7.47	252	2.3	442

sampling was stored in DOT-approved drums. Purge water from monitoring well clusters 12, 11, 6 and 1 was not containerized as these are background wells. In addition, water from wells that were naturally flowing (monitoring well clusters 7, 10, 12, 13 and EW01) was not containerized. Gallons of water from these wells are being released to the surface every day. Drums of purge and decon water from sampling locations that are below the Wisconsin PALs will be dumped on the ground. Drums will elevated levels of VOCs, special VOCs, or metals will be disposed of with the containment water generated as part of the landfill cap construction.

SECTION 3
GROUNDWATER SAMPLING RESULTS

This section describes the baseline groundwater sampling results. The groundwater samples were analyzed for TCL VOCs, special VOCs (trichlorfluoromethane, dichlorofluoromethane, and tetrahydrafuran), and TAL metals (filtered and unfiltered). The TCL VOCs and TAL metals were analyzed through the U.S. EPA Contract Laboratory Program (CLP). VOCs were analyzed by American Analytical and Technical Services in Baton Rouge, Louisiana. Metals samples were analyzed by Sentinel, Inc., in Huntsville, Alabama. The special VOCs were analyzed by Chemtech in Englewood, New Jersey. Table 3-1 presents the VOC results. Table 3-2 presents the special SAS VOC results. Table 3-3 presents the metals results.

3.1 VOLATILE ORGANIC COMPOUND RESULTS

The baseline VOC results in shallow, intermediate, and deep monitoring wells are discussed below.

3.1.1 Shallow Monitoring Wells

There are 15 shallowing monitoring wells at the site. Tetrachloroethene was detected at 8 μg/L in monitoring well MW14S. This is below the contract required detection limit (CRDL). Total xylene was detected at 69 μg/L in monitoring well MW2S. There is no Preventative Action Level (PAL) or Enforcement Standard (ES) for xylene in water. No other VOCs were detected in the shallow monitoring wells.

3.1.2 Intermediate and Deep Monitoring Wells

There are 25 intermediate and deep monitoring wells that were sampled at the site. Monitoring well MW9B was not sampled due to damage incurred during the remedial investigation. Six VOCs were detected in the intermediate and deep monitoring wells. Detections of these compounds were all below the CRDL. 4-Methyl-2-pentanone was detected in MW7I and MW9I at concentrations ranging from 2 to 5 μg/L. 1,1 Dichloroethane was detected in MW9I at 3 μg/L. 1,2-Dichloroethene (total) was detected in MW10I, MW14I and EW01 at concentrations ranging from 2 to 5 μg/L.

Table 3-1

Monitoring Well Analytical Results
Volatile Organic Compound Analysis
Stoughton, Wisconsin
(µg/L)

Sample Number:	MW01D	MW01S	MW02D	MW02S	MW03D	MW03B	MW03S	MW04D
EPA Number:	EXY43	EXY44	EXY13	EXY12	EXY14	EXY27	EXY15	EXY42
Sample Date:	4/20/98	4/20/98	4/17/98	4/17/98	4/17/98	4/17/98	4/17/98	4/20/98
PARAMETER								
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 U	10 U
Acetone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 U	10 U
Chloroform	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 U	10 U
2-Butanone	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	69	10 U	10 U	10 U	10 U

U - Compound was not detected.
J - Estimated value.
☐ - Compound was detected.

[redacted]

Table 3-1

Monitoring Well Analytical Results
Volatile Organic Compound Analysis
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	MW04S	MW05D	MW05S	MW06D	MW06S	MW07D	MW07I	MW07I-DP
EPA Number:	EXY45	EXY38	EXY39	EXY09	EXY08	EXY22	EXY19	EXY20
Sample Date:	4/20/98	4/20/98	4/20/98	4/19/98	4/19/98	4/15/98	4/15/98	4/15/98
PARAMETER								
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2 J
2-Hexanone	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

U - Compound was not detected.
J - Estimated value.
[ ] - Compound was detected.

Table 3-1

Monitoring Well Analytical Results
Volatile Organic Compound Analysis
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	MW07S	MW08B	MW08I	MWO8I-DP	MW08S	MW09I	MW09S	MW10D
EPA Number:	EXY21	EXY36	EXY34	EXY35	EXY37	EXY25	EXY24	EXY46
Sample Date:	4/21/98	4/19/98	4/19/98	4/19/98	4/19/98	4/17/98	4/17/98	4/20/98
PARAMETER								
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U	3 J	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	5 J	10 U	10 U
2-Hexanone	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

U - Compound was not detected.
J - Estimated value.
[ ] - Compound was detected.

[redacted]

Table 3-1

Monitoring Well Analytical Results
Volatile Organic Compound Analysis
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	MW10I	MW10S	MW11D	MW11I	MW11S	MW12D	MW12I	MW12I-DP
EPA Number:	EXY48	EXY49	EXY05	EXY06	EXY07	EXY04	EXY02	EXY03
Sample Date:	4/21/98	4/21/98	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98
PARAMETER								
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U	10 U	24 U	23 U	10 U
Acetone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	5 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	2 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U
2-Hexanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Tetrachloroethene	3 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

U - Compound was not detected.
J - Estimated value.
☐ - Compound was detected.

Table 3-1

Monitoring Well Analytical Results
Volatile Organic Compound Analysis
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	MW12S	MW13D	MW13D-DP	MW131	MW13S	MW14D	MW14I	MW14S
EPA Number:	EXY01	EXY50	EXY51	EXY52	EXY53	EXY31	EXY32	EXY33
Sample Date:	4/18/98	4/21/98	4/21/98	4/21/98	4/21/98	4/18/98	4/18/98	4/18/98
PARAMETER								
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	23 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	7 J	10 UJ
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U	10 U	2 J	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	7 J	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	5 J	8 J
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

U - Compound was not detected.
J - Estimated value.
[ ] - Compound was detected.

Table 3-1

Monitoring Well Analytical Results
Volatile Organic Compound Analysis
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	MW15D	MW15I	MW15S	MWEW01	FB01	FB02	FB03	FB04
EPA Number:	EXY18	EXY17	EXY16	EXY40	EXY10	EXY26	EXY30	EXY47
Sample Date:	4/15/98	4/15/98	4/15/98	4/19/98	4/15/98	4/17/98	4/19/98	4/21/98
PARAMETER								
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	2 J	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2-Hexanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

U - Compound was not detected.
J - Estimated value.
[ ] - Compound was detected.

Table 3-1

Monitoring Well Analytical Results
Volatile Organic Compound Analysis
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	TB01	TB02	TB03	TB04
EPA Number:	EXY11	EXY28	EXY29	EXY41
Sample Date:	4/15/98	4/17/98	4/18/98	4/20/98
PARAMETER				
Chloromethane	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 UJ	10 U	10 U
Acetone	10 UJ	10 UJ	10 UJ	10 UJ
Carbon Disulfide	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 UJ	10 U	10 U
Chloroform	10 U	10 UJ	10 U	3 J
1,2-Dichloroethane	10 U	10 UJ	10 U	10 U
2-Butanone	10 UJ	10 UJ	10 UJ	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 UJ	10 U
2-Hexanone	10 UJ	10 UJ	10 UJ	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U

U - Compound was not detected.
J - Estimated value.
[ ] - Compound was detected.

Table 3-2

Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(µg/L)

Sample Number:	MW01D	MW01S	MW02D	MW02S	MW03D	MW03B	MW03S	MW04D
EPA Number:	98ZG04S24	98ZG04S25	98ZG04S10	98ZG04S09	98ZG04S11	98ZG04S29	98ZG04S12	98ZG04S26
Sample Date:	4/20/98	4/20/98	4/17/98	4/17/98	4/17/98	4/17/98	4/17/98	4/20/98
PARAMETER								
Dichlorodifluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrahydrofuran	10 U	10 U	10 U	1.6 J	310 D	1.4 J	10 U	10 U

U - Compound was not detected.
J - Estimated value.
[ ] - Compound was detected.

Table 3-2

Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	MW04S	MW05D	MW05S	MW06D	MW06S	MW07D	MW07I	MW07I-DP
EPA Number:	98ZG04S27	98ZG04S34	98ZG04S35	98ZG04S08	98ZG04S07	98ZG04S18	98ZG04S16	98ZG04D16
Sample Date:	4/20/98	4/20/98	4/20/98	4/19/98	4/19/98	4/15/98	4/15/98	4/15/98
PARAMETER								
Dichlorodifluoromethane	10 U	7.7 J	10 U	10 U	10 U	10 UJ	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrahydrofuran	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U

U - Compound was not detected.
J - Estimated value.
[ ] - Compound was detected.

Table 3-2

Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	MW07S	MW08B	MW08I	MWO8I-DP	MW08S	MW09I	MW09S	MW10D
EPA Number:	98ZG04S17	98ZG04S32	98ZG04S22	98ZG04D22	98ZG04S33	98ZG04S20	98ZG04S21	98ZG04S38
Sample Date:	4/21/98	4/19/98	4/19/98	4/19/98	4/19/98	4/17/98	4/17/98	4/20/98
PARAMETER								
Dichlorodifluoromethane	10 U	10 U	10 U	10 U	10 U	120	200 D	10 U
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U	5.7 J	2.1 J	10 U
Tetrahydrofuran	10 U	1 J	20	21	10 U	3.2 J	14	10 U

U - Compound was not detected.
J - Estimated value.
☐ - Compound was detected.

Table 3-2

Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	MW10I	MW10S	MW11D	MW11I	MW11S	MW12D	MW12I	MW12I-DP
EPA Number:	98ZG04S39	98ZG04S40	98ZG04S04	98ZG04S05	98ZG04S06	98ZG04S03	98ZG04S02	98ZG04D02
Sample Date:	4/21/98	4/21/98	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98
PARAMETER								
Dichlorodifluoromethane	110 D	1.9 J	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrahydrofuran	21	10 U	10 U	10 U	10 U	0.5 J	10 U	10 U

U - Compound was not detected.
J - Estimated value.
[ ] - Compound was detected.

Table 3-2

Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(µg/L)
(Continued)

Sample Number:	MW12S	MW13D	MW13D-DP	MW131	MW13S	MW14D	MW14I	MW14S
EPA Number:	98ZG04S01	98ZG04S28	98ZG04D28	98ZG04SS36	98ZG04S37	98ZG04S30	98ZG04S31	98ZG04S19
Sample Date:	4/18/98	4/21/98	4/21/98	4/21/98	4/21/98	4/18/98	4/18/98	4/18/98
PARAMETER								
Dichlorodifluoromethane	10 U	10 U	10 U	1.8 J	10 U	10 U	160 D	120 D
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	6.8 J	50 UD
Tetrahydrofuran	10 UJ	10 U	10 U	22	10 U	2.5 J	5.5 J	50 UD

U - Compound was not detected.
J - Estimated value.
[ ] - Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)

Sample Number:	MW01DMSDUF	MW01DF	MW01SUF	MW01SF	MW02DUF	MW02DF	MW02SUF	MW02SF
EPA Number:	MEXH75	MEXH76	MEXH73	MEXH74	MEXH29	MEXH30	MEXH27	MEXH28
Sample Date:	4/20/98	4/20/98	4/20/98	4/20/98	4/17/98	4/17/98	4/17/98	4/17/98
PARAMETER								
Aluminum	64.6 J	33.2 J	994.13	94.2 J	60.2	69.5	90.5 J	46.4
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.1 U	3.1 U	4.33 J	3.1 U	6.7	5.9	3.1 U	3.4
Barium	69 J	67.6 J	74.45 B	64.85 B	93.3	91	118 J	118
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.5	0.3 U	1.32 J	0.843 J	0.3	0.8	0.3 U	0.3
Calcium	80000 J	79100 J	40268.32 J	39681.74 J	78000	75900	102000 J	107000
Chromium	1.1 J	0.9	3.41 J	0.6 U	0.6 U	0.8 J	0.6 U	0.6 U
Cobalt	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Copper	16.8	6.6 J	105.21 J	47.08 J	12.8	53.6	17.4 J	11.8
Iron	879 J	325 J	1824.05	220.96 J	2230	1160	7670	7480
Lead	15.3 J	12.4 J	54.03 J	37.49 J	24.3 J	63.7 J	11 J	22.6 J
Magnesium	49200	48700	17567.36 J	17097.54 J	48500	48000	37900 J	38900
Manganese	19 J	16.3 J	202.55	164.53	75.9	75.8	1060	1070
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	3.2	2	3.31 J	2.03 J	1.7 U	1.7 U	1.7 U	1.7 U
Potassium	2920 J	2900 J	1987.99 J	1815.69 J	1910	1880	7830 J	7570
Selenium	2.7	2 U	2 UJ	2.69 J	2 U	2 U	2 U	2 U
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	153000	151000	13704.26	13729.62	11400	10400	12900 J	12700
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	1.2	1.4	2.65 B	0.8 U	0.8 U	0.8 U	1.1	1.1
Zinc	13	38.1 J	46.37 J	41.37 J	11.9	29	8 J	14.2

U - Compound was not detected.
J - Estimated value.
B -Reported value is less than the CRDL but greater than the IDL.
[ ] -Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW03DUF	MW03DF	MW03BUF	MW03BF	MW03SUF	MW03SF	MW04DUF	MW04DF
EPA Number:	MEXH31	MEXH32	MEXH47	MEXH48	MEXH33	MEXH34	MEXH79	MEXH80
Sample Date:	4/17/98	4/17/98	4/17/98	4/17/98	4/17/98	4/17/98	4/20/98	4/20/98
PARAMETER								
Aluminum	56.7	49.4	46.9	50.2	330	45.7	47.09 J	89.27 J
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	13.21 J	9.9 J
Barium	74.6	72.2	32.4	30.4	59.3	55.6	54.04 B	62.48 B
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	1	0.4	0.8	0.3 U	0.4	0.3 U	0.596 J	0.494 J
Calcium	91000	88900	80600	76400	66000	64200	110407.57 J	106134.46 J
Chromium	0.6 UJ	0.6 UJ	2.4 J	2.1 J	3.3 J	2.2 J	0.6 U	0.6 U
Cobalt	1.2 U	2.5	1.2 U	3.2	1.2 U	1.2 U	1.2 U	2.44 J
Copper	58.7	15.4	40.5	23.4	26.7	13.6	17.08 J	24.79 J
Iron	289	181	25.6 J	37.5 J	687	62.9 J	3928.61	3462.13
Lead	67.2 J	24.3 J	30.6 J	28.5 J	33.6 J	23.6 J	11.04 J	18.77 J
Magnesium	57500	55900	45100	42200	35300	34200	68754.31 J	66810.86 J
Manganese	114	115	2.7	10.6	53.3	3.2	48.84	35.55
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	2.9	3.4	1.7 U	1.7 U	1.7 U	1.7 U	1.7 J	1.7 J
Potassium	2010	1960	2380	1900	973	904	2198.54 J	2227.74 J
Selenium	2 U	2 U	2 U	2 U	2 U	2 U	2.19 J	2.11 J
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	14300	14000	8140	7700	27600	28700	19611.39	19473.41
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	0.8 U	0.8 U	0.8 U	0.8 U	1.8	0.8 U	0.8 U	0.8 U
Zinc	58.6	20.6	17	21.1	14.8	16.8	25.59 J	40.39 J

U - Compound was not detected.
J - Estimated value.
B -Reported value is less than the CRDL but gre
☐ -Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW04SUF	MW04SF	MW05DUF	MW05DF	MW05SUF	MW05SF	MW06DUF	MW06DF
EPA Number:	MEXH77	MEXH78	MEXH67	MEXH68	MEXH69	MEXH70	MEXH19	MEXH20
Sample Date:	4/20/98	4/20/98	4/20/98	4/20/98	4/20/98	4/20/98	4/19/98	4/19/98
PARAMETER								
Aluminum	85.4 J	70.31 J	89.57 J	80.75 J	74.41 J	48.66 J	76.6 J	39.5 J
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.1 U	3.1 U	5.58 J	7.18 J	3.1 U	3.72 J	3.1 U	3.1 U
Barium	29.06 B	35.73 B	54.12 B	52.45 B	36.21 B	34.41 B	29 J	28 J
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.387 J	0.3 U	1.29 J	1.44 J	0.457 J	0.397 J	0.3 U	0.3 U
Calcium	41854.92 J	51951.59 J	85760.45 J	86189 J	52508.92 J	50828.91 J	67900 J	67400 J
Chromium	1.96 J	1.58 B	2.86 J	0.804 B	2.66 J	1.22 B	1.8	2
Cobalt	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Copper	21.29 J	18.92 J	120.29 J	81.75 J	17.06 J	20.36 J	6.8 J	25.8 J
Iron	94.85 J	35.31 J	884.45	173.09 J	101.22 J	46.87 J	259 J	33.4 J
Lead	20.88 J	21.77 J	42.77 J	81.45 J	10.17 J	33.55 J	7.5 J	21.5 J
Magnesium	19514.95 J	26158.06 J	58883.89 J	59404.57 J	26056.56 J	25461.21 J	41900	41800
Manganese	4.72 J	1.12 B	30.29	29.06	8.43 J	0.936 J	2.8 J	3.5 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	1.7 J	1.7 J	1.7 J	1.7 J	1.7 J	1.7 J	1.7 U	1.7 U
Potassium	809.39 J	517.2 J	4312.23 J	4348.04 J	510.99 J	492.98 J	1450 J	1460 J
Selenium	2 UJ	2 UJ	2 UJ	3.16 J	2 UJ	2 UJ	2 UJ	2 UJ
Silver	0.969 J	0.08 U	4.94 B	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	10278.49	9453.96	14893.04	15145.38	10050.17	9153.76	4570	4460
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Zinc	27.09 J	22.3 J	40.1 J	37.52 J	15.09 J	27.89 J	8.6 J	10.7 J

U - Compound was not detected.
J - Estimated value.
B -Reported value is less than the CRDL but gre
☐ -Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW06SUF	MW06SF	MW07DUF	MW07DF	MW07DF-DP	MW07IUF	MW07IUF-DP	MW07SUF
EPA Number:	MEXH21	MEXH22	MEXH49	MEXH50	MEXH44	MEXH41	MEXH43	MEXH95
Sample Date:	4/19/98	4/19/98	4/15/98	4/15/98	4/15/98	4/15/98	4/15/98	4/21/98
PARAMETER								
Aluminum	253 J	14.9 U	69.8 J	67.6 J	84.8 J	61.5 J	85.2 J	5798.41
Antimony	3.1 U	3.1 U	3.1 R	3.1 R	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.1 U	3.1 U	3.1 R	3.1 R	3.1 U	3.1 U	3.1 U	9.3 J
Barium	56.6 J	52.3 J	24 J	24.3 J	25.5 J	35.4 J	38.5 J	111.16 B
Beryllium	0.1 U	0.1 U	0.1 R	0.1 R	0.1 U	0.1 U	0.1 U	0.398 J
Cadmium	0.3 U	0.3 U	0.3 R	0.3 R	0.3 U	1.2 J	1.2 J	1.61 J
Calcium	73500 J	69500 J	70400 J	70200 J	67100 J	73700 J	79400 J	126113.22 J
Chromium	3	0.8	0.6 R	0.6 R	0.6 U	2 J	1.9 J	216.19
Cobalt	1.2 U	1.2 U	1.2 R	1.2 R	1.7 J	1.2 U	1.2 U	14.15 B
Copper	14.6 J	4.9 J	11.5 J	21.7 J	29.5 J	163 J	144 J	126.7 J
Iron	373 J	31 J	136 J	32 J	35.9 J	68.8 J	42.6 J	14282.94
Lead	3.9 J	1.9 J	9.1 J	11.5 J	10.2 J	37.9 J	69.9 J	18.51 J
Magnesium	34500	32400	40700 J	40800 J	38800 J	41900 J	45100 J	68895.79 J
Manganese	20.1 J	0.7 J	9.1 J	8.9 J	15.7 J	8.4 J	13.2 J	1093.36
Mercury	0.21	0.2 U	0.2 R	0.2 R	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	4.1	1.7 U	1.7 R	1.7 R	1.9	1.7 U	1.7 U	204.62 J
Potassium	4340 J	4100 J	1300 J	1280 J	1270 J	1680 J	1770 J	2928.62 J
Selenium	2.1 J	2 UJ	2 R	2 R	2 U	2 U	2 U	2 UJ
Silver	0.8 U	0.8 U	0.8 R	0.8 R	0.8 U	0.8 U	0.8 U	0.977 J
Sodium	6460	6270	3370 J	3390 J	3410 J	10500 J	11100 J	6016.46
Thallium	4.6 U	4.6 U	4.6 R	4.6 R	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	0.8 U	0.8 U	0.9 J	0.8 R	0.9	0.8 U	0.8 U	25.2 B
Zinc	16.5 J	2.7 J	10.3 J	12.7 J	14.3 J	45.5 J	37.6 J	82.02 J

U - Compound was not detected.
J - Estimated value.
B -Reported value is less than the CRDL but gre
☐ -Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW07SF	MW08BUF	MW08BF	MW08IUF	MW08IF	MW08IF-DP	MW08SUF	MW08SF
EPA Number:	MEXH51	MEXH63	MEXH64	MEXH60	MEXH61	MEXH62	MEXH65	MEXH66
Sample Date:	4/21/98	4/19/98	4/19/98	4/19/98	4/19/98	4/19/98	4/19/98	4/19/98
PARAMETER								
Aluminum	139.77 J	104 J	36.9 J	69 J	72.9 J	84.2 J	34.1 J	29.1 J
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.71 J	5.1 J	3.1 U	4.4 J	3.1 U	3.1 U	3.1 U	3.2
Barium	54.03 B	37.6 J	32.1 J	42.8 J	41.3 J	42.1 J	27.5 J	27 J
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	2.62 B	1.3	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.4
Calcium	80196.24 J	70000 J	64800 J	86400 J	83800 J	84500 J	69400 J	68900 J
Chromium	1.7 B	17.2	1 J	4	0.6 U	0.9	1.2 J	0.7
Cobalt	3.48 J	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Copper	246.6 J	140 J	4.6 J	12.1 J	18.2 J	30.6 J	6.9 J	16 J
Iron	97.9 J	257 J	61.9 J	72.4 J	37.6 J	40.6 J	117 J	32.1 J
Lead	57.5 J	42 J	6 J	3.7 J	9.3 J	17.1 J	14.4 J	23 J
Magnesium	44937.06 J	42500	39600	49700	48300	48800	39000	38600
Manganese	307.76	32.9 J	1.5 J	40.6 J	39.4 J	42.3 J	0.7 J	0.6 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	117.88 J	29.7	6	9.1	7.4	7.9	1.7 U	1.7 U
Potassium	1269.88 J	7060 J	6600 J	1680 J	1700 J	1670 J	740 J	738 J
Selenium	4.56 J	2 UJ	2 U	2 UJ	2.7 J	2 UJ	2 U	2 U
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	6389.17	9670	9260	10400	10200	10200	6440	6270
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	1.4 B	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	1	0.8 U
Zinc	44.25 J	40 J	8.3 J	4.6 J	8.1 J	11.7 J	13.3	15.2 J

U - Compound was not detected.
J - Estimated value.
B -Reported value is less than the CRDL but gre
[ ]-Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW09IUF	MW09IF	MW09SUF	MW09SDPUF	MW09SF	MW09SDPF	MW10DUF	MW10DF
EPA Number:	MEXH13	MEXH14	MEXH11	MEXH45	MEXH12	MEXH46	MEXH89	MEXH90
Sample Date:	4/17/98	4/17/98	4/17/98	4/17/98	4/17/98	4/17/98	4/20/98	4/20/98
PARAMETER								
Aluminum	58.5 J	79 J	228 J	129	51.8 J	44.1	85.36 J	94.19 J
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.1 U	3.1 U	3.1 U	4.1	3.1 U	3.1 U	3.1 U	5.2 J
Barium	29 J	27.5 J	29.7 J	28.8	29 J	27.5	33.13 B	33.86 B
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.3 U	0.6 J	0.3 U	0.9	0.3 U	0.3 U	1.79 J	0.493 J
Calcium	67300 J	64100 J	52700 J	53900	52300 J	52200	72490.59 J	75533.18 J
Chromium	0.6 U	0.6 U	2.4 J	2.1 U	0.7	0.6 U	1.72 J	1.49 B
Cobalt	2	4.4 J	3.8	4	3.7 J	5	1.2 U	1.2 U
Copper	26.8 J	65.7 J	25 J	47.7	29 J	7	109.84 J	25.02 J
Iron	224 J	119 J	234 J	272	125 J	59 J	32.93 J	37.18 J
Lead	22.4 J	34.2 J	21.2 J	27.8 J	21.7 J	6.5 J	43.58 J	17.35 J
Magnesium	43800 J	41300 J	48400 J	48000	49000 J	47000	40937.83 J	42568.93 J
Manganese	301	294	380	365	361	355	5.69 J	3.26 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	4	4.2	15.5	15.6	14.8	15.9	1.7 J	1.7 J
Potassium	1600 J	1520 J	1320 J	1220	1280 J	1180	1609.4 J	1717.07 J
Selenium	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 UJ
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	14000 J	13000 J	25000 J	24400	25800 J	24300	8317.31	8544.68
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Zinc	13.6 J	20.8 J	14.6 J	29.4	11.8 J	20	60.61 J	230.73

U - Compound was not detected.
J - Estimated value.
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[ ] -Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW10IMSDUF	MW10IF	MW10SUF	MW10SF	MW11DUF	MW11DF	MW11I	MW11I
EPA Number:	MEXH91	MEXH92	MEXH94	MEXH93	MEXH09	MEXH10	MEXH23	MEXH24
Sample Date:	4/21/98	4/21/98	4/21/98	4/21/98	4/18/98	4/18/98	4/18/98	4/18/98
PARAMETER								
Aluminum	61.5	35.8	4610	36.6	67.6	36.6	53 J	14.9 U
Antimony	4.4	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.2	3.1 U	13.2	3.9	3.1 U	3.1 U	3.4 J	3.1 U
Barium	30.4 J	32.3 J	103 J	54.8 J	19.6	19.5	26.9 J	26.1 J
Beryllium	0.1 U	0.1 U	0.2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	1	2.4	0.9	0.6	0.3	0.3 U	0.3 U	0.3 U
Calcium	82400 J	83800 J	115000 J	72000 J	64000	64100	77600 J	76800 J
Chromium	1.9	0.6 U	89.9	0.7	2.4 J	2.4 J	1.7	1.6
Cobalt	1.2 U	2.6	8.4	4	7.4	7.2	1.2 U	1.6
Copper	54.7	133 J	53.6	40.4 J	15.5	7	10.8 J	2.4 J
Iron	1620 J	37.5 J	8150 J	107 J	43.6 J	34 J	65.6 J	23.2 J
Lead	43.6 J	37 J	31.9 J	17.1 J	26.5 J	7.1 J	3.1 J	1.9 J
Magnesium	47700	48300	74800	44900	39000	39400	44400	44000
Manganese	47.4 J	33.3 J	534 J	266 J	10.3	9	1.6 J	4.8 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	6.4	5.6	71	5.9	1.7 U	1.7 U	1.7 U	1.7 U
Potassium	1340 J	1360 J	2770 J	877 J	1460	1490	1670 J	1610 J
Selenium	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	18200	18600	21600	19000	6820	6840	5150	5150
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	1.1	0.8 U	14.4	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Zinc	24 J	44.3 J	44.5	15.2 J	37.2	9.9	9.9 J	2.9 J

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☐ -Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW11SUF	MW11SF	MW12DUF	MW12DF	MW12IUF	MW12IDPUF	MW12IF	MW12SMSDUF
EPA Number:	MEXH17	MEXH18	MEXH07	MEXH08	MEXH03	MEXH04	MEXH05	MEXH01
Sample Date:	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98
PARAMETER								
Aluminum	8030	85.9 J	104	392	40.4	60.1	39.7	68.2
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	6.6 J	4 J	3.1 U	3.1 U	5.4	5.3	6.5	19.5
Barium	69.3 J	24.9 J	36	37.7	100	101	99.7	119
Beryllium	0.4 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.5	0.3 U	1.6	1.2	0.3 U	0.7	0.3	0.6
Calcium	134000 J	73000 J	76400	73400	55500	54600	55100	93700
Chromium	52	1	2.8 J	2.6 J	1.4 J	0.6 U	0.6 U	0.7 J
Cobalt	7.8 J	2.4	1.2 U	1.8	1.2 U	1.2 U	1.2 U	11.7
Copper	62 J	32.3 J	102	67.7	7.2	44.8	10.5	13.1
Iron	12100	50.2 J	162	604	303	310	297	4360
Lead	26.1 J	6.5 J	100 J	66 J	9.6 J	20 J	19 J	29.7 J
Magnesium	83400	44400	43100	42600	38200	37600	37800	51300
Manganese	602 J	244 J	24.1	8	90	90.9	81.7	1890
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	47.8	3.3	1.7 U	2.3	1.7 U	1.7 U	1.7 U	11.2
Potassium	4020 J	1720 J	1750	2220	1710	1780	1750	216
Selenium	2 UJ	2.8 J	2 U	2 U	2 U	2 U	2 U	2 U
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	4930	4720	5370	5250	4420	4320	4320	79300
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.8 J
Vanadium	21.6	0.8 U	0.8	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Zinc	47.7 J	7.2 J	42.8	48.4	18.4	15.7	13.9	10.7

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J - Estimated value.
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☐ -Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW12SMSDDF	MW13DUF	MW13DUF-DP	MW13DF	MW13DF-DP	MW131UF	MW131F	MW13SUF
EPA Number:	MEXH02	MEXH81	MEXH82	MEXH83	MEXH84	MEXH85	MEXH86	MEXH87
Sample Date:	4/18/98	4/21/98	4/21/98	4/21/98	4/21/98	4/21/98	4/21/98	4/21/98
PARAMETER								
Aluminum	59.3	109 J	101 J	44.8	35.2	18.2	35.2	1620
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	16.7	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.9
Barium	116	24.1 J	23.3 J	23.6 J	23 J	56.6 J	57.1 J	60.6 J
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	1.4	0.5	1.3	2.1	1	0.3	0.4	0.5
Calcium	92400	76400 J	73500 J	74100 J	73500 J	60300 J	60200 J	83900 J
Chromium	1.2 J	2.1	1.9	3.7	1.3	0.6 U	0.6 U	93
Cobalt	12.1	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	5.8
Copper	78.4	31.6	54.9	93.4 J	44.6 J	19.9	17.9 J	20.2
Iron	4220	289 J	178 J	58.5 J	29.6 J	277 J	219 J	3580 J
Lead	72.2 J	16.2 J	35.1 J	42.5 J	35.2 J	6.7 J	24.6 J	8.8 J
Magnesium	50400	43900	42100	42300	42100	39500	39600	54800
Manganese	1870	13.5 J	11.7 J	1.6 J	0.6 J	32.9 J	32.2 J	205 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	10.9	1.7 U	1.7 U	1.9	1.7 U	2	1.7 U	70.4
Potassium	157	1330 J	1250 J	1240 J	1260 J	1630 J	1640 J	2130 J
Selenium	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	77100	4890	4600	4680	4710	4100	4150	5000
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	0.8 U	0.8 U	0.8	0.8 U	0.8 U	0.8 U	0.8 U	7.9
Zinc	27.5	33	34.1	46.4 J	21.9 J	6.7	20.9 J	16.6

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J - Estimated value.
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Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW13SF	MW14DUF	MW14DF	MW14I	MW14I	MW14SUF	MW14SF	MW15DUF
EPA Number:	MEXH88	MEXH54	MEXH55	MEXH56	MEXH59	MEXH57	MEXH58	MEXH39
Sample Date:	4/21/98	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98	4/18/98	4/15/98
PARAMETER								
Aluminum	45.6	88.1 J	28.8 J	84.9 J	14.9 U	81.2 J	81.6 J	104 J
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.1 U	3.1 U	3.1 U	3.6 J	5.8 J	3.1 U	3.5 J	3.1 U
Barium	43.7 J	37.8 J	35.5 J	67.5 J	37.4 J	37.4 J	64.5 J	40.2 J
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.5	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Calcium	58200 J	75800 J	73900 J	58600 J	55200 J	55800 J	57200 J	80500 J
Chromium	1	2.3	1	0.6 U	1.3	2	0.6 U	3.2 J
Cobalt	2.3	1.2 U	1.2 U	1.2 U	2.6	1.2 U	1.4	1.2 U
Copper	20.6 J	22.8 J	5 J	69.3 J	10.6 J	30.4 J	10 J	29.1 J
Iron	73.5 J	77.4 J	19.9 J	210 J	56.6 J	36.1 J	218 J	60.2 J
Lead	21.9 J	5.3 J	1.9 J	36.1 J	2.6 J	7.7 J	5.7 J	18.2 J
Magnesium	39700	43500	42300	46900	29800	30200 J	46400 J	46000 J
Manganese	15.9 J	6.8 J	1.4 J	359 J	53 J	46.3 J	328 J	3.9 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	20 U	0.2 U
Nickel	3.3	2	1.7 U	5	1.7 U	1.7 U	4.6	1.7 U
Potassium	1470 J	1660 J	1550 J	1670 J	734 J	790 J	1610 J	1900 J
Selenium	2 U	2 U	2 U	2.7 J	2 UJ	2 UJ	2.7 J	2 U
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	4920	8370	8130	14600	8570	8710 J	14400 J	12600 J
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	0.8	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Zinc	16.2 J	9.2 J	7.8 J	21.7 J	9.9 J	7.3 J	7.4 J	14.9 J

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J - Estimated value.
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Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	MW15DF	MW15IUF	MW15I	MW15SUF	MW15SF	MWEW01UF	MWEW01F	FB01UF
EPA Number:	MEXH40	MEXH37	MEXH38	MEXH35	MEXH36	MEXH71	MEXH72	MEXH25
Sample Date:	4/15/98	4/15/98	4/15/98	4/15/98	4/15/98	4/19/98	4/19/98	4/15/98
PARAMETER								
Aluminum	116 J	37.8 J	14.9 UJ	14.9 U	65.1 J	21.2 J	49.4 J	74.4 J
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Barium	37.8 J	28.6 J	27.2 J	57.8 J	58.6 J	28.9 J	31.1 J	1.6 J
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Calcium	76500 J	67700 J	65500 J	78500 J	80100 J	74900 J	79100 J	336 J
Chromium	2.1 J	3.7	2.6	1 J	0.8	0.6 U	0.6 U	0.6 U
Cobalt	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Copper	25.5 J	8 J	19.3 J	8.7 J	20.4 J	5.7	8.8 J	38.3
Iron	33.6 J	44.8 J	39.9 J	45.8 J	176 J	49 J	55.4 J	93.8 J
Lead	19.3 J	3.7 J	19 J	2 J	16 J	4.9 J	17.4 J	19.5 J
Magnesium	43300 J	39200 J	37900 J	44800 J	45500 J	46400	49200	109 J
Manganese	3 J	3.3 J	2.4 J	23.4 J	22.2 J	31 J	31 J	6.5
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	2.1	2.2	1.7 U	1.7 U	1.7 U	2.9	4.9	1.7 U
Potassium	1790 J	1210 J	1170 J	780 J	774 J	1810 J	1^30 J	136 J
Selenium	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	11800 J	4460 J	4210 J	4490 J	4550 J	14500	15400	378 J
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	0.8 U	1.1	1.1	1.3	1.1	0.8 U	0.8 U	0.8 U
Zinc	50.1 J	6.6 J	12.1 J	4.5 J	14.2 J	30.7	16.4 J	13.6

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[ ]-Compound was detected.

Table 3-3

Monitoring Well Analytical Results
Inorganics (Total Metals)
Stoughton, Wisconsin
(mg/L)
(Continued)

Sample Number:	FB01F	FB02UF	FB02F	FB03UF	FB03F	FB04UF	FB04F
EPA Number:	MEXH26	MEXH15	MEXH16	MEXH52	MEXH53	MEXH97	MEXH96
Sample Date:	4/15/98	4/17/98	4/17/98	4/19/98	4/19/98	4/21/98	4/21/98
PARAMETER							
Aluminum	72 J	14.9 U	14.9 U	64.7 J	55.1 J	42.97 J	59.95 J
Antimony	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Arsenic	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.82 J
Barium	1.2 J	0.7 J	0.8 J	1.1 J	0.8 J	1.27 J	1.09 J
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.806 J	0.3 U
Calcium	396 J	300 J	272 J	468 J	370 J	254.72 J	224.02 J
Chromium	0.6 U	0.6	0.6 U	0.6 U	0.6 U	1.06 B	0.6 U
Cobalt	1.5	1.2 U	1.2 U	1.8	1.2 U	1.2 U	1.23 B
Copper	18.8	2.4 J	7	6.6 J	18.7 J	54.89 J	6.42 J
Iron	35.9 J	114 J	119 J	83.4 J	20.1 J	33.16 J	22.69 J
Lead	13.3 J	1.9 J	1.9 J	6.6 J	17.4 J	42.24 J	9.12 J
Magnesium	128 J	115 J	93 J	152 J	121 J	75.82 J	78.09 J
Manganese	7.6	1 J	3.9	5.9 J	1.2 J	2.64 B	5.51 B
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 J	1.7 J
Potassium	113 J	72.6 J	64 J	107 J	91.3 J	146.83 J	120.28 J
Selenium	2 U	2 U	2 U	2.2 J	2 UJ	2.96 J	2.49 J
Silver	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	425 J	149 J	146 J	239 J	240 J	244.72 B	239.61 B
Thallium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
Vanadium	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Zinc	11.4	5.2	8	9.9	10.9	33.62	17.36 B

U - Compound was not detected.
J - Estimated value.
B -Reported value is less than the CRDL but gre
-Compound was detected.

Trichloroethene was detected in MW10I and MW14I at concentrations ranging from 2 to 7 μg/L. Tetrachloroethene was detected in MW10I and MW14I at concentrations ranging from 3 to 5 μg/L. Acetone was detected in MW14I at 7 μg/L.

3.1.3 Summary of VOC Results

Total xylene is the only compound that was detected above the CRDL. There is no PAL or ES for xylene in water.

3.2 SPECIAL VOLATILE ORGANIC COMPOUNDS

The baseline special VOC (trichlorofluormethane, dichlorodifluoromethane, and tetrahydrafuran) results in shallow, intermediate, and deep monitoring wells are discussed below. The PAL for trichlorofluoromethane (TCFM), dichlorodifluoromethane (DCDFM), and tetrahyrafuran (THF) are 698 μg/L, 200 μg/L, and 10 μg/L, respectively. The ES for TCFM, DCDFM, and THF, are 3,490, 1000, and 50 μg/L, respectively.

3.2.1 Shallow Monitoring Wells

The 15 shallow monitoring wells were all analyzed for the three special VOCs. TCFM was only detected in MW9S. It was detected below the CRDL at 2.1 μg/L.

DCDFM was detected in three monitoring wells (MW9S, MW10S, and MW14S). It was reported below the CRDL in MW10S. Concentrations found in MW9S and MW14S were 200 μg/L and 120 μg/L, respectively. The concentration in MW9S meets the PAL of 200 μg/L. Figure 3-1 shows the areal extent of DCDFM contamination in groundwater.

THF was detected in two monitoring wells,(MW2S and MW9S). Concentrations were reported below the CRDL in MW2S. The concentration in MW9S was 14 μg/L which exceeds the PAL of 10 μg/L. Figure 3-2 shows the areal extent of THF contamination in groundwater.

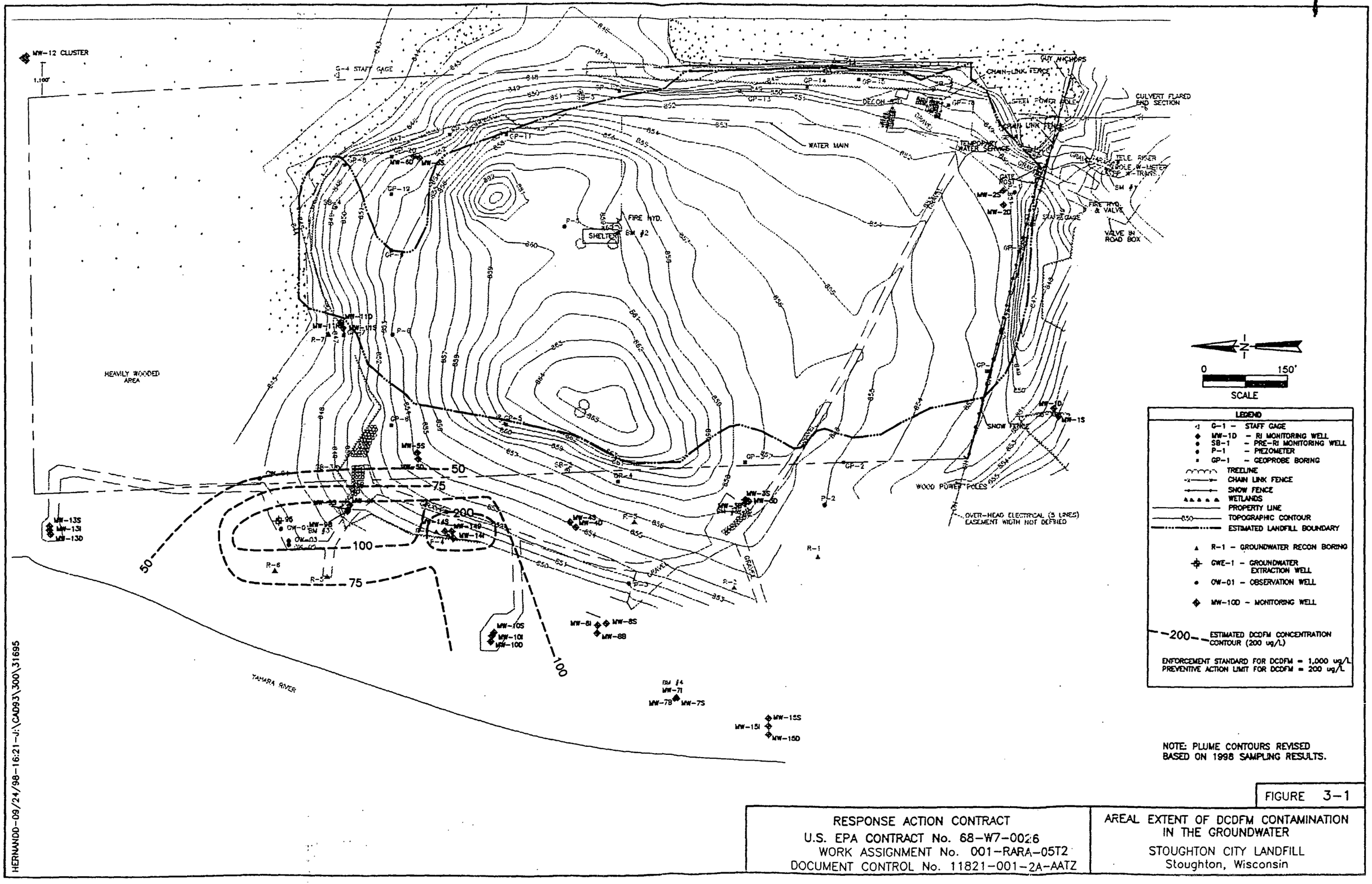
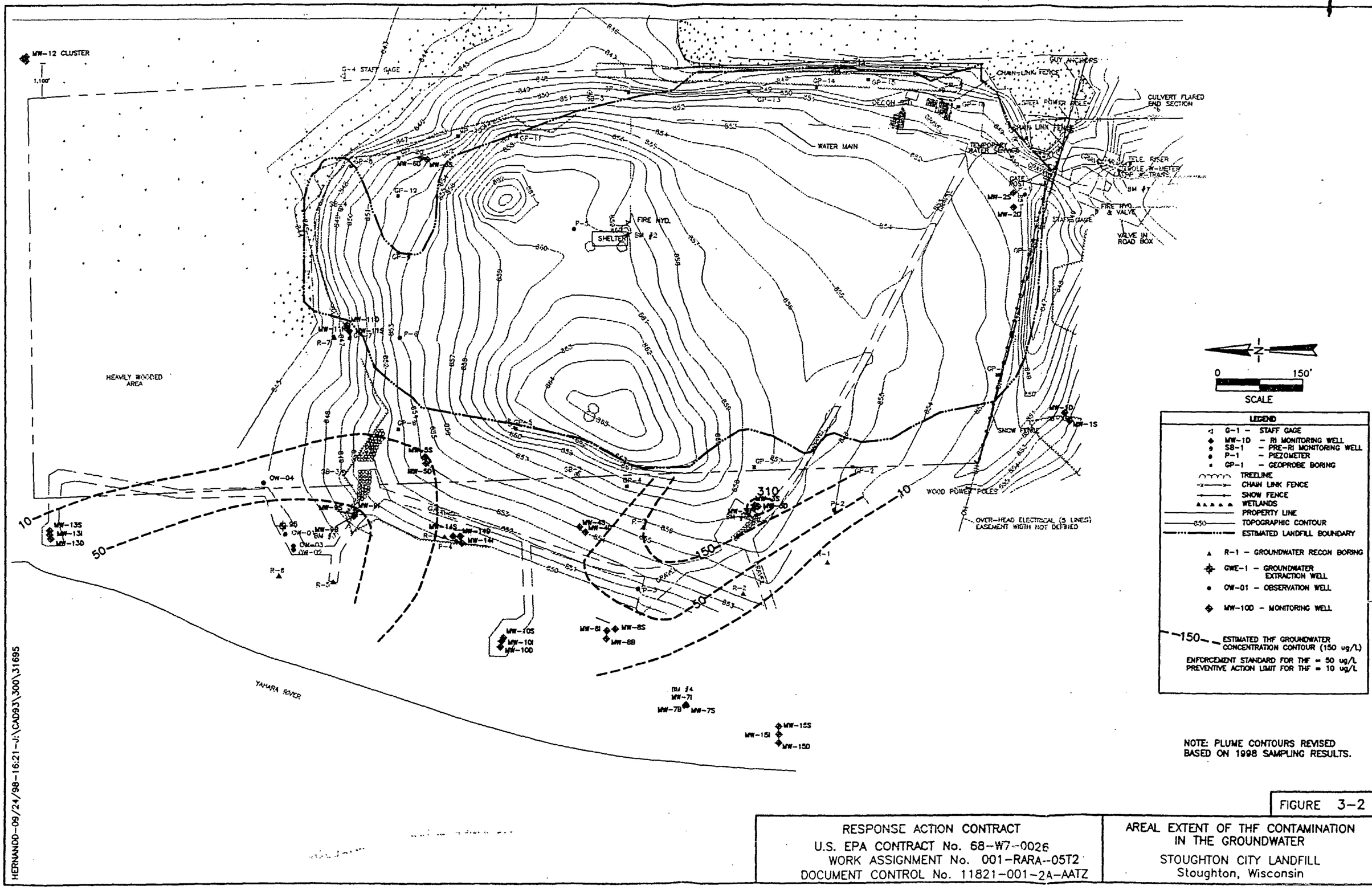


FIGURE 3-1

RESPONSE ACTION CONTRACT
U.S. EPA CONTRACT No. 68-W7-0026
WORK ASSIGNMENT No. 001-RARA-05T2
DOCUMENT CONTROL No. 11821-001-2A-AATZ

AREAL EXTENT OF DCDFM CONTAMINATION IN THE GROUNDWATER
STOUGHTON CITY LANDFILL
Stoughton, Wisconsin



NOTE: PLUME CONTOURS REVISED BASED ON 1998 SAMPLING RESULTS.

HERNANDO-09/24/98-16:21-J:\CAD93\300\31695

FIGURE 3-2

RESPONSE ACTION CONTRACT
U.S. EPA CONTRACT No. 68-W7-0026
WORK ASSIGNMENT No. 001-RARA-05T2
DOCUMENT CONTROL No. 11821-001-2A-AATZ

AREAL EXTENT OF THF CONTAMINATION IN THE GROUNDWATER
STOUGHTON CITY LANDFILL
Stoughton, Wisconsin

3.2.2 Intermediate and Deep Monitoring Wells

There are 25 intermediate and deep monitoring wells that were sampled at the site. Monitoring well MW9B was not sampled due to damage incurred during the remedial investigation. TCFM was detected in three monitoring wells (MW9I, MW14I, and EW01). Concentrations in all three wells were below the CRDL.

DCDFM was detected in six monitoring wells (MW05D, MW9I, MW10I, MW13I, MW14I, and EW01). Concentrations were below the CRDL in MW5D and MW13I. Concentrations in MW9I, MW10I, MW14I, and EW01 ranged from 95 to 160 μg/L. Concentrations in all six monitoring wells were below the PAL.

THF was detected in 11 monitoring wells (MW3D, MW3B, MW8B, MW8I, MW9I, MW10I, MW12D, MW13I, MW14D, MW14I and EW01). Concentrations were below the CRDL in MW3B, MW8B, MW9I, MW12D, MW14D, and MW14I. Concentrations in MW3D, MW8I, MW10I, MW13I and EW01 ranged from 20 to 310 μg/L. Concentrations in these 5 wells exceeded the PAL. Figure 3-2 shows the areal extent of tetrahydrafuran contamination in groundwater.

3.2.3 Summary of Special VOCs

The ES for TCFM and DCDFM, was not exceeded in any of the wells during the April 1998 sampling round. THF was detected above the ES in monitoring wells MW3D (310 μg/L), and EW01 (58 μg/L). In the 1996 sampling effort, THF was detected about the ES in monitoring wells MW3D (240 μg/L), MW8I (120 μg/L), and EW01 (67 μg/L). During the 1998 sampling round, THF was detected above the PAL but below the ES in MW8I (20 μg/L). The concentrations are similar between 1996 and 1998 for MW3D and lower in 1998 for MW8I and EW01. There were no wells during the 1998 sampling round which for the first time exceeded the PAL or ES.

3.3 METALS

The target analyte list (TAL) of metals was collected at each of the monitoring wells. An unfiltered and filtered metal sample was collected at each monitoring well location with the exception of

MW7I. A filtered metal sample could not be collected at MW7I due to a bend in the riser that did not allow the pump to be lowered down the well. A piece of tubing was lowered into MW7I and allowed water to flow through the tubing; however, the pressure was not enough to collect the filtered metal portion of the sample.

Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc all have a PAL and an ES associated with them. The metals results from the baseline sampling are discussed below.

3.3.1 Shallow Monitoring Wells

The shallow monitoring well discussion presents only those results that meet or exceed the PAL or ES. Monitoring wells MW7S, MW11S, and MW12S contained arsenic ranging from 6.6 to 19.5 μg/L in the unfiltered samples. These concentrations exceeded the arsenic PAL of 5. The MW12S filtered sample(16.7μg/L) also exceeded the PAL. Monitoring well MW11S detected beryllium at the PAL of 0.4 μg/L in the unfiltered sample. Monitoring wells MW7S, MW9S, MW10S, MW11S, MW12S, and MW13S had cadmium concentrations ranging from 0.4 to 1.61 μg/L in the unfiltered samples. The PAL for cadmium is 0.5. MW7S, MW10S, MW12S, and MW13S also had cadmium concentrations (0.5 to 2.6 μg/L)that exceeded the PAL for the filtered samples. Monitoring wells MW7S, MW11S, and MW13S had chromium concentrations ranging from 52 to 216 μg/L in the unfiltered samples. The PAL for chromium is 10 and the ES is 100. The chromium level in MW7S also exceeded the ES. The copper PAL of 130 was exceeded in the MW07S filtered sample (246.6 μg/L). Lead was detected above the PAL of 1.5 in every shallow monitoring well. It exceeded the ES of 15 in the following unfiltered samples: MW01S, MW03S, MW07S, MW09S, MW10S, MW11S, and MW12S. Lead also exceeded the ES in the following filtered samples: MW01S, MW02S, MW03S, MW07S, MW08S, MW09S, MW10S, MW12S, MW13S, and MW15S. Mercury exceeded the PAL of 0.2 in the unfiltered sample at MW06S (0.21μg/L). MW07S, MW11S, and MW13S had nickel concentrations ranging from 47.8 to 204.62 μg/L in the unfiltered samples. The PAL for nickel is 20 and the ES is 100. The unfiltered sample for MW07S (117.88

μg/L) and the filtered sample (204.62 μg/L), both exceeded the ES for nickel. The thallium concentration in the unfiltered sample (4.8 μg/L) at MW12S exceeds the PAL of 0.4.

3.3.2 Intermediate and Deep Monitoring Wells

The deep monitoring well results discussion presents only those results that meet or exceed the PAL or ES. Antimony was detected in the unfiltered sample at monitoring well MW10I at a concentration of 4.4 μg/L. This exceeds the 1.2 μg/L PAL for antimony. Monitoring wells MW02D, MW04D, MW05D, MW08B, and MW12I, had arsenic concentrations ranging from 5.58 to 13.21 μg/L in the unfiltered samples. Monitoring wells MW2D, MW4D, MW5D, MW10D, MW12I, and MW14I had arsenic concentrations ranging from 5.2to 9.9 μg/L in the filtered samples. The above arsenic concentrations exceeded the PAL but none exceeded the ES. Unfiltered cadmium results exceeded the PAL for the following locations: MW1D, MMW3D, MW4D, MW5D, MW7I, MW8B, MW10D, MW12I, and MW13D. Cadmium concentrations ranged from 0.5 to 2.1 μg/L. Filtered cadmium results exceeded the PAL for the following locations: MW2D, MW5D, MW9I, MW12D, and MW13D. Cadmium concentrations in the filtered samples ranged from 0.6 to 2.4 μg/L. The unfiltered chromium result for MW8B (17.2 μg/L) exceeded the PAL of 10. Unfiltered lead results exceeded the PAL for all of the unfiltered and filtered sample locations. Lead exceeded the ES in the following unfiltered samples: MW1D, MW2D, MW3D, MW3B, MW5D, MW7I, MW8B, MW9I, MW10D, MW11D, MW12D, MW13D, MW14I and MW15D. Lead exceeded the ES in the following filtered samples: MW2D, MW3D, MW3B, MW4D, MW5D, MW6D, MW9I, MW10D, MW10I, MW12D, MW12I, MW13D, MW13I, MW15D, and MW15I. Nickel exceeded the PAL in the unfiltered sample at MW8B (29.7 μg/L).

3.3.3 Summary of Metals Results

Arsenic, cadmium, chromium, lead, and nickel were the analytes that were most frequently detected above the PAL in the shallow, intermediate, and deep wells. Chromium and nickel were detected above the ES in MW07S. This well had very little water in it and was purged dry twice. The sediments in the bottom of the well were disturbed during purging and sampling due to the low volume of water in the well, the slow recharge, and the high pressure required to lift the water out

of the well. Therefore, the results from MW07S are not typical of overall site conditions. Lead was detected above the ES in the majority of the wells including the upgradient monitoring wells MW12S, MW12I, and MW12D. In most cases, the concentrations were less in the filtered samples than in the unfiltered samples.

GROUNDWATER SAMPLING MEMORANDUM
STOUGHTON CITY LANDFILL
STOUGHTON, WISCONSIN

June 1999

Prepared For:

U.S. Environmental Protection Agency
Superfund Division
Region V
77 West Jackson Boulevard
Chicago, Illinois 60604

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SECTION 1
INTRODUCTION

This memorandum presents the procedures and results of groundwater sampling conducted during the post-remedial action groundwater monitoring (April 1999) at the Stoughton City Landfill (SCL) site in Stoughton, Wisconsin. Roy F. WESTON, Inc. (WESTON®) conducted the sampling in accordance with the Quality Assurance Project Plan Revision 1.

The objective of this sampling effort was to monitor site groundwater quality and site gas/vapor quality after the placement of the landfill cap, remedial action activities. Prior to starting the field activities, WESTON prepared a Health and Safety Plan, Quality Assurance Project Plan (QAPP), and the Field Sampling Plan (FSP). The QAPP and FSP addendum were submitted to the United States Environmental Protection Agency (U.S. EPA) on 27 March 1998. Due to the low detection limits for the three special volatile organic compounds (trichlorofluoromethane, dichlorodifluoromethane, and tetrahydrafuran) WESTON had to procure a lab to do the special analytical services request. WESTON procured the services of Chemtech, of Englewood, New Jersey to perform the special analysis.

The field procedures and groundwater sampling results are presented in Sections 2 and 3, respectively.

SECTION 2

FIELD PROCEDURES

This section describes the field procedures for the baseline groundwater sampling.

2.1 GROUNDWATER MONITORING WELL SAMPLING

Monitoring wells were sampled using a submersible Grundfos pump. Sampling equipment was decontaminated pursuant to protocols described in Subsection 2.2. Samples were collected using the following methodology:

Upon removing the protective cap to the monitoring well riser, the head space was monitored with a CGI/O_2 (Combustible Gas Indicator/Oxygen meter) and an OVM (Organic Vapor Monitor).

- The depth to the water level in the well and the total depth of the well was measured with an electrical sounding device (accuracy $\pm$ 0.01 feet). The reference point for these depths was the top of the well riser pipe.
- The volume of standing water in the well was calculated. Volume of water in a 2-inch diameter well (gallons) = water depth (feet) x 0.16 (gallons/foot). For a 4-inch diameter well (gallons) = water depth (feet) x 0.65 (gallons/foot). For a 6-inch diameter well (gallons) = length (feet) x 1.47 (gallons/foot).
- A Grundfos pump was used for purging and sampling, and was decontaminated prior to being used in the well. Well purging was done with the pump intake just above or within the screened interval. The pump was not lowered as far into the couple of wells that are artesian and free flowing. Field measurements of pH, temperature, conductivity, dissolved oxygen, and turbidity were taken over time. Stabilization of these well purging parameters ($\pm$.25 units for pH, $\pm$0.5C for temperature, $\pm$10 percent for conductivity, $\pm$0.1 mg/L for dissolved oxygen, and $\pm$1unit for turbidity) indicated equilibrated conditions. Well purging continued until the turbidity decreased to 5 NTU or less, or until five purge volumes were removed.
- Samples were collected directly from the pump after the well purging was completed. One sample was collected at each location. One sample was collected for special VOC analysis (trichlorofluoromethane, dichlorodifluoromethane, and tetrahydrafuran). The special VOCs sample was prepreserved with hydrochloric acid. The samples were placed in a cooler on ice immediately following sample collection.

Table 2-1 presents the sampling order, sampling date, and field parameters during monitoring well sampling.

2.2 DECONTAMINATION PROCEDURES

The submersible pump decontamination consisted of submerging the pump in a 5-gallon pail of tap water and detergent (alconox) solution. Tap water was obtained from a City of Stoughton water system connection located outside a hotel in Stoughton. Approximately 3 to 4 gallons of the alconox solution was pumped through the pump and tubing. This was followed by pumping approximately 3 to 4 gallons of deionized water through the pump and tubing. The pump casing was sprayed off using deionized water in a hand-held spray bottle. Alconox water solution followed by deionized water was poured over the outside of the tubing and the pump electrical cord.

2.3 MANAGEMENT OF INVESTIGATIVE DERIVED WASTE

Investigation derived wastes (IDWs) are defined as purge water and decontamination water generated during the groundwater sampling. Decontamination and purge water collected during sampling was stored in DOT-approved drums. Purge water from monitoring well clusters 3, 4, 5, 8, 12, 14, and 15 was not containerized as these are upgradient wells. In addition, water from wells that were naturally flowing (monitoring well clusters 7, 10, 12, 13 and EW01) was not containerized. Gallons of water from these wells are being released to the ground surface every day. Drums of purge and decontamination water from sampling locations that are below the Wisconsin PALs will be dumped on the ground. Drums with elevated levels of special VOCs will be disposed of properly.

2.4 LANDFILL GAS MONITORING PROCEDURES

Gas monitoring probes (GMP) measurements were recorded using a CGI/0_2 and an OVM. Measurements were recorded using the following methodology:

The CGI/0_2 and the OVM were calibrated. Upon removing the protective cap from the GMP riser pipe, the CGI/0_2 probe was inserted a few inches into the riser pipe. The lower exposure limit (LEL) reading and the percent of oxygen reading were taken and recorded at each GMP. The OVM

probe was inserted a few inches into the GMP riser pipe. The organic vapor reading was taken and recorded as parts per million (ppm).

Table 2-1
Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin

Monitoring Well No.	Date of Sample	Purged Vol. (Gal.)	Temperature °C	pH (units)	Conductivity (microsiemens/cm) (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW15S	4/13/99	2	7.5	7.3	562	1.2	4.6
		4	7.5	7.3	588	1.25	0.64
		7	7.5	7.3	640	1.3	0.16
		9	7.8	7.3	595	1.25	0.17
		10.5	7.3	7.3	589	1.25	0.17
MW15I	4/13/99	9	10.2	7.6	574	2.5	0.40
		20	10.3	7.5	580	2.5	0.54
		30	10.7	7.5	582	2.55	0.34
MW15D	4/13/99	13	10.9	7.4	710	5.9	0.33
		25	10.9	7.3	472	5.9	0.54
		40	10.7	7.3	467	5.9	0.55
		55	10.7	7.3	509	5.9	0.51

Table 2-1
Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal.)	Temperature °C	pH (units)	Conductivity (microsiemens/cm) (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW7S	4/13/99	4.5	13.8	7.3	685	3.4	125
		5.5	15.6	7.4	733	2.3	147
		7.5	12.8	7.4	661	5.2	193
		8.5	12.9	7.4	693	4.9	176
MW7I	4/13/99	8	10.4	7.5	627	1.0	3.57
		18	10.4	7.5	646	1.0	2.40
		30	10.3	7.5	622	1.1	1.75
MW7B	4/13/99	10	9.6	7.3	561	5.9	0.14
		25	9.5	7.3	563	5.9	0.20
		40	9.5	7.3	563	5.9	0.20

Table 2-1
Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal.)	Temperature °C	pH (units)	Conductivity (microsiemens/cm) (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW8S	4/13/99	5	10.7	7.4	585	5.2	1.44
		10	10.8	7.4	580	5.0	0.52
		15	10.7	7.4	584	5.1	0.20
MW8B	4/13/99	12	10.1	7.4	622	4.8	2.21
		25	9.9	7.4	638	4.8	1.80
		40	9.9	7.4	640	4.8	2.7
MW8I	4/14/99	40	10.1	7.1	--	0.8	1.52
		80	10.3	7.4	--	0.8	0.61
		120	10.5	7.4	--	0.8	0.20
		160	10.7	7.5	--	0.8	0.43

-- No measurement taken, conductivity meter malfunction

Table 2-1
Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal.)	Temperature °C	pH (units)	Conductivity (microsiemens/cm) (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW13S	4/14/99	2.5	11.5	7.6	369	1.75	> 200
		4.5	11.3	7.7	431	1.7	> 200
		8.0	11.2	7.7	439	1.7	> 200
		10.5	11.3	7.7	435	1.7	113.4
MW9I	4/14/99	7.0	11.4	7.6	527	0.5	1.05
		14.0	11.3	7.6	524	0.5	0.62
		21.0	11.4	7.6	536	0.6	0.58
MW9S	4/14/99	5.0	12.2	7.6	551	0.9	80.6
		10	10.6	7.6	539	1.0	> 200
		15	12.2	7.5	576	1.05	23.9
		20	12.3	7.6	566	1.0	25.4
		25	12.6	7.6	572	1.0	19.5

Table 2-1
Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal.)	Temperature °C	pH (units)	Conductivity (microsiemens/cm) (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW5S	4/15/99	1.5	8.5	7.5	330	5.2	62.8
		3.0	8.4	7.5	331	5.3	23.8
		4.5	8.4	7.5	327	5.3	10.1
		6.0	8.4	7.5	330	5.3	6.8
		7.5	8.3	7.5	328	5.3	5.29
MW5D	4/15/99	11.0	10.2	7.3	676	0.7	44.1
		23.0	10.2	7.3	657	0.75	32.9
		35.0	10.3	7.3	654	0.75	23.2
		46.0	10.3	7.3	640	0.75	13.85
		57.0	10.3	7.3	669	0.8	11.86

Table 2-1
Summary of Field Parameters
Baseline Groundwater Sampling
Stoughton Landfill
Stoughton, Wisconsin
(Continued)

Monitoring Well No.	Date of Sample	Purged Vol. (Gal.)	Temperature °C	pH (units)	Conductivity (microsiemens/cm) (s/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
MW3S	4/15/99	1.5	9.4	7.4	347	5.3	176.8
		4.0	9.6	7.4	348	5.3	92.7
		6.0	9.4	7.5	340	5.4	54.7
		7.5	9.4	7.5	339	5.3	35.5
MW3D	4/15/99	10.5	10.3	7.4	642	0.75	12.36
		21.0	10.3	7.4	663	0.80	4.93
		32.0	10.3	7.4	676	0.80	4.97
MW3B	4/15/99	13.5	10.1	7.3	436	3.6	2.23
		27.0	10.0	7.3	481	3.7	0.85
		40.5	10.0	7.2	475	3.6	0.40

SECTION 3

GROUNDWATER SAMPLING RESULTS

This section describes the post-remedial action groundwater sampling results. The groundwater samples were analyzed for three special VOCs (trichlorfluoromethane, dichlorodifluoromethane, and tetrahydrafuran). The special VOCs were analyzed by Chemtech in Englewood, New Jersey. Table 3-1 presents the special SAS VOC results.

3.1 SPECIAL VOLATILE ORGANIC COMPOUNDS

The post-remedial action special VOC results in shallow, intermediate, and deep monitoring wells are discussed below. The Preventive Action Levels (PAL) for trichlorofluoromethane (TCFM), dichlorodifluoromethane (DCDFM), and tetrahyrafuran (THF) are 698 μg/L, 200 μg/L, and 10 μg/L, respectively. The Enforcement Standards (ES) for TCFM, DCDFM, and THF, are 3,490 μg/L, 1000 μg/L, and 50 μg/L, respectively.

3.1.1 Shallow Monitoring Wells

Ten shallow monitoring wells were analyzed for the three special VOCs. TCFM was detected in MW9S and MW14S. Concentrations found in MW9S and MW14S were below the PAL at 3.3 ug/L and 3 μg/L, respectively.

DCDFM was detected in three monitoring wells MW9S, MW10S, and MW14S. It was reported below the contract required detection limit (CRDL) in MW10S. Concentrations found in MW9S and MW14S were 400 μg/L and 710 μg/L, respectively. The concentrations in MW9S and MW14S exceeded the PAL of 200 μg/L. Figure 3-1 shows the areal extent of DCDFM contamination in groundwater.

THF was detected in three monitoring wells, MW9S, MW10S, and MW14S. Concentrations were reported below the PAL in MW10S and MW14S. The concentration in MW9S (22 μg/L) exceeds the PAL of 10 μg/L. Figure 3-2 shows the areal extent of THF contamination in groundwater.

I, B, D = deep

1.1

8.27

<0.25

Table 3-1
Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(μg/L)

Sample Number:	MW3B	MW03D	MW3S	MW4D	MW4D-DP	MW4S	MW05D	MW5S
EPA Number:	99ZG06S26	99ZG06S25	99ZG06S24	99ZG06S21	99ZG06D21	99ZG06S20	99ZG06S23	99ZG06S22
Sample Date:	4/15/99	4/15/99	4/15/99	4/15/99	4/15/99	4/15/99	4/15/99	4/15/99
PARAMETER								
Dichlorodifluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	11	10 U
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	1.3 J	10 U
Tetrahydrofuran	10 RU	230 RD	10 RU	10 RU	10 RU	10 RU	10 RU	10 RU

R - Result is unusable
U - Compound was not detected.
J - Estimated value.
D - Value from dilution
- Compound was detected

Table 3-1
Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(μg/L)
(Continued)

Sample Number:	MW7B	MW7I	MW7S	MW8B	MW8I	MW8S	MW09I	MW09I-DP
EPA Number:	99ZG06S09	99ZG06S08	99ZG06S07	99ZG06S11	99ZG06S12	99ZG06S10	99ZG06S14	99ZG06D14
Sample Date:	4/13/99	4/13/99	4/13/99	4/13/99	4/14/99	4/13/99	4/14/99	4/14/99
PARAMETER								
Dichlorodifluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	340D	350D
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	6.1 J	6.4 J
Tetrahydrofuran	10 U	10 U	10 U	10 U	10 RU	10 U	10 RU	10 RU

R - Result is unusable
U - Compound was not detected.
J - Estimated value.
D - Value from dilution
[redacted] - Compound was detected

Table 3-1
Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(μg/L)
(Continued)

Sample Number:	MW09S	MW10B	MW10I	MW10S	MW12D	MW12I	MW12S	MW13B
EPA Number:	99ZG06S15	99ZG06S30	99ZG06S29	99ZG06S19	99ZG06S03	99ZG06S02	99ZG06S01	99ZG06S28
Sample Date:	4/14/99	4/16/99	4/16/99	4/15/99	4/12/99	4/12/99	4/12/99	4/16/99
PARAMETER								
Dichlorodifluoromethane	400D	0.8 J	280D	2.4 J	10 U	10 U	10 U	10 U
Trichlorofluoromethane	3.3 J	10 UJ	2.6 J	10 U	10 U	10 U	10 U	10 U
Tetrahydrofuran	22 J	10 U	10 U	0.7 J	10 U	10 U	10 U	10 UJ

R - Result is unusable
U - Compound was not detected.
J - Estimated value.
D - Value from dilution
▒ - Compound was detected

Table 3-1
Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(μg/L)
(Continued)

Sample Number:	MW13I	MW13S	MW14D	MW14I	MW14S	MW15D	MW15D-DP	MW15I
EPA Number:	99ZG06S27	99ZG06S13	99ZG06S18	99ZG06S17	99ZG06S16	99ZG06S06	99ZG06D06	99ZG06S05
Sample Date:	4/16/99	4/14/99	4/14/99	4/14/99	4/14/99	4/13/99	4/13/99	4/13/99
PARAMETER								
Dichlorodifluoromethane	0.7 J	10 U	1.5 J	590D	710D	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U	5 J	3 J	10 U	10 U	10 U
Tetrahydrofuran	20	10 RU	10 RU	3.2 J	3.8 J	10 U	10 U	10 U

R - Result is unusable
U - Compound was not detected.
J - Estimated value.
D - Value from dilution
- Compound was detected

Table 3-1
Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(μg/L)
(Continued)

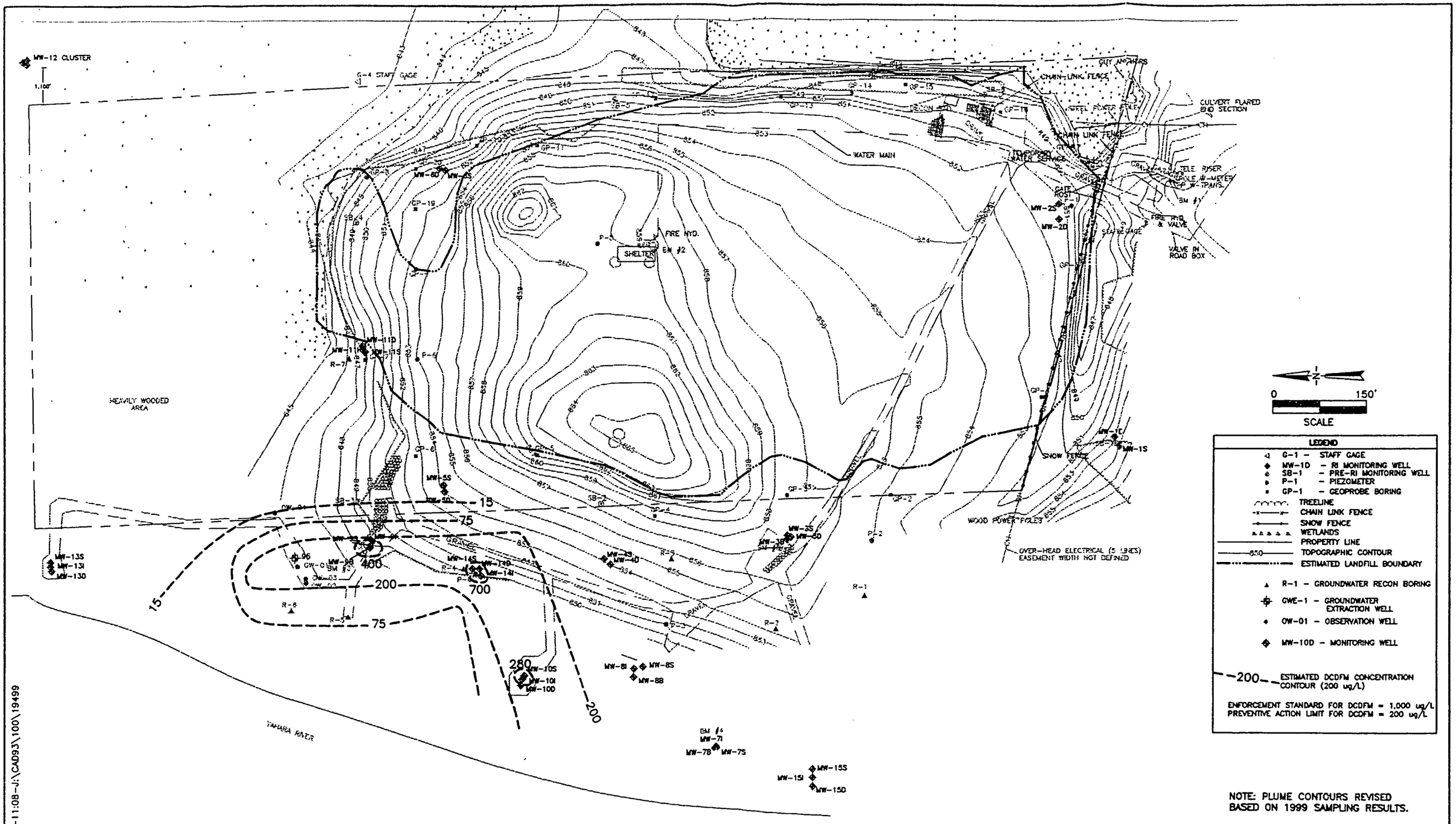
Sample Number:	MW15S	EW01	EW01-DP	FB01	FB02	FB03	FB04	TB01
EPA Number:	99ZG06S04	99ZG06S31	99ZG06D31	99ZG06R01	99ZG06R02	99ZG06R04	99ZG06R06	99ZG06R03
Sample Date:	4/13/99	4/16/99	4/16/99	4/13/99	4/14/99	4/15/99	4/16/99	4/14/99
PARAMETER								
Dichlorodifluoromethane	10 U	83	100	10 U	2.1 J	10 U	10 U	10 U
Trichlorofluoromethane	10 U	3.6 J	4.2 J	10 U	10 U	10 U	10 UJ	10 U
Tetrahydrofuran	10 U	10 U	18	10 U	10 RU	10 RU	10 U	10 U

R - Result is unusable
U - Compound was not detected.
J - Estimated value.
D - Value from dilution
[illegible] - Compound was detected

Table 3-1
Monitoring Well Analytical Results
Special Volatiles
Stoughton, Wisconsin
(μg/L)
(Continued)

Sample Number:	TB02	TB03						
EPA Number:	99ZG06R05	99ZG06R07						
Sample Date:	4/15/99	4/16/99						
PARAMETER								
Dichlorodifluoromethane	10 U	10 U						
Trichlorofluoromethane	10 U	10 U						
Tetrahydrofuran	10 RU	10 U						

R - Result is unusable
U - Compound was not detected.
J - Estimated value.
D - Value from dilution.
[redacted] - Compound was detected



LEGEND

- G-1 – STAFF GAGE
- MW-1D – RI MONITORING WELL
- SB-1 – PRE-RI MONITORING WELL
- P-1 – PIEZOMETER
- GP-1 – GEOPROBE BORING
- TREELINE
- CHAIN LINK FENCE
- SNOW FENCE
- WETLANDS
- PROPERTY LINE
- 850 TOPOGRAPHIC CONTOUR
- ESTIMATED LANDFILL BOUNDARY
- R-1 – GROUNDWATER RECON BORING
- GWE-1 – GROUNDWATER EXTRACTION WELL
- OW-01 – OBSERVATION WELL
- MW-10D – MONITORING WELL
- 200 ESTIMATED DCDFM CONCENTRATION CONTOUR (200 ug/L)

ENFORCEMENT STANDARD FOR DCDFM = 1,000 ug/L
PREVENTIVE ACTION LIMIT FOR DCDFM = 200 ug/L

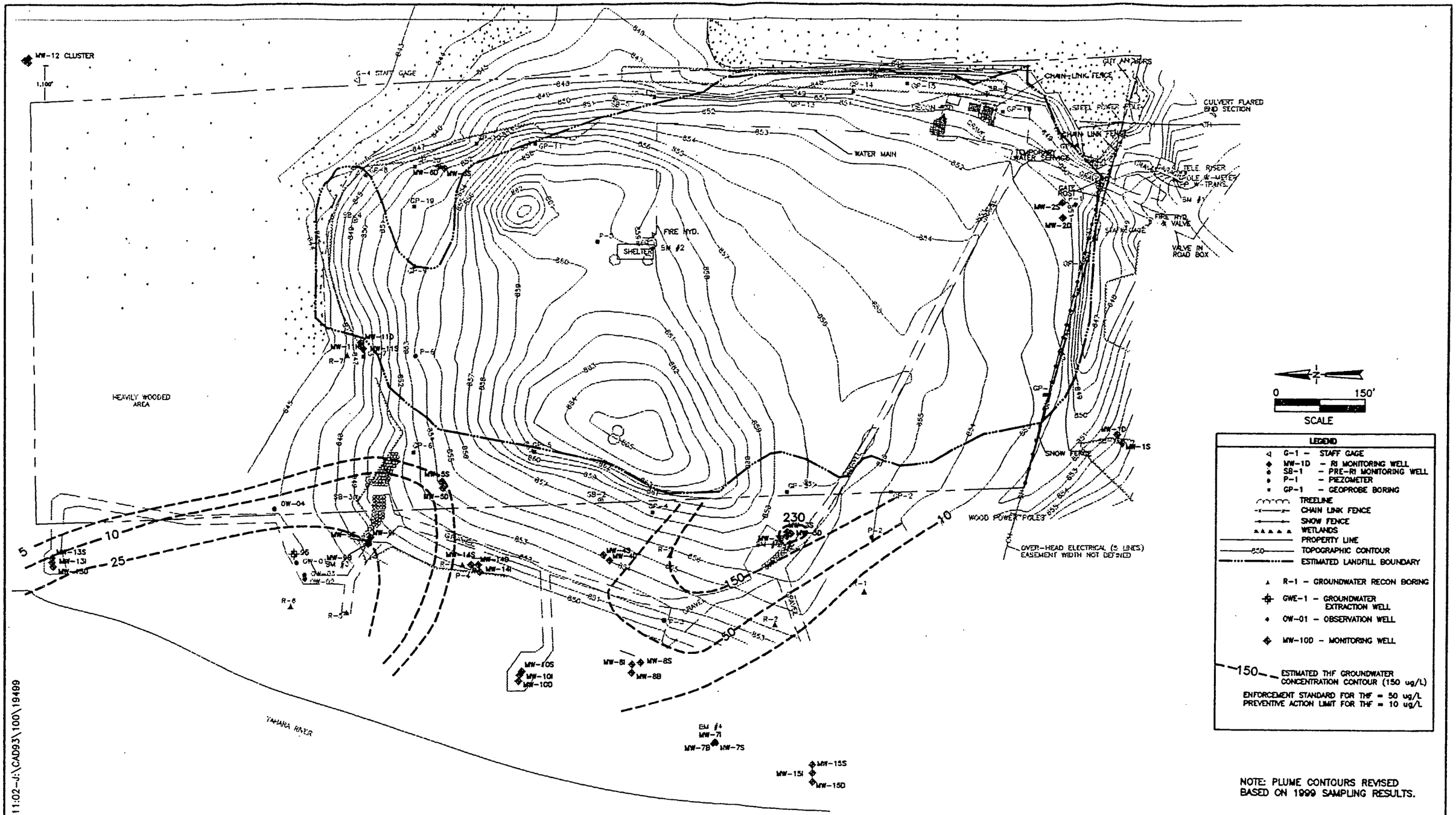
NOTE: PLUME CONTOURS REVISED BASED ON 1999 SAMPLING RESULTS.

FIGURE 3-1

RESPONSE ACTION CONTRACT
U.S. EPA CONTRACT No. 68-W7-0026
WORK ASSIGNMENT No. 001-RARA-05T2
DOCUMENT CONTROL No. 11821-001-2A-ACSU

AREAL EXTENT OF DCDFM CONTAMINATION IN THE GROUNDWATER
STOUGHTON CITY LANDFILL
Stoughton, Wisconsin

HERNANDO-06/24/99-11:08-J:\CAD93\100\19499



NOTE: PLUME CONTOURS REVISED BASED ON 1999 SAMPLING RESULTS.

HERNANDD-06/24/99-11:02-J:\CAD93\100\19499

FIGURE 3-2

RESPONSE ACTION CONTRACT
U.S. EPA CONTRACT No. 68-W7-0026
WORK ASSIGNMENT No. 001-RARA-0572
DOCUMENT CONTROL No. 11821-001-2A-ACSU

AREAL EXTENT OF THF CONTAMINATION IN THE GROUNDWATER
STOUGHTON CITY LANDFILL
Stoughton, Wisconsin

3.1.2 Intermediate and Deep Monitoring Wells

There were 18 intermediate and deep monitoring wells that were sampled at the site. TCFM was detected in five monitoring wells, MW9I, MW10I, MW13I, MW14I, and EW01. Concentrations in all five wells were below the PAL.

DCDFM was detected in eight monitoring wells, MW05D, MW9I, MW10B, MW10I, MW13I, MW14I, MW14D, and EW01. Concentrations were below the PAL in MW5D, MW10B, MW14D, MW13I, and EW01. Concentrations in MW9I, MW10I, and MW14I ranged from 280 to 590 μg/L, which were above the PAL.

THF was detected in four monitoring wells, MW3D, MW13I, MW14I and the duplicated sample in EW01. The concentration was below the detection limit in MW14I. Concentrations in MW3D, MW13I and EW01 ranged from 18 to 230 μg/L. Concentrations in these three wells exceeded the PAL. Figure 3-2 shows the areal extent of tetrahydrafuran contamination in groundwater.

3.1.3 Summary of Special VOCs

The ES for TCFM and DCDFM, was not exceeded in any of the wells during the April 1999 sampling round. THF was also detected above the ES in monitoring well MW3D (230 μg/L). In the 1998 sampling effort, THF was also detected above the ES in monitoring wells MW3D (310 μg/L), MW8I (120 μg/L), and EW01 (67 μg/L). The concentrations are lower in 1999 for theses three wells. There were no wells during the 1999 sampling round which exceeded the PAL or ES for the first time.

SECTION 4

GAS MONITORING PROBE RESULTS

Three gas monitoring probes (GMP-1, GMP-2, and GMP-3) were monitored for percent oxygen, combustible gas, and organic vapors. The results of the gas probe monitoring are shown in Table 4-1. GMP-2 and GMP-3 had slight oxygen deficient environments. All three LEL measurements were zero. No significant organic vapors were present in any of the gas probes. However, a slight reading of 1.1 ppm was detected in GMP-3.

TABLE 4-1

GAS MONITORING PROBE RESULTS
STOUGHTON, WISCONSIN

Gas Monitoring Probe	Percent Oxygen (%)	Combustble Gas Indicator (% LEL)	Organic Vapor Monitor (ppm)
GMP-1	20.8	0	0
GMP-2	16.5	0	0
GMP-3	14	0	1.1

APPENDIX C

Mann Kendall Statistical Test Results

State of Wisconsin
Department of Natural Resources
Remediation and Redevelopment Program

Mann-Kendall Statistical Test
Form 4400-215 (2/2001)

Notice: This form is the DNR supplied spreadsheet referenced in Appendices A of Comm 46 and NR 746, Wis. Adm. Code. It is provided to consultants as an optional tool for groundwater contaminant trend analysis to support site closure requests under s. Comm 46.07, Comm 46.08, NR 746.07, NR 746.08, Wis. Adm. Code. Use this form or a manual method when seeking case closure under those rules. Earlier versions of this form should not be used.

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Site Name : Stoughton City Landfill | BRRTS No. = | Well Number = MW3D

Compound ->		Tetrahydrofuran Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event Number	Sampling Date (most recent last)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)
1	20-Apr-98	310.00					
2	15-Apr-99	230.00					
3	28-Aug-00	65.00					
4	4-Apr-01	53.00					
5	20-Nov-01	70.00					
6	22-Apr-02	100.00					
7	19-Nov-02	61.00					
8	23-Apr-03	88.00					
9	18-Nov-03	48.00					
10	20-Apr-04	66.00					
	Mann Kendall Statistic (S) =	-17.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	10	0	0	0	0	0
	Average =	109.10	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	88.211	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.809	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥80% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Trend ≥90% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at			n<4	n<4	n<4	n<4	n<4
80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4

Data Entry By = LMH | Date = 23-Jun-04 | Checked By = RKL

State of Wisconsin
Department of Natural Resources
Remediation and Redevelopment Program

Mann-Kendall Statistical Test
Form 4400-215 (2/2001)

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Site Name : Stoughton City Landfill				BRRTS No. =			Well Number = MW8I
	Compound ->	Tetrahydrofuran Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event Number	Sampling Date (most recent last)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)
1	19-Apr-98	20.00					
2	15-Apr-99	10.00					
3	28-Aug-00	19.00					
4	4-Apr-01	7.40					
5	20-Nov-01	5.50					
6	22-Apr-02	3.70					
7	19-Nov-02	3.70					
8	23-Apr-03	2.00					
9	18-Nov-03	1.90					
10	20-Apr-04	1.30					
	Mann Kendall Statistic (S) =	-42.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	10	0	0	0	0	0
	Average =	7.45	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	6.893	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.925	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥80% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Trend ≥90% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4
	Data Entry By = LMH		Date = 23-Jun-04		Checked By = PEL		

State of Wisconsin
Department of Natural Resources
Remediation and Redevelopment Program

Mann-Kendall Statistical Test
Form 4400-215 (2/2001)

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Site Name : Stoughton City Landfill | Dichlorodifluoro | BRRTS No. = | Well Number = MW9S

Event Number	Sampling Date (most recent last)	Benzene Concentration (leave blank if no data)	methane Concentration (leave blank if no data)	Tetrahydrofuran Concentration (leave blank if no data)	Trichloroethene Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
Compound ->							
1	14-Apr-98	0.05	200.00	14.00	0.13		
2	16-Apr-99		400.00	22.00			
3	28-Aug-00	0.74	250.00	13.00	0.80		
4	4-Apr-01	0.05	160.00	0.13	0.13		
5	20-Nov-01	0.59	170.00	20.00	0.54		
6	22-Apr-02	0.72	91.00	14.00	0.13		
7	19-Nov-02	0.05	100.00	4.40	0.13		
8	23-Apr-03	0.79	100.00	14.00	0.26		
9	18-Nov-03	0.83	0.25	11.00	0.51		
10	20-Apr-04	0.98	130.00	11.00	0.22		
Mann Kendall Statistic (S) =		21.0	-26.0	-13.0	-1.0	0.0	0.0
Number of Rounds (n) =		9	10	10	9	0	0
Average =		0.53	160.13	12.35	0.32	#DIV/0!	#DIV/0!
Standard Deviation =		0.377	108.413	6.467	0.245	#DIV/0!	#DIV/0!
Coefficient of Variation(CV)=		0.706	0.677	0.524	0.776	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected						n<4	n<4
Trend ≥80% Confidence Level		**INCREASING**	**DECREASING**	**DECREASING**	No Trend	n<4	n<4
Trend ≥90% Confidence Level		**INCREASING**	**DECREASING**	No Trend	No Trend	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	**CV <= 1 STABLE**	n<4 n<4	n<4 n<4

Data Entry By = LMH | Date = 23-Jun-04 | Checked By = PBL

State of Wisconsin
Department of Natural Resources
Remediation and Redevelopment Program

Mann-Kendall Statistical Test
Form 4400-215 (2/2001)

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Site Name : Stoughton City Landfill | Dichlorodifluoro | BRRTS No. = | Well Number = MW9I

Event Number	Sampling Date (most recent last)	Chloromethane Concentration (leave blank if no data)	methane Concentration (leave blank if no data)	1,2-DCA Concentration (leave blank if no data)	Trichloroethene Concentration (leave blank if no data)	Vinyl Chloride Concentration (leave blank if no data)	Concentration (leave blank if no data)
Compound ->							
1	17-Apr-98	0.10	120.00	0.13	0.13	0.13	
2	14-Apr-99	0.10	340.00	0.13	0.13	0.13	
3	28-Aug-00	82.00	190.00	0.13	0.98	0.13	
4	4-Apr-01	0.10	120.00	0.13	0.13	0.13	
5	20-Nov-01	0.10	140.00	0.13	1.10	0.13	
6	22-Apr-02	0.10	67.00	0.13	0.96	0.13	
7	19-Nov-02	0.10	130.00	0.13	0.95	0.13	
8	23-Apr-03	0.10	100.00	0.13	1.10	0.13	
9	18-Nov-03	44.00	150.00	3.10	1.40	0.27	
10	20-Apr-04	0.10	96.00	0.13	1.30	0.25	
	Mann Kendall Statistic (S) =	1.0	-14.0	-7.0	27.0	3.0	0.0
	Number of Rounds (n) =	10	10	10	10	10	0
	Average =	12.68	145.30	0.42	0.82	0.15	#DIV/0!
	Standard Deviation =	27.993	76.073	0.940	0.496	0.057	#DIV/0!
	Coefficient of Variation(CV)=	2.208	0.524	2.221	0.606	0.370	#DIV/0!
Error Check, Blank if No Errors Detected							n<4
Trend ≥80% Confidence Level		No Trend	**DECREASING**	No Trend	**INCREASING**	No Trend	n<4
Trend ≥90% Confidence Level		No Trend	No Trend	No Trend	**INCREASING**	No Trend	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV > 1 NON-STABLE**	NA	**CV > 1 NON-STABLE**	NA	**CV <= 1 STABLE**	n<4 n<4

Data Entry By = LMH | Date = 23-Jun-04 | Checked By = RBL

i:\1764\Reports\5 Yr Eval.Report\4400-215_MW9I.XLS

[redacted] of Wisconsin [redacted] Mann-Kendall Statistical Test

Department of Natural Resources **Form 4400-215 (2/2001)**

Remediation and Redevelopment Program

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Site Name : Stoughton City Landfill			BRRTS No. =		Well Number = MW9B	

Compound ->	Chloromethane					
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	4-Apr-01	0.10					
2	20-Nov-01	0.10					
3	22-Apr-02	0.10					
4	19-Nov-02	1.10					
5	23-Apr-03	0.10					
6	18-Nov-03	3.00					
7	20-Apr-04	0.10					
8							
9							
10							
Mann Kendall Statistic (S) =		5.0	0.0	0.0	0.0	0.0	0.0
Number of Rounds (n) =		7	0	0	0	0	0
Average =		0.66	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Standard Deviation =		1.098	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Coefficient of Variation(CV)=		1.671	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		**CV > 1 NON-STABLE**	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = LMH	Date = 23-Jun-04	Checked By = RGL

State of Wisconsin
Department of Natural Resources
Remediation and Redevelopment Program

Mann-Kendall Statistical Test
Form 4400-215 (2/2001)

Notice: This form is the DNR supplied spreadsheet referenced in Appendices A of Comm 46 and NR 746, Wis. Adm. Code. It is provided to consultants as an optional tool for groundwater contaminant trend analysis to support site closure requests under s. Comm 46.07, Comm 46.08, NR 746.07, NR 746.08, Wis. Adm. Code. Use this form or a manual method when seeking case closure under those rules. Earlier versions of this form should not be used.

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Site Name : Stoughton City Landfill				BRRTS No. =		Well Number = MW10S	
	Compound ->	Tetrahydrofuran Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
Event Number	Sampling Date (most recent last)						
1	21-Apr-98	0.25					
2	15-Apr-99	0.70					
3	28-Aug-00	3.50					
4	4-Apr-01	0.25					
5	21-Nov-01	0.25					
6	23-Apr-02	20.00					
7	19-Nov-02	3.50					
8	24-Apr-03	1.30					
9	19-Nov-03	0.25					
10	21-Apr-04	0.25					
	Mann Kendall Statistic (S) =	-2.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	10	0	0	0	0	0
	Average =	3.03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	6.105	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	2.018	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		CV > 1 NON-STABLE	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4
	Data Entry By = LMH		Date = 23-Jun-04		Checked By = RBL		

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Mann-Kendall Statisti[redacted] Test

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Site Name : Stoughton City Landfill		Dichlorodifluoro	Tetrachloro	BRRTS No. =		Well Number = MW10I	
	Compound ->	methane Concentration (leave blank if no data)	ethene Concentration (leave blank if no data)	Tetrahydrofuran Concentration (leave blank if no data)	Trichloroethene Concentration (leave blank if no data)	Vinyl Chloride Concentration (leave blank if no data)	Concentration (leave blank if no data)
Event Number	Sampling Date (most recent last)						
1	21-Apr-98	110.00	5.00	21.00	3.00	0.25	
2	16-Apr-99	280.00		5.00			
3	28-Aug-00	150.00	1.80	6.80	1.30	0.25	
4	4-Apr-01	163.00	2.50	5.10	1.50	1.00	
5	21-Nov-01	110.00	2.10	7.00	1.40	0.62	
6	23-Apr-02	110.00	2.40	7.70	1.60	0.77	
7	19-Nov-02	130.00	2.30	11.00	1.70	0.71	
8	24-Apr-03	91.00	1.70	5.50	1.20	0.25	
9	19-Nov-03	79.00	2.10	5.70	1.50	0.58	
10	21-Apr-04	110.00	2.30	5.10	1.50	0.49	
	Mann Kendall Statistic (S) =	-21.0	-10.0	-4.0	-3.0	-1.0	0.0
	Number of Rounds (n) =	10	9	10	9	9	0
	Average =	133.30	2.47	7.99	1.63	0.55	#DIV/0!
	Standard Deviation =	57.351	0.986	4.920	0.534	0.264	#DIV/0!
	Coefficient of Variation(CV)=	0.430	0.400	0.616	0.327	0.482	#DIV/0!
Error Check, Blank if No Errors Detected							n<4
Trend ≥80% Confidence Level		**DECREASING**	**DECREASING**	No Trend	No Trend	No Trend	n<4
Trend ≥90% Confidence Level		**DECREASING**	No Trend	No Trend	No Trend	No Trend	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	**CV <= 1 STABLE**	**CV <= 1 STABLE**	**CV <= 1 STABLE**	n<4 n<4
	Data Entry By = LMH		Date = 23-Jun-04		Checked By = [redacted]		

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Site Name : Stoughton City Landfill | BRRTS No. = | Well Number = MW13I

	Compound ->	Tetrahydrofuran					
		Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event Number	Sampling Date (most recent last)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)
1	21-Apr-98	22.00					
2	16-Apr-99	20.00					
3	28-Aug-00	19.00					
4	4-Apr-01	22.00					
5	21-Nov-01	22.00					
6	23-Apr-02	9.90					
7	20-Nov-02	16.00					
8	24-Apr-03	9.20					
9	19-Nov-03	17.00					
10	21-Apr-04	15.00					
	Mann Kendall Statistic (S) =	-22.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	10	0	0	0	0	0
	Average =	17.21	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	4.759	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.277	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥80% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Trend ≥90% Confidence Level		**DECREASING**	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4	n<4 n<4

Data Entry By = LMH | Date = 23-Jun-04 | Checked By = RJL

[redacted] State of Wisconsin

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Site Name : Stoughton City Landfill		Dichlorodifluoro	Tetrachloro	BRRTS No. =		Well Number = MW14S	
	Compound ->	methane	ethene	trichloroethene			
Event Number	Sampling Date (most recent last)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)	Concentration (leave blank if no data)
1	18-Apr-98	120.00	8.00	5.00			
2	14-Apr-99	710.00					
3	28-Aug-00	330.00	5.20	4.40			
4	4-Apr-01	180.00	5.10	4.10			
5	21-Nov-01	110.00	6.50	5.60			
6	23-Apr-02	98.00	5.00	3.90			
7	20-Nov-02	160.00	6.20	4.10			
8	24-Apr-03	170.00	5.30	3.70			
9	19-Nov-03	78.00	4.20	2.70			
10	21-Apr-04	77.00	4.20	1.80			
	Mann Kendall Statistic (S) =	-25.0	-19.0	-27.0	0.0	0.0	0.0
	Number of Rounds (n) =	10	9	9	0	0	0
	Average =	203.30	5.52	3.92	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	192.847	1.207	1.136	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.949	0.219	0.290	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected					n<4	n<4	n<4
Trend ≥80% Confidence Level		DECREASING	DECREASING	DECREASING	n<4	n<4	n<4
Trend ≥90% Confidence Level		DECREASING	DECREASING	DECREASING	n<4	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	NA	NA	n<4 n<4	n<4 n<4	n<4 n<4
	Data Entry By = LMH		Date = 23-Jun-04		Checked By = REL		

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Site Name : Stoughton City Landfill	Dichlorodifluoro	Tetrachloro	BRRTS No. =		Well Number = MW14I	
Compound ->	methane Concentration	ethene Concentration	Trichloroethene Concentration	Vinyl Chloride Concentration	Concentration	Concentration
Event Number	Sampling Date (most recent last)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)	(leave blank if no data)
1	18-Apr-98	160.00	5.00	7.00	0.13		
2	14-Apr-99	590.00					
3	28-Aug-00	250.00	1.30	3.40	0.13		
4	4-Apr-01	120.00	0.13	3.60	0.13		
5	21-Nov-01	140.00	2.20	3.60	0.13		
6	23-Apr-02	96.00	2.30	3.60	0.13		
7	20-Nov-02	86.00	2.00	3.70	0.59		
8	24-Apr-03	150.00	2.00	2.60	0.13		
9	19-Nov-03	110.00	1.40	2.30	0.50		
10	21-Apr-04	140.00	1.80	2.50	0.32		
	Mann Kendall Statistic (S) =	-18.0	-7.0	-17.0	13.0	0.0	0.0
	Number of Rounds (n) =	10	9	9	9	0	0
	Average =	184.20	2.01	3.59	0.24	#DIV/0!	#DIV/0!
	Standard Deviation =	149.709	1.300	1.392	0.183	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.813	0.645	0.388	0.754	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected						n<4	n<4
Trend ≥80% Confidence Level		**DECREASING**	No Trend	**DECREASING**	**INCREASING**	n<4	n<4
Trend ≥90% Confidence Level		**DECREASING**	No Trend	**DECREASING**	No Trend	n<4	n<4
Stability Test, If No Trend Exists at 80% Confidence Level		NA	**CV <= 1 STABLE**	NA	NA	n<4 n<4	n<4 n<4
	Data Entry By = LMH		Date = 23-Jun-04		Checked By = REL		

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