

Monitoring of volatile organic compounds (VOCs) in Tomah, Wisconsin. [DNR-031a] 1988

Krohn, Charles J. Madison, Wisconsin: Wisconsin Department of Natural Resources, 1988

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Wisconsin Groundwater Management Practice Monitoring Project No. 31

Water Resources Center University of Wisconsin - MSN 1975 Willow Drive Madison, WI 53706



GROUNDWATER Wisconsin's buried treasure

Wisconsin Department of Natural Resources



CORRESPONDENCE MEMORANDUM

Water Resources Center University of Wisconsin - MSN STATE OF 1979CWINEW Drive DEPARTMENT MEDINON, 93500 DEPARTMENT MEDINON, 93500

FILE CODE: 4400

DATE: September 20, 1988

TO: File

FROM: Charles J. Krohn

SUBJECT: Veldey's Mobil Station Tomah, WI Gasoline Investigation SW14 SCL SP637



I. Introduction

The following is a phase one site assessment prepared by the Department of Natural Resources evaluating the subsurface conditions at the intersection of Superior Street and Clifton Streets in Tomah, Wisconsin (see Appendix A: site maps).

The purpose of the assessment was to verify the existence of dissolved phase and adsorbed phase hydrocarbon which were previously detected by Layne Northwest of Pewaukee, Wisconsin, using a soil gas survey. In addition to the soil gas survey, Layne Northwest also detected dissolved phase hydrocarbons in monitoring well P-4 which is located just south of Veldey's Mobil Station. Monitoring well P-4 was drilled in an area which showed the highest values on the original soil gas survey.

During tank excavation at Veldey's Mobil on July 11 and 12, 1988, soil samples were taken by DNR personnel to quantify the amount of adsorbed phase hydrocarbons in the station tank pad. Soil samples showed a maximum total BTEX level of 730 ppm as determined by the State Laboratory of Hygiene in Madison.

To date DNR personnel have completed the following operations at the site.

- * Installation of 4 monitoring wells
- * Collection and analyses of soil samples taken during tank excavation
- * HNU Screening of soils during tank excavation
- * Collection and analyses of groundwater from monitoring wells installed by the DNR
- * Fluid level monitoring of the site
- * A site survey of all monitoring well elevations

II. Monitoring Well Installation

Monitoring wells MW-1, MW-2, MW-3 and MW-4 were installed on August 2, 1988, by DNR personnel. Drilling was accomplished with a rotary truck mounted rig, fitted with a solid stem auger. Monitor wells MW-1, MW-2, MW-3, and MW-4 were completed to depths of 23.00 ft., 23.83 ft., 22.75 ft. and 24.50 ft. respectively.

All monitoring wells were constructed with two-inch diameter thread joint 0.010-inch slotted PVC well screen, two-inch diameter thread joint PVC riser and a two-inch diameter PVC well point. Each well was fitted with a locking top hole water tight plug and was then cemented in at grade for protection.

All monitoring wells were grouted with bentonite crumbles above the sand pack within the annular space to prevent surface water infiltration. Native soil fill material was placed above the bentonite filling the remaining annular space to the top of the hole. A well construction diagram for each monitoring well is depicted on well logs in Appendix B.

A site survey was conducted to develop top of casing elevations which were then used in conjunction with well gauging data to construct a groundwater contour map of the study area (see Appendix C: Survey Field Notes).

III. Site Monitoring

Site monitoring data was obtained on August 12, 1988, (see Appendix D: Well Monitoring form). The tape and paste method was used to determine well depth, depth to water and depth to product in all DNR installed monitoring wells.

No free phase hydrocarbons were detected during the course of the hydrogeologic investigation.

IV. Site Geology

The City of Tomah lies on the western edge of paleo Lake Wisconsin. Erosion of Cambrian outcrops on the depositioned edge of the Lacustrine environment resulted in the deposition of a relatively thin (10-30 ft) sequence of unconsolidated sand in the Tomah area.

Underlying the unconsolidated reworked Cambrian sands is a thick sequence of Cambrian sands which is known as the Dresbach Group. The Dresbach Group lies directly on the crystalline Pre-Cambrian basement complex.

During installation of monitoring wells MW-1, MW-2, MW-3 and MW-4, unconsolidated sands were penetrated to the total depth in each bore hole. Drill cuttings from soil borings were logged and the information is included on individual well logs in Appendix B. Dark reddish brown chert was evident in several zones which caused temporary reductions in the penetration rate while drilling. These zones of hardness represent either iron-chert concretions and/or high energy deposition of chert pebbles weathered out of parent Cambrian outcrops.

V. Hydrogeology

Both the reworked unconsolidated Cambrian sands and the underlying parent Cambrian Dresback Group are known aquifers in the Tomah area. During the course of the investigation, monitoring wells were installed and then gauged to determine groundwater flow directions and gradients within the Cambrian aquifer.

While drilling monitoring wells MW-1 through MW-4, a fine to medium grained moderately sorted sand was encountered at an average depth of two feet below grade. Groundwater was first encountered while drilling at an average depth of 19.0 feet below grade. After completion of the monitoring wells, a period of 10 days was given, prior to well gauging, for the groundwater within the well bores to reach a static level.

Well monitoring data was collected on August 12, 1988, and was later combined with the surveyed top of casing elevations, in order to construct the Groundwater Contour Map in Appendix A. The arrows on the map indicate groundwater flow directions on August 12, 1988, after Tomah municipal well #3 was off line for 23 months.

Tomah municipal well #3 was shut down after routine VOC tests detected Benzene levels which were above the public health standard in August, 1986. The well was originally drilled in 1938 to a depth of 280 feet and was completed with the bottom 80 feet open to the formation according to records kept at the DNR office in La Crosse. Well #3 served the City of Tomah water system from 1938 to 1986, during which time the water department typically pumped between 200,000 and 420 000 gallons per day from the Cambrian sandstone.

Layne Northwest conducted deionized slug tests to determine the hydraulic conductivity, transmissivity and storativity of the formation surrounding each monitoring well. These values were then averaged and then used to create a model for pumping rates of 100, 150 and 400 gallons per minute over a ten-day period. The data indicates that the cone of depression for a 100 gpm pumping rate would reflect a 3-foot drawdown at the apex of the cone and a 1.0 foot drawdown at a radius consistent with the Veldey property. The cone of depression for a 150 gpm rate would consist of a 4.0 foot drawdown at the apex of the cone and a 1.5 foot drawdown at a radius consistent with the Veldey property. The cone of depression for a 400 gpm pumping rate would consist of a 10foot drawdown at the apex of the cone and a 4-foot drawdown at a radius consistent with the Veldey property.

The actual pumping rate for Tomah municipal well no. 3 ranged between 138 gpm and 291 gpm in 1985 based on records filed with the Department of Natural Resources. Judging from the modeling done by Layne Northwest and rates of pumping for an average year in Municipal Well #3, it is evident that a cone of depression has existed across the project site since 1938 when the municipal well was brought on line. The location of the apex of the cone, when Well #3 was on line, would be at the well bore with subsequent groundwater flow gradients directed toward the well within the radius of influence of the well. The cone of depression created by Well #3 served as a mechanism for free phase hydrocarbon transport at the water surface while dissolved phase hydrocarbons were transported toward the well bore by the low head situation created by high volume pumping.

VI. Soil Quality Analyses

Soil samples were taken during tank excavation at Veldey's Mobil on July 11 and 12, 1988. A maximum contamination level of 730 ppm total BTEX was detected in samples sent to the Wisconsin State Laboratory of Hygiene for VOC analyses.

A full report of the tank excavation was submitted on August 12, 1988, listing all pertinent lab data, a site map and HNU screening data.

Soil samples were not taken during monitoring well installation due to project budget restrictions. HNU screenings were conducted during well drilling and the results can be found on individual well logs in Appendix B. The HNU Photoionization Analyzer was found to be malfunctioning during calibration tests following the field screening. This may have resulted in artificially low readings during field screening.

The only recorded HNU readings above background were detected in Monitoring Well MW-1 which is located adjacent to the Mobil Station tank pad. The highest reading and the strongest hydrocarbon odors were recorded at a depth of 19.0 feet below grade which corresponds to the piezometric surface at the station.

VII. Water Quality Analyses

Groundwater samples were obtained from monitoring wells MW-1, MW-2, MW-3 and MW-4 on August 10, 1988. Each well was properly developed to ensure the sample was representative of the formation groundwater. Individual wells were sampled using a teflon bailer to collect the groundwater to be analyzed. Samples were then placed into septum capped vials and then put on ice for preservation. The preserved iced samples were then sent by mail to the State Laboratory of Hygiene in Madison for volatile organic compound analyses.

Results of water analyses performed by the State Laboratory indicate total BTEX levels of 60,400.0 ppb, 22.8 ppb, 0.0 ppb and 114.3 ppb in monitoring wells MW-1, MW-2, MW-3 and MW-4 respectively. Complete laboratory results are listed in Appendix E.

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The total BTEX levels in monitoring well MW-1 represent the highest contamination values detected by either Layne Northwest or the Wisconsin DNR. Layne Northwest monitoring well P-4, contained a total BTEX level of 29,153 ppb on January 14, 1988.

The dissolved phase hydrocarbon plume depicted on the site map in Appendix A shows a representation of the hydrocarbon plume which exists at the site. The location of the plume is consistent with the soil gas survey which was conducted by Layne Northwest and is also consistent with groundwater flow directions when municipal well #3 was on line.

Monitoring well MW-4 is located adjacent to an abandoned tank pad at the Armed Forced Recruiting Office on Clifton Street in Tomah. Water analyses indicated a total BTEX level of 114.3 ppb in monitoring well MW-4 on August 10, 1988.

VIII. Conclusions

Based on information collected during the hydrogeologic assessment performed by the Department of Natural resources on the area surrounding the intersection of Superior and Clifton Streets in Tomah, Wisconsin, the following has been concluded:

- * Strata beneath the project area consists of medium grained unconsolidated sand to total depth in each monitoring well.
- Dissolved phase hydrocarbons were detected in monitoring wells MW-1 (60,400 ppb total BTEX) and MW-2 (22.8 ppb total BTEX), adjacent to Veldey's Mobil tank pad.
- * Dissolved phase hydrocarbons were detected in monitoring well MW-4 (114.3 ppb total BTEX), adjacent to the abandoned tank pad at the Armed Forced Recruiting Center on Clifton Street.
- * Soil samples taken during tank excavation at Veldey's Mobil Station showed a maximum BTEX level of 730 ppm during laboratory analyses.
- * Normal groundwater flow directions, over the project area, have been altered by a cone of depression created by Tomah Municipal Well #3 which was put on line in 1938 and taken out of service in 1986.

IX. Recommendations

- * Initiate a groundwater remediation effort at Veldey's Mobil Station in order to reduce dissolved phase and adsorbed phase hydrocarbon contamination across the project site.
- * Specific recommended remediation techniques include groundwater depression, product recovery, air stripping and possibly in-situ soil venting to reduce vapors and remediate adsorbed hydrocarbons above the water table.

CK:jd SWFILE2.CK

Table of Appendices

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Appendix A:	Site Maps
Appendix B:	Well Logs
Appendix C:	Survey Field Notes
Appendix D:	Well Monitoring Forms
Appendix E:	State Lab Results
Appendix F:	Station Photographs

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APPENDIX A: SITE MAPS

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APPENDIX B: WELL LOGS

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-	- 10							
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APPENDIX C: SURVEY FIELD NOTES

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APPENDIX D:

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WELL MONITORING FORMS

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Operator((s) Krohn								
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APPENDIX E: STATE LAB RESULTS

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University of Wisconsin Center for Health Sciences

AREA CODE 608 TEL. NO. 262-1293

WILLIAM D. STOVALL BUILDING 465 HENRY MALL MADISON, WISCONSIN 53706

MEMORANDUM

Date: August 29, 1988

To: Charles Krohn

From: David Degenhardt

State Laboratory of Hygiene sample 485, field number 1 from monitoring well 1 at Veldey's Mobil Gas in Tomah may contain the compounds listed below according to tentative computer identification from gas chromatography/mass spectroscopy analysis. The concentration of contaminants could not be determined, nor has the presence of the compounds been confirmed by alternative analysis techniques.

acetone naphthalene alkylated naphthalene alkylated benzenes and other hydrocarbons

If you have any questions, contact me at (608) 262-2797.

DD/jk/dave.5h



University of Wisconsin Center for Health Sciences

AREA CODE 608 TEL. NO. 262-1293

WILLIAM D. STOVALL BUILDING 465 HENRY MALL MADISON, WISCONSIN 53706

MEMORANDUM

Date: August 29, 1988

To: Charles Krohn

From: David Degenhardt

State Laboratory of Hygiene sample 486, field number 2 from monitoring well 1 at Veldey's Mobil Gas in Tomah may contain the compounds listed below according to tentative computer identification from gas chromatography/mass spectroscopy analysis. The concentration of contaminants could not be determined, nor has the presence of the compounds been confirmed by alternative analysis techniques.

acetone naphthalene alkylated naphthalene alkylated benzenes and other hydrocarbons

If you have any questions, contact me at (608) 262-2797.

DD/jk/dave.5h

University of Wisconsin Center for Health Sciences

AREA CODE 608 TEL. NO. 262-1293

WILLIAM D. STOVALL BUILDING 465 HENRY MALL MADISON, WISCONSIN 53706

MEMORANDUM

Date: August 29, 1988

To: Charles Krohn

From: David Degenhardt

State Laboratory of Hygiene sample 483, field number 4 from monitoring well 2 at Veldey's Mobil Gas in Tomah may contain the compounds listed below according to tentative computer identification from gas chromatography/mass spectroscopy analysis. The concentration of contaminants could not be determined, nor has the presence of the compounds been confirmed by alternative analysis techniques.

acetone alkylated benzenes and other hydrocarbons

If you have any questions, contact me at (608) 262-2797.

DD/jk/dave.5h

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SEP 2 1988

BUREAU OF SOLID -HAZARDOUS WASTE MANAGEMENT

University of Wisconsin Center for Health Sciences

AREA CODE 658 TEL. NO. 262-1293

WILLIAM D. STOVALL BUILDING 465 HENRY MALL MADISON, WISCONSIN 53706

MEMORANDUM

Date: August 29, 1988

To: Charles Krohn

From: David Degenhardt $\mathcal{A}\mathcal{D}$

State Laboratory of Hygiene sample 487, field number 5 from monitoring well 3 at Veldey's Mobile Gas in Tomah may contain the compounds listed below according to tentative computer identification from gas chromatography/mass spectroscopy analysis. The concentration of contaminants could not be determined, nor has the presence of the compounds been confirmed by alternative analysis techniques.

acetone alkylated benzenes and other hydrocarbons

If you have any questions, contact me at (608) 262-2797.

DD/jk/dave.5h



University of Wisconsin Center for Health Sciences

AREA CODE 608 TEL. NO. 262-1293

WILLIAM D. STOVALL BUILDING 465 HENRY MALL MADISON, WISCONSIN 53706

MEMORANDUM

Date: August 29, 1988

To: Charles Krohn

From: David Degenhardt

State Laboratory of Hygiene sample 488, field number 6 from monitoring well 4 at Veldey's Mobile Gas in Tomah may contain the compounds listed below according to tentative computer identification from gas chromatography/mass spectroscopy analysis. The concentration of contaminants could not be determined, nor has the presence of the compounds been confirmed by alternative analysis techniques.

naphthalene alkylated naphthalene alkylated benzenes and other hydrocarbons

If you have any questions, contact me at (608) 262-2797.

DD/jk/dave.5h

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_ Carbon Dis	sulfide [5.0]	_ 071		_ Methylethylketor		\$19 \$25	
_ Carbon Tet	trachloride (2.0)	_ 073		Methylene Chlori Styrene [2.0]		393	
_ Chlorobenz	zene [2.0]	083			methane [3 0]	396	
_ Chloroetha		087				397	
	hylvinyl ether [4.0]	093		_ Tetrachloroethyle		399	
_ Chloroform		095		Tetrahydrofuran		401	
_ 0-Chloroto		_ 108		Tohuene [1.0]		<u>X</u> 411	I, Ī.Ē.Ē. 🗌
_ P-Chloroto		110 146		_ 1,2,4-Trichlorober	nzene [1.0]	_ 419	
	ethane [2.0] hloromethane [2.0]**	_ 147		_ 1,1,1.Trichloroeth	ane [1.0]	421	
	no-3-Chloropropane [7.0]	148		_ 1,1,2.Trichloroeth		_ 423	
	robenzene [2.0]	_ 153		_ Trichloroethylen		425	
	robenzene [2.0]	155	•	_ Trichlorofluorom		_ 427	·-
	robenzene [2.0]	157		_ Trichlorotrifhuoro		_ 428	
_ 1,1-Dichlor	roethane [1.0]	165		_ 1.2.3-Trichloropr		432 434	
_ 1,2-Dichlor		167		Vinyl Chloride [1	.0]	<u> </u>	27000-
	roethylene, cis [1.0]	168		_ Xylenes [2.0]		4 401	
	roethylene [1.0]	_ 169	·-	•• Total Trihalome	thanes		
	roethylene, trans [1.0]	_ 170	·				
	ropropane [1.0]	178		NO Detects	The second second		
	ropropene [2.0]	180					AUG 1 2 1988
	ropropane [1.0]	181		Date Received And Sample No.			
R.H. Laessig, Wisconsin St. Madison, Wis	PhD., Director ate Laboratory of Hygien consin 53706	•		Date Reported	070	A	UG 3 0 1988
	2098			BAL - E.	5485HV	j 708	28 JUNE

	ک لے کی لیے کہ کی کو اور کر کے کو
if New Facility	
Bill to: Solid Waste Hazardous Waste Wastewater	
I.D. Point Field Well & Mail & No	County / 8 Route
Name Valley's NAUGIL Gas Inv. P.O. City	
Description Monitoring West 14	u-1, Duplierte
	MW Monitoring Well EF Efficient OW Waste
Send C. Krohn Report C. Krohn	LY Lysimeter IF Infinent LE Leachate SO Soil
Ta: 3550 prormon liver not.	LE Leachate SO Soil SE Sediment OI Oil
La Crosse WI 54601	SU Surface Water SL Shudge
Account SW017	_ PW Private Well OT Other
	Analysis Type:
Collected By C. Krohn	_Q GC/MS Screen and Quantification
	S GC/MS Screen
Phone (<u>605</u>) <u>785</u> - <u>9000</u>	(NOTE: if followup enter previous sample no.)
Check any appropriate:	Water System Type (Water Supply Use ONLY)
S Split E Enforcement B Field Blank	_ M Community-Municipal Sample Type:
S Surface Source T Treated	O Community-OTM D (SDWA) Compliance Sample N Non-community C (SDWA) Check
	_ P Private [Initial Sample Date]
_ Free Chlorine Residual (Field) mg/L	X Non-potable W Raw Water ~ if New Well
_ Free Chlorine Residual (Lab) • mg/L	I Miscellaneous Distribution
Detection limits (ug/L) Detected ug/L are indicated by []	Detected ng/L
_ Benzene [1.0] X 025 2400	_ 2,2-Dichloropropane [2.0] _ 182
Bromobenzene [4.0]046	1,3-Dichloropropene, cis [2.5]183
_ Bromodichloromethane [1.0]** _ 051 · _	_ 1,3-Dichloropropene, trans [2.5] _ 185 _ Ethylbenzene [1.0] X 233 3
Bromonform [5.0]**053	Ethylene Dibromide [1.0] 236
Bromometanie [1.0] 000 001	Methylethylketone (MEK) [12] 319
Carbon Tetrachloride [2.0] 073	Methylene Chloride [5.0] 325
Chlorobenzene [2.0] 083	Styrene [2.0]
Chloroethane [2.0]087 2-Chloroethylvinyl ether [4.0]093	
Chloroform [1.0]** 095	Tetrachloroethylene [1.0] 399
0-Chlorotoluene [1.0] 108	
_ P-Chlorotohuene [1.0] _ 110	Tohiene [1.0] X 411 3 1,2,4-Trichlorobenzene [1.0] 419
Dibromomethane [2.0] 146 • Dibromochloromethane [2.0]** 147 •	
	_ 1,1,2-Trichloroethane [2.0] _ 423
_ 1,2-Dichlorobenzene [2.0] _ 153	_ Trichloroethylene [1.0] _ 425
1,3-Dichlorobenzene [2.0]155•	
1,4-Dichlorobenzene [2.0]157 1,1-Dichloroethane [1.0]165	1,2,3-Trichloropropane [2.0]432
1,1-Dichloroethane [1.0] 165 	_ Vinyl Chloride [1.0] _ 434 07 6-
	_ Xylenes [2.0]
_ 1,1-Dichloroethylene [1.0] _ 169	** Total Trihalomethanes
1,2-Dichloroethylene, trans [1.0]170• 1,3-Dichloropropane [1.0]178•	
1,3-Dichloropropane [1.0]178 1,1-Dichloropropene [2.0]180	NO Detects
1,2-Dichloropropane [1.0] 181	Date Received AUG 1 2 1938
R.H. Lassig, PhD., Director	And Sample No.
Wisconsin State Laboratory of Hygiene Madison, Wisconsin 53706	Date Reported
88-2099	ECLO ES 486 HU; ADSIZEVLALT

	70CS Form 4800-5 Rev. 12-87
Bill to: Solid Waste Hazardous Waste Wastewater	Water Supply Spills VotherUST
Deleti Bild	Penta
I.D. Point/ Pield No	County / 18 Code
1.D. Velden's Mobil Gas Inv. P.O. City	
Collection $\bigcirc 5 1 1 0 1 3 3$ Time: $\overline{H} \overline{H} : \overline{M} \overline{M}$ Location	Barley Rinse Water
Description Boiler Rinse Wate	<u>~</u>
	MW Monitoring Well EF Effluent OW Waste
Send C. Krohn	_ LY Lysimeter _ IF Infinent
Report 3550 Mormon Coler RL.	_ LE Leachate SO Soil SE Sediment OI Oil
Le Crusse WI 54601	SE Sediment OI Oil SU Surface Water SL Skudge
	PW Private Well OT Other
Account $\underline{SW017}$	
	Analysis Type: LG GC/MS Screen and Quantification
Collected By Charles J Krohn	S GC/MS Screen (SV)
	_ 0 Parameter Specific
Phone (605) 735-7000	(NOTE: if followup enter previous sample no.)
Check any appropriate	Water System Type (Water Supply Use ONLY)
Check any appropriate:	M Community-Municipal Sample Type:
S Split E Enforcement B Field Blank	_ O Community-OTM _ D (SDWA) Compliance Sample
S Surface Source T Treated	_ N Non-community _ C (SDWA) Check
_ Free Chlorine Residual (Field) mg/L	_ P Private (Initial Sample Date)
_ Free Chlorine Residual (Lab) • mg/L	X Non-potable W Raw Water > if New Well I Miscellaneous Distribution
Detection limits (ug/L) Detected ug/L	
are indicated by []	Detected ug/L
Benzene [1.0] 025	
_ Bromobenzene [4.0] _ 046 · -	
_ Bromodichloromethans [1.0]** _ 051 · -	
Bromomethane [1.0]055	Ethylene Dibromide [1.0] 236
Bromomethane [1.0] 055	Methylethylketone (MEK) [12] 319
Carbon Fetrachloride [2.0] 073	Methylene Chloride [5.0] 325
Chlorobenzene [2.0] 083	
Chloroethane [2.0] 087	1,1,2. Tetrachloroethane [3.0] 396 • • 1,1,2.2. Tetrachloroethane [3.0] 397 • • •
2-Chloroethylvinyl ether [4.0] 093	Tetrachloroethylene [1.0] 399
Chloroform [1.0]** 095 • O-Chlorotohane [1.0] 108 • •	Tetrahydrofuran (THP) [200] 401
0-Chlorotohuene [1.0]108 P-Chlorotohuene [1.0]110	_ Tohiene [1.0] _ 411 • -
Dibromomethane [2.0] 146	_ 1,2,4-Trichlorobenzane [1.0] _ 419
Dibromochloromethane [2.0]** 147 •	1,1,1-Trichlorosthane [1.0]421 1,1,2-Trichlorosthane [2.0]423
_ 1,2-Dibromo-3-Chloropropane [7.0] _ 148	
1,2-Dichlorobenzene [2.0]153• -	
1,3-Dichlorobenzene [2.0]155	_ Trichlorotrifhoroethane [3.0] _ 428
	_ 1,2,3-Trichloropropane [2.0] _ 432
1,2-Dichloroethane [1.0] 167	Vinyl Chloride [1.0] 434
_ 1,2-Dichloroethylene, cis [1.0] _ 168	_ Xylenes [2.0] 437 •
_ 1,1-Dichloroethylene [1.0] _ 169	** Total Trihalomethanes
1,2-Dichloroethylene, trans [1.0]170 1.3-Dichloropropane [1.0]178	*
	NO Detects
1,2-Dichloropropane [1.0] 181	Date Received AUG 1 2 1988
	And Sample No.
R.H. Lasssig, PhD., Director Wisconsin Stats Laboratory of Hygiene	AUG 3 0 1988
Madison, Wisconsin 53706	Date Reputed
88-2097	ESHEMHA ; AUSIZEBEALT

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88-2097

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	SW14 SCL SM67-
	OCS orm 4800-5 Rev. 12-87
☐ if New Facility Bill to: ☐ Solid Waste ☐ Hazardous Waste ☐ Wastewater	Water Supply Spills BOther LUST
I.D. Point/ $M \cup 2$ Field Number Well / $M \cup 2$ No	$\underline{-4} \qquad \text{County} \underline{-3} \underline{-5} $
$\mathbf{D}_{\mathbf{r}}$	
()	
Collection $O_{\mathbf{M}} \otimes (1 + \frac{1}{p}) = \frac{3}{p} \sum_{\mathbf{N}} T_{\mathbf{M}} \otimes (1 + \frac{1}{p}) = \frac{3}{p} \sum_{\mathbf{N}} T_{\mathbf{M}} \otimes (1 + \frac{1}{p}) = \frac{3}{p} \sum_{\mathbf{N}} C_{\mathbf{N}} \otimes (1 + \frac{1}{p}) = \frac{3}{p} \sum_{\mathbf{N}} \sum_{\mathbf{N}} C_{\mathbf{N}} \otimes (1 + \frac{1}{p}) = \frac{3}{p} \sum_{\mathbf{N}} \sum_$	Monitoring Well MW-2
Description Woter Spingle	
	WW Monitoring Wall EF Efficient OW Waste
Send C. Krihn	MW Monitoring Well EF Efficient OW Waste LY Lysimeter IF Influent
Report 7.770 (1) RA	_ LE Leachate _ SO Soil
	SE Sediment OI Oil
La Crosse WI 54601	_ SU Surface Water _ SL Shudge
Account or 17	PW Private Well OT Other
$\frac{\text{Account}}{\text{Number}} = S \underline{\underline{W}} 0 \underline{1} \underline{7}$	Analysis Type:
Collected By Charles J Krohn	LQ GC/MS Screen and Quantification
	S GC/MS Screen
Phone (608) 785-7000	_ O Parameter Specific (NOTE: if followup enter previous sample no.)
Check any appropriate:	Water System Type (Water Supply Use ONLY)
S Split E Enforcement B Field Blank	M Community-Municipal Sample Type: O Community-OTM D (SDWA) Compliance Sample
S Surface Source T Treated	_ N Non-community C (SDWA) Check
	_ P Private (Intial Sample Date)
_ Free Chlorine Residual (Field) _ • _ mg/L	_ X Non-potable _ W Raw Water _ r if New Well
_ Free Chlorine Residual (Lab) _ • _ mg/L	_ I Miscellaneous Distribution
Detection limits (ug/L) Detected ug/L	Detected ug/L
$\frac{\text{are indicated by []}}{\text{Benzene (1,0)}} \xrightarrow{X 025} \underline{\mathcal{A}} \cdot \underline{\mathcal{A}}$	2,2-Dichloropropane [2.0] 182
	1,3-Dichloropropene, cis [2.5]183
Bromodichloromethane [1.0]** 046 • •	_ 1,3-Dichloropropene, trans [2.5] _ 185
Bromoform [5.0]** 053	_ Ethylbenzene [1.0] _ 233
_ Bromomethane [1.0] _ 055 • -	Ethylene Dibromide [1.0] 236 • Methylethylketone (MEK) [12] 319 •
Carbon Disulfide [5.0] 071 •	Methylene Chloride [5.0] 325
Carbon Tetrachloride [2.0] 073 •	Styrene [2.0] 393
Chlorobenzene [2.0] 083 Chloroethane [2.0] 087	_ 1,1,1,2-Tetrachloroethane [3.0] _ 396
2-Chloroethylvinyl ether [4.0] 093	_ 1,1,2,2-Tetrachloroethane [3.0] _ 397
Chloroform (1.0)** 095 •	
_ 0-Chlorotohiene [1.0] _ 108	Tetrahydrofuran (THF) [200]401 Tohuene [1.0]411
_ P-Chlorotoluene [1.0] _ 110	
Dibromomethane [2.0] 146 • Dibromochloromethane [2.0]** 147 •	1,1,1.Trichloroethane [1.0] 421
Dibromochloromethane [2.0]** 147 • • 1,2-Dibromo-3-Chloropropane [7.0] 148 • •	_ 1,1,2-Trichloroethane [2.0] _ 423
	_ Trichloroethylene [1.0] _ 425 • _
1,3-Dichlorobenzene [2.0]155	
_ 1,4-Dichlorobenzene [2.0] _ 157	Trichlorotrifhuoroethane [3.0] 428 •
_ 1,1-Dichloroethane [1.0] _ 165	
1,2-Dichloroethane [1.0] 167	
	** Total Trihalomethanes
1,3-Dichloropropane [1.0]178	NO Detects
	AUG 1 1988
1,2-Dichloropropane [1.0] 181	And Sample No.
R.H. Leessig, PhD., Director	
Wisconsin State Laboratory of Hygiene	Date Reported DPD AUG 3 U 1988
Madison, Wisconsin 53706	ESY83HA; A081286LALT
88-2096	ESTOSHA, TUBICOBUTLE

Swiy Sil SP637

Department of Nat	tural Resources	VOCS Form 4800-5 Rev. 12-87
☐ if New Facility Bill to: ☐ Solid Waste ☐ Haz	ardous Waste 🔲 Waster	rater Water Supply Spills Other
I.D.	Point/ (a) 7 F	Seld County / & Route
I.D. Veldevis Mobil	Gas Inv.	P.O. or Tomah WI
Collection $Q \xrightarrow{\text{S}} I \xrightarrow{\text{J}} J \xrightarrow{\text{J}} I \xrightarrow{\text{S}} \xrightarrow{\text{S}}$	Time: $\frac{1}{H} \frac{2}{H} : \frac{2}{M} \frac{2}{M}$ Lo	mpleMul-3
Description	proniting h	ieil NGW-3
Send Report To: 3,50 Mormon La Crosse, WS	n Calee Rd	MW Monitoring Well EF Effluent OW Waste LY Lysimeter IF Influent LE Leachate SO Soil SE Sediment OI Oil SU Surface Water SL Shdge FW Private Well OT Other
Account $S W 0 1 \%$ Number $S W 0 1 \%$ Collected By K_{∞} Phone $(6 0 8) Z I 5 - 9$		Analysis Type: 2 Q GC/MS Screen and Quantification S GC/MS Screen 0 Parameter Specific (NOTE: if followup enter previous sample no.)
Check any appropriate: S Split E Enforcer S Surface Source Free Chlorine Residual (Field)	nent D Field Blaz	O Community-OTM D (SDWA) Compliance Samples N Non-community C (SDWA) Check P Private /
Free Chlorine Residual (Lab)	_ • ¤	
Detection limits (ug/L)	Detected ug/L	I Miscellaneous Distribution
are indicated by [] — Benzene [1.0] — Bromobenzene [4.0] — Bromodichloromethane [1.0]** — Bromoform [5.0]** — Bromomethane [1.0] — Carbon Disulfide [5.0] — Carbon Tetrachloride [2.0] — Chlorobenzene [2.0] — Chloroethane [2.0] — 2-Chloroethylvinyl ether [4.0] — Chloroform [1.0]** — 0-Chlorotohuene [1.0] — Dibromomethane [2.0] — Dibromomethane [2.0] — Dibromochloromethane [2.0]** 1.2-Dichlorobenzene [2.0] — 1,3-Dichlorobenzene [2.0] — 1,4-Dichlorobenzene [2.0] — 1,2-Dichloroethane [1.0] — 1,2-Dichloroethane [1.0] — 1,2-Dichloroethane [1.0] — 1,2-Dichloroethane [1.0] — 1,2-Dichloroethane [1.0] — 1,2-Dichloroethylene, cis [1.0] — 1,3-Dichloroethylene, trans [1.0] — 1,3-Dichloropropane [1.0] — 1,3-Dichloropropane [1.0] — 1,1-Dichloropropane [2.0]	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2.2-Dichloropropane [2.0] 182
_ 1,2-Dichloropropane [1.0] R.H. Lasssig, PhD., Director Wisconsin State Laboratory of Hyp Madison, Wisconsin 53706 88-2100		- Date Received And Sample No. Date Reported ES487HA AO 812886415
00-0100		

88-2100

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	-		SW14 Sec 58637
Department of Nature		OCS form 4800-5 Rev. 12-87	
if New Pacility			Other LUST
Bill to: Solid Waste L Hazard			
I.D. Number	Point/ Well / M W H No	6 County /	8 Route Code
· · · · · · · · · · · · · · · · · · ·			
Name Veldeys / Visit C	The LAV. City	- junch, WI-	
Collection (25, 10, 185 -	17.317 Sample	Montoning Well M	1.e)-4
	$\frac{1}{H} = \frac{1}{H} = \frac{1}$		
Description Mo	nitoring Well A	6W-4 1	
		WW Monitoring WellEF	Effluent OW Waste
Send C. Krohn C)NB	LY LysimeterIF	Influent
Report To: 3550 Mormor	Carles Rol	_ LE Leachate _ SO	Soil
3550 / 15000		_ SE Sediment _ OI	on (ENF)
Account Silo-	54601	SU Surface Water SL	Sindge
		PW Private Well OT	Other
Number		Analysia Type:	
Collected By Krohy	<u> </u>	Q GC/MS Screen and Quantification	4
		S GC/MS Screen	
Phone (600) 735-90	<u>58</u>	(NOTE: if followup enter previous same	ple no.)
Check any appropriates	ž.	Water System Type (Water Supply Us	ONLY
Check any appropriate:			h Type:
S Split L E Enforcemen	t 🗌 B Field Blank	· · · · · · · · · · · · · · · · · · ·	(SDWA) Compliance Sample
S Surface Source	L T ITELIEG	_ N Non-community _ C	(SDWA) Check
Free Chlorine Residual (Pield)	_ • mg/L	_ P Private	(Initial Sample Date)
Free Chlorine Residual (Lab)	_ • mg/L		Raw Water if New Well
Detection limits (ug/L)	Detected ug/L		Miscellaneous Distribution
are indicated by []		•	Detected ug/L
Benzene [1.0]	¥ 025 11C		
Bromobenzene [4.0]	_ 046		-183 $ \cdot -$ -185 $ \cdot -$
_ Bromodichloromethane [1.0]**	-051 $$		
Bromoform [5.0]** Bromomethane [1.0]	_ 055		_ 236 · _
Carbon Disulfide [5.0]			_ 319 • _
Carbon Tetrachloride [2.0]	_ 073		_ 325 · _
Chlorobenzene [2.0]	_ 083		393•_ 396•_
_ Chloroethane [2.0]	_ 087		397
2-Chloroethylvinyl ether [4.0] Chloroform [1.0]**	093		_ 399 • _
0-Chlorotohuene [1.0]		_ Tetrahydrofuran (THF) [200]	_ 401 · _
_ P-Chlorotoluene [1.0]			_ 411
Dibromomethane [2.0]	_ 146	1	- 419
Dibromochloromethane [2.0]**	_ 147		-423 $$
1,2-Dibromo-3-Chloropropane [7.0] 1,2-Dichlorobenzene [2.0]	148 153		425
1,2-Dichlorobenzene [2.0] 1,3-Dichlorobenzene [2.0]	_ 155 · _	Trichlorofluoromethane [1.0]	_ 427 · _
_ 1,4-Dichlorobenzene [2.0]			_ 428 · _
1,1-Dichloroethane [1.0]	_ 165 · _		_ 432 · -
_ 1,2-Dichloroethane [1.0]	_ 167	Vinyl Chloride [1.0] Xylenes [2.0]	X 4373
1,2-Dichloroethylene, cis [1.0]	168		
1,1-Dichloroethylene [1.0] 1,2-Dichloroethylene, trans [1.0]	169 170	•• Total Trihalomethanes	
1,2-Dichloropropane [1.0]		NO Detecta	
	_ 180	LI NO Detects	
1,2-Dichloropropane [1.0]	_ 181	Date Received	1 2 1960
R.H. Lassig, PhD., Director		And Sample No.	
Wisconsin State Laboratory of Hygien	10	Date Reported	AUG 3 0 1988
Madison, Wisconsin 53706		Che hope the DI At	A. AOSIZSSCALT
86-7101		ES488H	- 1100.000

State Visconsin Department o. Natural Resources

CHAIN OF CUSTODY RECCID Form 4100-145

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Sample Collector(s) C. Kruby	Tille Work Station Hydro spectropict / Los Crosse	Telephone No. (include area cute) 608- 785-9000
Property Owner C:ty of Tornah	Property Address J J J J Stranger UMAY-	Telephone No. (include area code)
Spit Samples: Offeral? Yes No (Check O Accepted? Yes No (Check O	пс) / () пс) Ассериоd Ву:	

Signature

Sample	Dalc	Типе		e Type	Station Location	Lab ID Number	No. of Containers	Comments
ID No.			Comp	Grah	Sample Description			11
MW-1	5/10/05	10:30		~	KANJ-1	485	4	Hydrono lan UN
nw-10	8/10/83	10:45		~	MIN-1 Piplintz	486	4	'n
Knw - 2-	3 /10/35	11:30		~	Anw-2.		4	
hew- 3	(12:00		~	1101-3	487	4	
Nonw-4		,2:30		/	KALL-4		4	
BAILS Sough)	11.00		V	Baba Birro - Final.		4	

I hereby certify that I received, properly have	dled, and disposed of these samples a	s noted below:
Reliver junched By (Signature)	Dote/Tune B/10/88 4:15 F	Roceived by: (Signature)
Relinquistical By (Signature)	Dalc/Tunc	Received by: (Signature)
Kelinyuished IIy (Signature)	Date/Tune 11/12/88 7:30 am	Received for Laboratory By: (Signature) David Degen Lardt

	Disposition of Un	used Portion	of Sample:
Dispose		Retain for	days
Keturn		Other	

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APPENDIX F: STAT

STATION PHOTOGRAPHS

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