

October 15, 1990

Mr. Wendell J. Wojner Department of Natural Resources Southern District Headquarters 3911 Fish Hatchery Road Fitchburg, Wisconsin 53711

RE: Ursula Borgerding Estate Property, 435 Woodward Avenue, Beloit

Dear Mr. Wojner:

Enclosed is a copy of the report of the subsurface investigation performed at the Ursula Borgerding Estate property. As you know, the Estate has an option to sell the property contingent on a WDNR-approved remedial action plan being implemented before the end of the year (we have obtained an extension from the original deadline of October 1, 1990). We are therefore under very tight time constraints. I realize that you have an extremely heavy case load, however I would appreciate your timely review of the report and comments on our recommendations. Also, if you can give me a rough estimate as to when we may expect your comments, the potential buyer may be somewhat appeased.

Please contact me at your earliest convenience with any comments or questions. Thank you for your efforts.

Sincerely,

DAMES & MOORE, LTD.

Kristine M. Stehr Project Manager and Hydrogeologist

Enclosure cc: Frances B. Sheehy, Rep.

# SUBSURFACE INVESTIGATION

# URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN

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# 1.0 INTRODUCTION

The Ursula Borgerding Estate (Estate) property is located at 435 Woodward Avenue, Beloit, Wisconsin. The property occupies a portion of the northeast  ${}^{1}/_{4}$  of the northeast  ${}^{1}/_{4}$  of Section 35, Township 1 north, Range 12 east (NE  ${}^{1}/_{4}$ , NE  ${}^{1}/_{4}$ , Se. 35, T. 1 N, R. 12 E; Figure 1). The site is bounded by the Rock River, to the west, Woodward Avenue, to the south, and a City of Beloit green area to the north. East of the property is the Chicago, Milwaukee and St. Paul Chicago and Northwestern railroad line and commercial development.

The site is located on the flood plain of the Rock River. There is little topographic expression at the site; however, the ground elevation rises approximately 30 feet over a 500-foot distance immediately east of Pleasant Street, less than 200 feet east of the site.

In conjunction with plans to sell the property, six underground storage tanks and three above-ground tanks were removed and an environmental investigation, in accordance with Department of Industry, Labor and Human Relations (DILHR), was performed in November, 1989. During the closure investigation, it became apparent that the soil and ground water in the area of the underground storage tanks had been impacted. This discovery prompted the following site investigation.

## 1.1 PURPOSE AND SCOPE

The purpose of the investigation was to determine the lateral boundaries of the environmental impact and provide recommendations for corrective action that address the Wisconsin Department of Natural Resources (WDNR) guidelines for site restoration. The scope of the investigation included a review of the site history and a review of data presented in the CBC Environmental Services underground storage tank closure report, dated December 11, 1989. The scope of the investigation included the installation of five soil borings, three of which were converted to monitoring wells. The scope was increased to include the installation of six additional soil borings, three of which were converted into monitoring wells.

# 1.2 SITE HISTORY

The Ursula Branigan Borgerding family has owned the Estate property since May 14, 1913, when Edward R. Branigan purchased the lot from the City Ice Company. Before coming under ownership by Edward Branigan, the Estate property was owned by several private individuals and corporations, including the Rock River Paper Mill, the Beloit College, the Beloit Water Power Company and the Knickerbocker Ice Company.

Operators on the property during the ownership by Edward Branigan included Standard Oil Company of Indiana (lease from May 4, 1931, terminating May 31, 1933) and the City Ice & Fuel Company. City Ice & Fuel cut ice blocks from the Rock River and shipped them via the Chicago, Milwaukee and St. Paul Chicago and Northwestern Railway Companies, which operated railroad lines on the eastern border of the property. City Ice & Fuel maintained large coal piles on or immediately adjacent to the Estate property. Historical photographs also indicate that Deep Rock, of Illinois, maintained above ground storage tanks on or adjacent to the property (Figure 2). The storage tanks are suspected to have contained diesel fuel for the railway operation.

Edward Branigan willed the property to Robert and Evelyn (wife) Branigan in 1946, who released the property to their daughter, Ursula Branigan Borgerding, later in the same year. Since Ursula Borgerding has owned the property, operators at the site have included Price Rite Gas, Drevdahl Automotive Painting, Heritage Painting & Decorating, and Superior Automotive Electric.

On May 24, 1984, a 1000-gallon gasoline release occurred at the Price Rite Gas station. The release occurred when an employee of Richards Brothers, the gasoline carrier for U.S. Oil, failed to shut the proper valve during tank-filling activities. Beloit fire and police departments responded to the spill by diking and foaming the gasoline. The spill was remediated under the direction of WDNR staff, who recommended that the remaining material be absorbed with sand. The spill is documented in the WDNR "Statewide Spills and Hazardous Incident Report," dated September 7, 1989.

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The future plans for the site are to raze the existing buildings and incorporate the site into a river-front parkway system. The property is expected to be turned over to the City of Beloit following park development.

# 2.0 PREVIOUS WORK

In November, 1989 Frances Borgerding Sheehy, representative for the Ursula Borgerding Estate, contracted Autoquip, Incorporated to remove the six underground and three aboveground storage tanks located at the property<sup>1</sup>. Upon removal of the tanks, significant gasoline contamination was identified in the soil and ground water in the tank area immediately west of the Heritage Painting & Decorating building (UST Location 1, Figure 3). The tanks in UST Location 1 most recently contained gasoline and fuel oil and were used to service the various gas stations operating out of the building most recently occupied by Heritage Painting & Decorating. The ages of the tanks are not known.

Low-level photoionization detector (PID) readings were recorded for the soils contained in a concrete vault located between the Heritage Painting & Decorating and Drevdahl Automotive Painting buildings (UST Location 2). The soils were completely excavated from the vault, which was later filled with clean fill material and covered with concrete. Ground water was not encountered in the UST Location 2 excavation.

In response to the high PID readings for the soils in UST Location 1, the UST closure assessment was abandoned in favor of performing a subsurface investigation with the objectives of defining the lateral and vertical boundaries of the soil and ground water contamination.

The first phase of the subsurface investigation was initiated on March 14, 1990 and is detailed in the following sections.

<sup>&</sup>lt;sup>1</sup> The field activities and laboratory results associated with the UST closure are presented in the CBC Environmental Services report titled, "A Report for an Underground Storage Tank Closure Site Assessment at 435 Woodward Avenue, Beloit, Wisconsin," dated December 11, 1989.

#### 3.0 PHASE I SUBSURFACE INVESTIGATION

Dames & Moore was retained by the Ursula Borgerding Estate to conduct the subsurface investigation at the Estate property. Dames & Moore personnel performed the first phase of the investigation on March 14, 1990. The first phase of the investigation consisted of installing five soil borings, three of which were converted into monitoring wells. The locations of the borings and monitoring wells are shown in Figure 4.

#### 3.1 FIELD METHODOLOGY

Soil samples were collected at 2.5 foot intervals, using a split spoon sampler, in accordance with ASTM methods D-1452 and D-1586. All samples were examined for characteristics such as texture, moisture content and signs of contamination. The soil characteristics and other sample-specific observations were recorded on soil boring logs (Appendix A). Bentonite chips were used to abandon the borings.

Samples from each interval were containerized in 4 oz. glass jars with teflon-lined lids. Each sample was screened in the field, using a Photovac photoionization detector (PID). The PID yields a semi-quantitative head-space analysis of the volatile compounds in the sample. PID readings are shown on the soil boring logs.

Between each sampling episode, the split spoon was washed in a TSP solution and double rinsed in clean tap water. All down-hole equipment was steam cleaned between borings.

Soil borings B-1, B-2 and B-3 were converted into monitoring wells MW-1, MW-2 and MW-3 respectively. Due to the presence of ground water at depths of two to ten feet below the ground surface, a well-construction variance from Wisconsin Administrative Code NR 141 was requested. The variance was granted by Wendell J. Wojner, the WDNR representative overseeing the project, on March 14, 1990. Appropriate well construction methods for high ground water conditions, were suggested by Mike Lemke of the WDNR. Mr. Lemke's suggestions were incorporated into the well designs. The well construction logs are presented in Appendix B.

The monitoring wells were developed and sampled in accordance with Wisconsin Administrative Code NR 141. Details of the development procedure and volumes of water purged are given on the well construction logs (Appendix B).

#### 3.2 LABORATORY ANALYSES

Soil and ground water samples were transported on ice to the Chem-Bio Corporation laboratory in Oak Creek, Wisconsin for chemical analysis. Appropriate chain-of-custody procedures were followed at all times. A copy of the chain-of-custody document is presented in Appendix C.

The soil samples were analyzed for total petroleum hydrocarbons (TPH), using an in-house infrared method, similar to the "California" method, whereby the contaminant is identified by matching the chromatogram to those of known standards. The water was analyzed for benzene, toluene, ethylbenzene and xylene (BTEX), using EPA method 601/602.

The results of the laboratory analyses are summarized in Table 1 (soil samples) and Table 2 (ground water). The laboratory reports are presented in Appendices D and E (soil and ground water, respectively). The data is discussed in section 3.3 below.

## 3.3 DATA ANALYSIS - SAMPLING LOCATIONS 1 THROUGH 5

#### 3.1.1 Soil Borings

The materials encountered during drilling indicate that significant land filling has occurred at the site. Foundry fill was found in all five borings at thicknesses of up to eight feet. Other fill materials encountered included wood and brick. At all boring locations, the soils had petroleum odors, usually increasing in strength with depth of sampling interval. Soils saturated with dark brown to black oily petroleum were encountered near the ground surface in borings MW-2 and MW-3 and at depths of eleven feet in boring MW-1. Soil types encountered below the fill materials consisted of brown or black organic clay, sandy clay, sand, silt and pebbles. The soils tended to coarsen with depth and generally reflect the fluvial depositional environment.

### 3.1.2 Laboratory Results

Laboratory analysis of soil and ground water samples indicated impact to the subsurface by gasoline and diesel fuel. The occurrence of gasoline components is consistent with the documented gasoline release of May 24, 1984. According to the data, effects on the subsurface soil from the gasoline spill are seen in highest concentration around UST Location 1 and west, toward the Rock River, at MW-2. The lower concentration of gasoline contamination at B-4 is suspected to be the result of minor releases from the piping or dispenser that operated in that area.

Impact to the subsurface soil by diesel fuel was found at MW-2, and is inconsistent with the site history. Diesel fuel was never stored in the tanks of UST Location 2, nor are there any records or indications of diesel fuel being spilled in that area. The primary theories to explain the presence of diesel fuel are, 1) the above-ground storage tanks, owned by Deep Rock (Figure 2) released diesel fuel to the subsurface or to the ground surface, 2) the foundry fill materials encountered throughout the site were contaminated with diesel fuel, 3) diesel fuel was used during ground filling activities to keep dust or other particulates from becoming airborne, or 4) the chromatogram produced during sample analysis was not distinct and could have been mismatched to the diesel standard. Based on these questions and the fact that the objective of determining the boundaries of impacted soil and water was not fulfilled, a second phase of investigation was initiated.

#### 4.0 PHASE II SUBSURFACE INVESTIGATION

The second phase of the subsurface investigation was conducted on July 5 and 6, 1990 and consisted of installing six soil borings, three of which were converted into monitoring wells.

MW-7 was installed off of the Estate property, on City of Beloit property. The locations of the borings and wells are shown in Figure 5.

# 4.1 FIELD METHODOLOGY

The methods utilized to install the soil borings and monitoring wells during the second phase of the investigation are identical to those described for the first phase (section 3.1 above). Borings B-6, B-7 and B-10 were converted into monitoring wells MW-6, MW-7 and MW-10, respectively. A variance from NR 141 was obtained from Wendell J. Wojner on July 6, 1990 to construct the monitoring wells in a manner appropriate for the high ground water. As the water table at the MW-7 location was only two to three feet below the ground surface, the screened interval of the well was placed below the water table so that an annular space seal could be installed without interfering with water quality. The well construction logs are presented in Appendix B.

# 4.2 LABORATORY ANALYSES

Soil and ground water samples were transported on ice to the laboratory for chemical analysis. The soil samples were analyzed at Swanson Environmental, Incorporated, Brookfield, Wisconsin, and the water samples were analyzed at Chem-Bio Corporation. Appropriate chain-of-custody procedures were followed at all times. A copy of the chain-of-custody documents are presented in Appendix C.

The soil samples were analyzed for total petroleum hydrocarbons (TPH) using the California method. In response to the presence of foundry fill materials encountered throughout the site, the analyses for ground water were expanded in an attempt to identify other compounds potentially impacting ground water quality. The water samples were analyzed for volatile organic compounds, including BTEX, using EPA method 8240, and for phenolics, using EPA method 420.2.

The results of the laboratory analyses are summarized in Table 1 (soil samples) and Table 2 (ground water). The laboratory reports are presented in Appendices D and E (soil and ground water, respectively). The data is discussed in section 4.3 below.

# 4.3 DATA ANALYSIS - SAMPLING LOCATIONS 6 THROUGH 11

## 4.3.1 Soil Borings

Foundry sands and cinders were encountered in all borings, except B-8, in thicknesses of two to eight feet and at depths of one to ten feet below the ground surface. In several borings, the foundry fill was interlayered with other fill materials, such as brick, sand and gravel. At boring location MW-10, approximately six inches of layered paint and paper was encountered from one to one-and-one-half feet below the ground surface. The soils at this sampling interval (1'-2.5') had a strong solvent odor. Slight solvent odors were noted in soils as deep as five feet at this location. There was no indication of this type of contamination at any other sampling location.

Strong petroleum odors were noted in the soils and ground water at all sampling locations except boring MW-6; only slight petroleum odors were detected in MW-6, at depths around 15'. Dark brown to black, oily petroleum saturated the soils from depths of three feet to depths greater than ten feet below the ground surface. At these intervals, oily sheens were seen on the water in the sampler.

#### 4.3.2 Laboratory Results

Laboratory analyses of soil samples collected from sampling locations 7 through 11 indicate detectable diesel fuel fractions in the soils. The soil sample submitted from soil boring MW-6 was selected to represent the highest concentration of impact at that location as determined by the PID. However, TPH concentrations were below laboratory detection limits.

Ground water samples were analyzed for BTEX, VOCs and phenolics. The greater range of analytical parameters was chosen to determine if the fill materials had impacted the ground water. In the water sample collected from MW-6, trace amounts of carbon disulfide were detected. Carbon disulfide is used industrially in manufacturing a multitude of products, such as rayon, flotation devices, vacuum tubes, explosives, preservatives and cements. It is also used as a solvent, degreaser and pesticide. Possible sources for the carbon disulfide contamination are the fill material used at the site or laboratory contamination. Although carbon disulfide is a regulated waste, limits on concentrations in ground water have not been ratified. However, the proposed regulatory level is 400 ppm, which is significantly greater than the concentrations found in the ground water at the Estate property.

In the sample from MW-7, benzene and carbon disulfide were detected. Acetone was also detected, however the concentration was only slightly greater than the concentration found in a laboratory blank and is thought to be the result of laboratory contamination. The benzene source is probably the petroleum encountered in the soil and water during drilling.

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The sample collected from MW-10 contained detectible quantities of benzene, carbon disulfide, acetone, 4-methyl-2-pentanone (MIBK) and 2-hexanone. The acetone, MIBK and 2-hexanone contamination is most likely the result of washing paint and paint solvent waste onto the ground in the area of MW-10. MIBK and acetone are regulated substances.

Trace concentrations of phenolics were detected in the water samples collected from monitoring wells MW-6, MW-7 and MW-10. The level for the protection of public health set by the WPA in 1986 for phenol is 3.5 ppm (mg/L), and the level to control taste and odor is 0.3 ppm. The concentrations of phenolics in the Estate ground water are significantly less than these regulatory standards.

#### 5.0 SITE HYDROGEOLOGY

Hydrogeologic data were collected throughout the investigation in order to characterize the aquifer at the Estate property. The foci of the characterization were the determination of 1) the ground water flow direction, 2) the hydraulic gradient, and 3) the hydraulic conductivity of the aquifer. The purpose of the characterization was to determine potential contaminant migration directions, the speed at which contaminants may be transported via ground water and to develop a basis for evaluating different ground water remediation methods.

#### 5.1 GROUND WATER FLOW DIRECTION AND HYDRAULIC GRADIENT

Complete sets of ground water elevation data were collected on July 11, 1990 and July 24, 1990. The elevations of water in the wells were collected using an electronic water-level indicator, marked in increments of 0.01 feet and were correlated to the ground elevation at MW-6, which is 750 feet above MSL. Because the screened interval of monitoring well MW-7 is below the water table and may not accurately reflect the water table elevation at this location, ground water level data from MW-7 were excluded from the calculations of ground water flow and gradient. The ground water contours are shown in Figure 6 (July 11, 1990) and Figure 7 (July 24, 1990).

Both sets of data indicate a steep ground water gradient to the east. The direction of ground water flow indicates that the Rock River may be recharging the ground water at the site. The magnitude of the gradient, approximately 0.036, suggests that there may be a production well east of the Estate property that is influencing the ground water flow. As such, the contamination in the ground water at the site may potentially impact the water being withdrawn at the production well. However, production wells in the area are suspected to be quite deep, and the primary contaminants in the Estate ground water, benzene, toluene, ethylbenzene and xylene, have very low solubilities in water (<0.1%) and densities less than that of water and are therefore, not likely to mobilize in the downward direction to any significant degree. MIBK and 2-hexanone have slightly higher solubilities (<2%) and are also less dense than water. Acetone, although less dense than water, is

miscible. However, the occurrence of acetone seems to be isolated to the MW-10 area and is in such concentrations that its occurrence may be the result of laboratory contamination.

### 5.2 HYDRAULIC CONDUCTIVITY AND GROUND WATER VELOCITY

Slug tests were conducted on each monitoring well to determine the hydraulic conductivity of the aquifer. The tests were conducted, and the data analyzed as described by Bouwer and Rice, (1976). The data are summarized in Table 3 and the slope plots are presented in Appendix F.

The hydraulic conductivity (K) at the site ranges from  $2.6 \times 10^{-4}$  cm/sec at MW-10 to  $1.7 \times 10^{-2}$  cm/sec at MW-6. The geometric mean value of K is  $1.6 \times 10^{-3}$  cm/sec at the site. The hydraulic gradient at the site is 0.036. Assuming an average effective porosity of 20%, this yields an average linear ground water velocity of approximately  $2.9 \times 10^{-4}$  cm/sec. This value converts to  $9.5 \times 10^{-6}$  feet/sec or approximately 300 feet per year.

#### 6.0 NATURE AND EXTENT OF IMPACTED AREA

## 6.1 SOIL QUALITY

Adverse impact to the soil at the Estate property is found consistently throughout the site and on City of Beloit property, in the area of MW-7. The area of gasoline impact was defined during the investigation and is depicted in Figure 8. The sampling locations that displayed gasoline fractions in the soil are MW-2, MW-3, B-4 and B-5. In each case, the sample chosen for laboratory analysis was the sample collected from immediately above the water table and not necessarily the sample with the highest PID reading.

The boundaries of impact by diesel fuel in the soil could not be defined, with the exception of sampling location MW-6 (Figure 9). The sample chosen from each location displayed either the highest PID reading or was collected from immediately above or below the ground

water table. In each case, the samples submitted are thought to accurately represent the conditions at the sampling location. The exception is the sample chosen for analysis from B-8. This sample was selected to define the lower boundary of impacted soil and is not representative of the higher concentrations at that location. The TPH data for B-8 is therefore not used to generate the contours depicted in Figure 9. Although laboratory analyses suggest that the diesel fuel impact is concentrated around the Heritage Painting & Decorating and Drevdahl Automotive Painting buildings, this is not consistent with in-field observations and may be the result of the different analytical methods used to determine the concentrations of TPH in the soils<sup>2</sup>. Based on in-field observations, the degree of diesel fuel impact did not differ significantly at any of the sampling locations where diesel fuel was determined to be the petroleum product present.

#### 6.2 GROUND WATER QUALITY

The most significant concentrations of BTEX in the Estate ground water are found in monitoring wells MW-1, MW-2 and MW-3. Of these, the highest concentration is in MW-3, located adjacent to UST Location 1, where the gasoline spill of 1984 occurred. This is consistent with in-field observations and with site history. The second most highly impacted location is MW-1. Based on the ground water flow direction, this area is expected to be impacted by the gasoline spill. However, the high concentration of diesel fuel components in the soil at this location may also have contributed to the impact on the ground water.

Based on the ground water velocity, discussed in section 5.2 above, the BTEX in the ground water, resulting from the 1984 gasoline spill, could be expected to have traveled more than 1900 feet if retardation factors, such as hydrophobic adsorption, are not considered. However, no significant ground water impact by BTEX compounds is seen in monitoring well MW-10, which is less than 200 feet from the spill location and directly in the flow path. This suggests that the silt and clay fractions in the soil, coupled with the high occurrence of organic matter, may be adsorbing the petroleum components and slowing their movement. The occurrence of BTEX compounds in the ground water is shown in Figure 8.

<sup>&</sup>lt;sup>2</sup> Soil samples from sampling location MW-1 was analyzed using the Chem-Bio Corporation in-house infrared method; samples from MW-6, MW-7, B-8, B-9, MW-10 and B-11 were analyzed at Swanson Environmental using the California method.

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The remediation of the 1984 gasoline release was directed by WDNR personnel according to the guidelines that existed at the time. The present extent of gasoline impacted soil and ground water reflect the inadequacy of those guidelines.

#### 7.0 CONCLUSIONS

Two phases of subsurface investigation have been performed at the Ursula Borgerding Estate property, located at 435 Woodward Avenue in Beloit, Wisconsin. The purpose of the investigation was to determine the lateral and vertical boundaries of soil and ground water impact at the site resulting from 1) the operation of underground petroleum storage tanks, 2) the May 24, 1984 documented gasoline release, and 3) historical activities at the site. The scope of the investigation included a review of historical documents and the installation of eleven soil borings, six of which were converted into monitoring wells.

Historical documents indicate that the site was owned or operated by various agencies, such as Beloit Water Power Company, the Rock River Paper Mill, Standard Oil Company, City Ice & Fuel Company, and Price Rite Gas. Historical photographs show large above-ground storage tanks, displaying the Deep Rock name, located on or adjacent to the Estate property. The operations of any of these companies may have contributed to the adverse environmental impacts identified at the site.

Strong petroleum odors, and in some cases, soils nearly saturated with dark brown to black, oily materials, were encountered in all of the sampling locations, except MW-6. Dark brown, grey or black foundry sand fill material was encountered in all of the borings except B-8. Six of the soil borings, MW-1, MW-2, MW-3, MW-6, MW-7 and MW-10, were converted into monitoring wells.

Laboratory analyses indicate that the impact to the soil from the gasoline spill is limited to the area depicted in Figure 8, which is expected, due to the 1984 gasoline release. Diesel fuel impact to the soils is found throughout the site and is not consistent with historical use of the underground storage tanks that were removed from the property in 1989. Possible sources of the diesel fuel are 1) releases from the Deep Rock above-ground storage tanks, 2) the use of diesel fuel contaminated foundry fill material at the site, or 3) the spraying of diesel fuel on the site to keep dust or other particulates from becoming airborne. The diesel fuel contamination was found throughout the site and north of the property, on City of Beloit property at MW-7.

Ground water impact by benzene, toluene, ethylbenzene and xylene (BTEX) is concentrated in the areas of MW-1, MW-2 and MW-3. Some impact to the ground water by MIBK and 2-hexanone was found in the area of MW-10. However this appears to be an isolated incident. Additionally, acetone and carbon disulfide were found in water samples from MW-10 and MW-7; however, due to the low concentration, these are thought to be the result of laboratory contamination.

The ground water at the site displays a steep hydraulic gradient, 0.036 feet per foot, from the west to the east. The direction of ground water flow suggests that the Rock River is recharging the ground water. The steepness of the gradient suggests that a production well may be operating somewhere east of the Estate property.

The average linear ground water velocity, as determined using the ground water gradient and the geometric mean of the hydraulic conductivity measurements, is approximately 300 feet per year. Based on these calculations, ground water impact resulting from the 1984 gasoline release could be expected to have traveled more than 1900 feet from the location of the spill and area of gasoline infiltration into the soil. The lack of significant BTEX concentrations at MW-10, less than 200 feet away from and in the path of ground water flow from the spill location, indicates that the migration of these compounds may be slowed by hydrophobic adsorption or other retardation factors.

#### 7.0 RECOMMENDATIONS

Due to the adverse environmental impacts, apparently caused in part by historical activities at the Estate property, specifically the presence of diesel fuel in the soil, complete restoration of the soil and ground water to pre-industrial conditions may not be practical. The area of gasoline impact has been defined.

Dames & Moore recommends that a pump and treat system be installed to restore the ground water quality in the gasoline-impacted area. The water may be discharged directly to the Rock River or may be passed through a carbon adsorption unit prior to discharge, depending upon the discharge permit requirements. The system may remain in service until BTEX concentrations in monitoring wells MW-1, MW-2, MW-3 and MW-10 are reduced to acceptable concentrations.

Respectfully Submitted,

DAMES & MOORE, LTD.

Kristine M. Stehr Project Manager and Hydrogeologist

Bruce L. Cutuight / HMS Bruce L. Cutright

Managing Associate

# **REFERENCES CITED**

Bouwer, H. and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely of partially penetrating wells: Water Resources Research, V. 12, n. 3, p. 423.

#### TABLE 1

# URSULA BORGERDING ESTATE LABORATORY ANALYSIS RESULTS

#### SOIL SAMPLES

SOIL BORING I.D.	<u>TPH</u>	CONTAMINANT
MW-1 / 3.5'-5'	1800	DIESEL FUEL
MW-2 / 1'-2.5'	920	GASOLINE
MW-3 / 3.5'-5'	1100	GASOLINE
B-4 / 9.5'-11'	43	GASOLINE
B-5 / 6.5'-8'	3100	GASOLINE
MW-6 / 12'-13.5'	ND	N/A
MW -7 / 6'-7.5'	88	DIESEL FUEL
B-8 / 8.5'-10'	154	DIESEL FUEL
B-9 / 6'-7.5'	604	DIESEL FUEL
MW-10 / 6'-7.5'	41	DIESEL FUEL
B-11 / 6'-7.5'	136	DIESEL FUEL

TPH concentrations in parts per million. ND = Concentration below detection limit of 4.0 ppm. NA = Not Analyzed.

#### TABLE 2

# URSULA BORGERDING ESTATE LABORATORY ANALYSIS RESULTS

#### GROUND WATER SAMPLES

PARAMETER	<u>MW-1</u>	<u>MW-2</u>	<u>MW-3</u>	<u>MW-6</u>	<u>MW-7</u>	<u>MW-10</u>
BENZENE	1300	220	5400	ND	11	12
TOLUENE	ND	9	660	ND	ND	ND
ETHYLBENZENE	71	660	130	ND	ND	ND
XYLENE	100	ND	2100	ND	ND	ND
CARBON DISULFIDE	NA	NA	NA	32	32	54
ACETONE	NA	NA	NA	ND	26	42
MIBK	NA	NA	NA	ND	ND	69
2-HEXANONE	NA	NA	NA	ND	ND	400
PHENOLICS (ppm)	NA	NA	NA	0.01	0.06	0.04

Concentrations in parts per billion unless otherwise noted. ND = Concentration below detection limit ; see laboratory report for detection limits. NA = Not Anlayzed.

#### TABLE 3

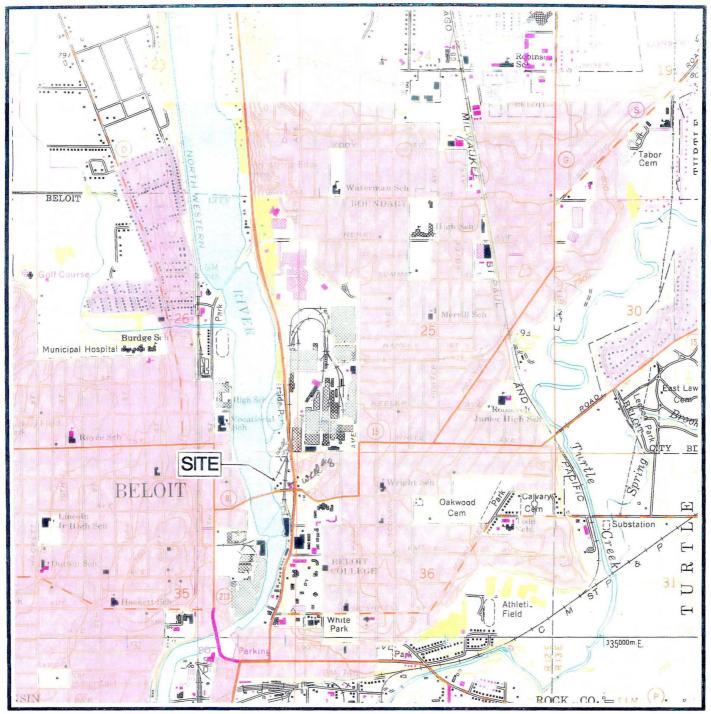
#### URSULA BORGERDING ESTATE

#### SLUG TEST DATA

MONITORING WELL	<u>¥1</u>	<u>T1</u>	<u>¥2</u>	<u>T2</u>	<u> </u>	<u>Δ Τ</u>
MW-1	1.33	33	0.69	151	0.64	-118
MW-2	0.47	16	0.29	146	0.18	-130
MW-3	0.20	24	0.06	55	0.14	-31
MW-6	0.36	12	0.03	30	0.33	-18
MW-7	0.04	17	0.02	45	0.02	-28
MW-10	0.23	45	0.10	247	0.13	-202

# HYDRAULIC CONDUCTIVITY (K)

MW-1	5.7	E-04	cm/sec
MW-2	4.5	E-04	cm/sec
MW-3	5.0	E-03	cm/sec
MW-6	1.7	E-02	cm/sec
MW-7	3.2	E-03	cm/sec
MW-10	2.6	E-04	cm/sec
GEOMETRIC MEAN	1.6	E-03	cm/sec



North

ADAPTED FROM USGS BELOIT QUADRANGLE, 7.5 MINUTE SERIES, 1976.

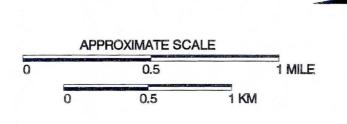


FIGURE 1 SITE LOCATION MAP

435 WOODWARD AVENUE BELOIT, WISCONSIN

DAMES & MOORE A PROFESSIONAL LIMITED PARTNERSHIP

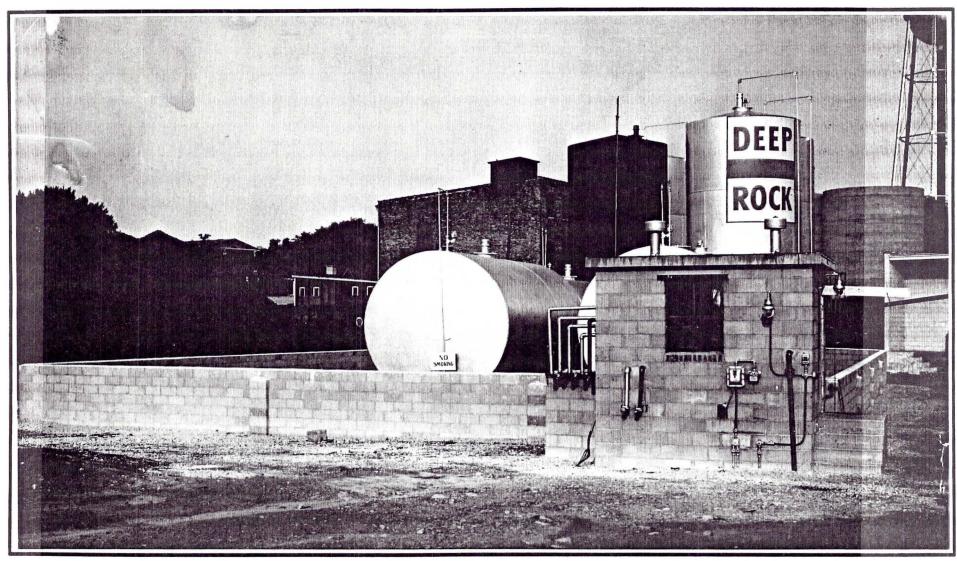


FIGURE 2

PHOTOGRAPH DATE, ESTIMATED 1940.

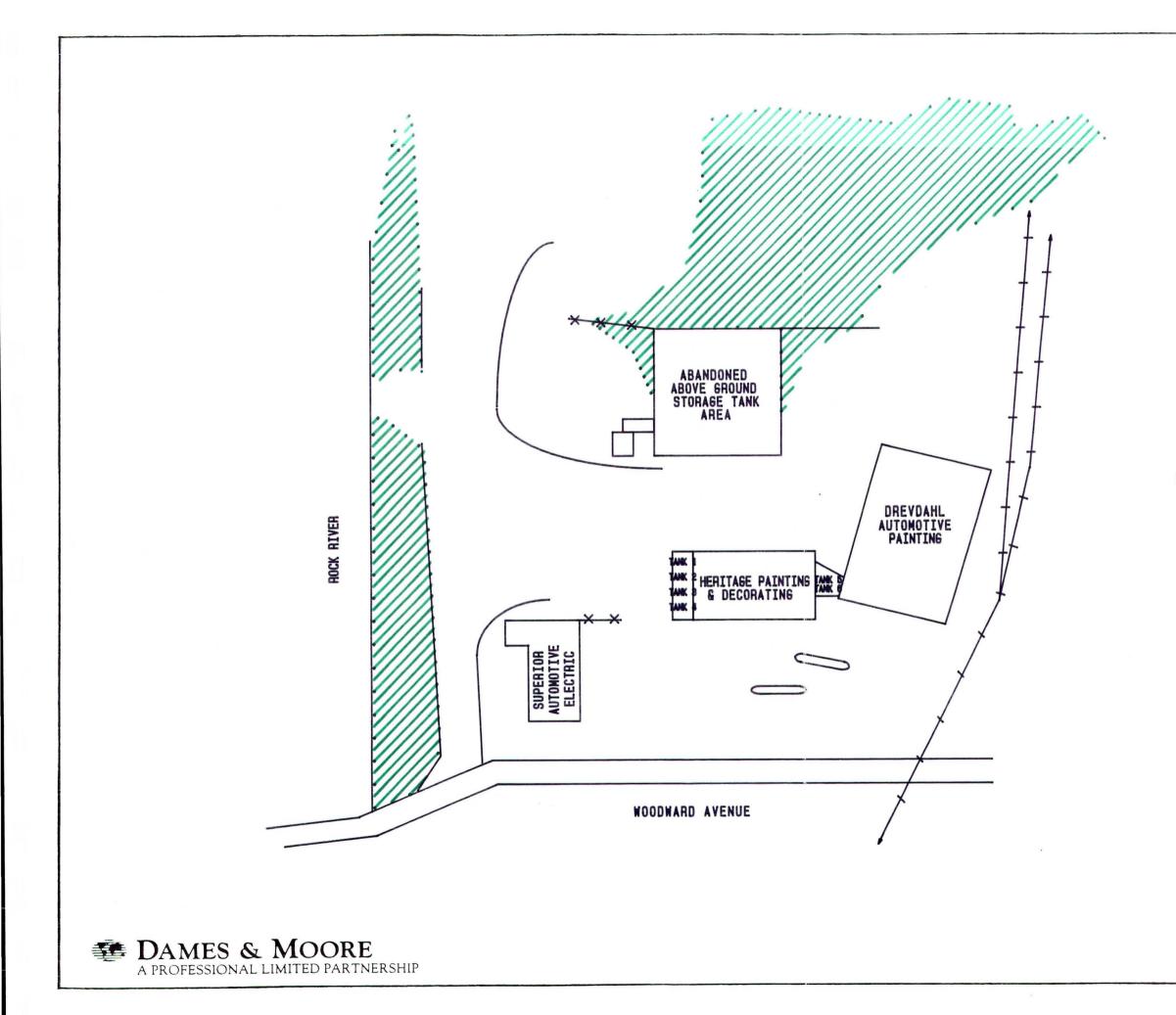
PHOTOGRAPH TAKEN FROM EDGE OF THE ROCK RIVER, FACING EAST NORTHEAST.

IN FOREGROUND ARE THE PUMP HOUSE AND ABOVE-GROUND STORAGE TANKS ("ABANDONED ABOVE-GROUND STORAGE TANKS AREA" IN FIGURE 2).

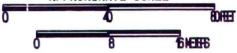
# **Dames & Moore**



HISTORICAL PHOTOGRAPH SHOWING COAL PILES AND ABOVE-GROUND STORAGE TANKS





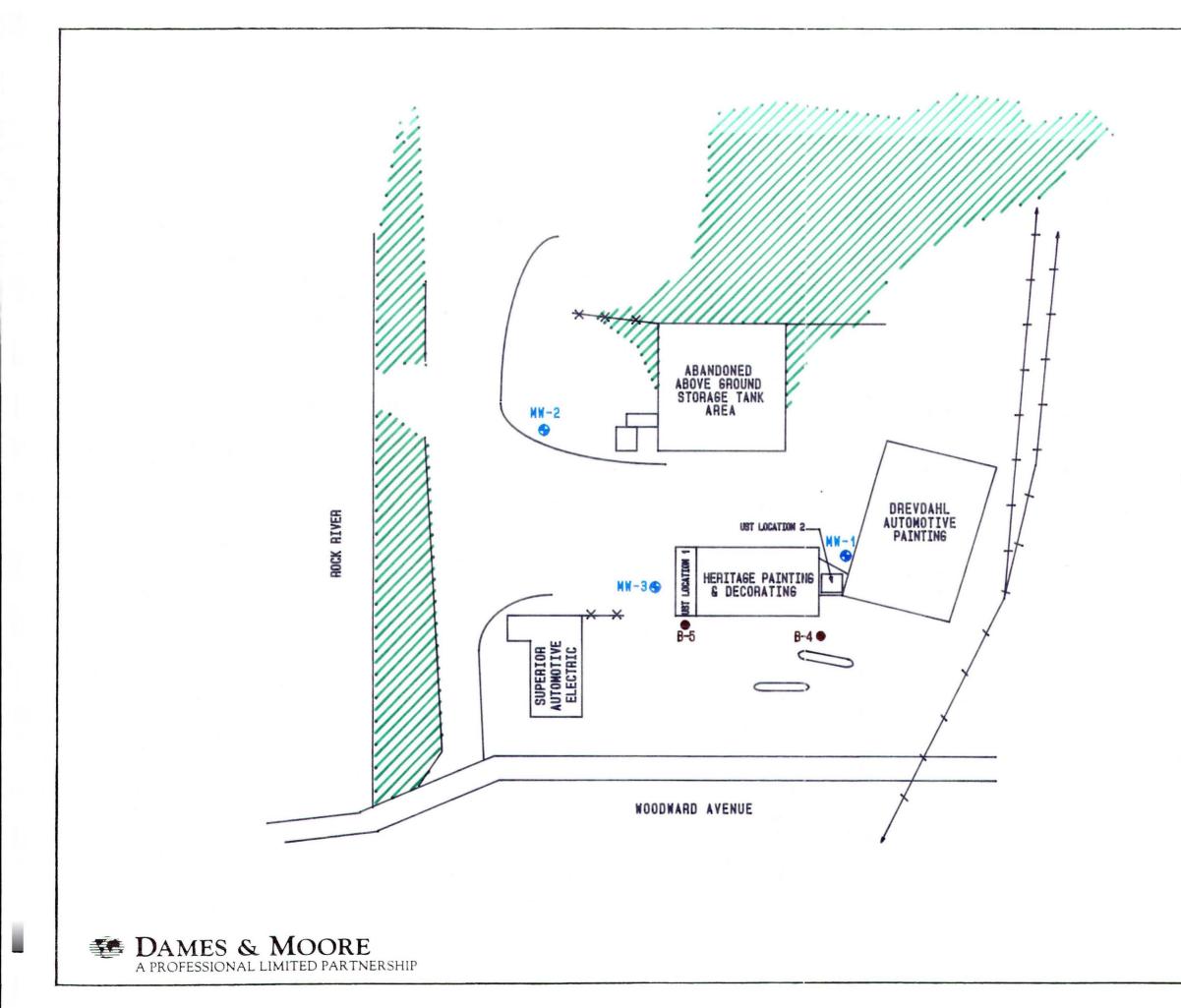


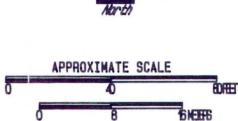


/// HEAVILY VEGETATED AREA

FIGURE 3 UNDERGROUND STORAGE TANK LOCATION MAP

URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN

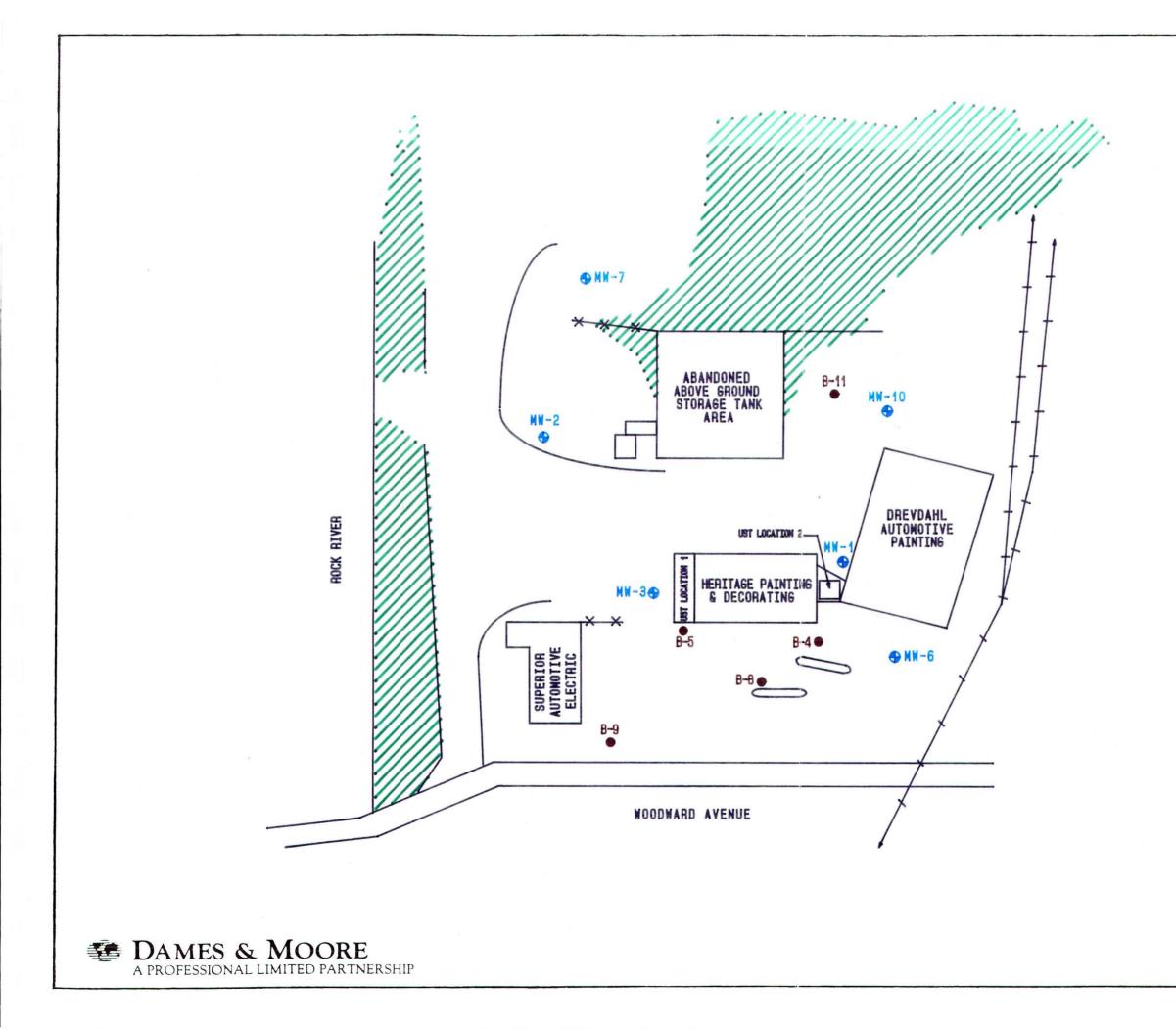






SOIL BORING LOCATION
 MONITORING WELL LOCATION
 FENCE
 ABANDONED RAIL ROAD TRACKS
 HEAVILY VEGETATED AREA

FIGURE 4 SOIL BORING AND MONITORING WELL LOCATION MAP SAMPLING LOCATIONS 1 THROUGH 5



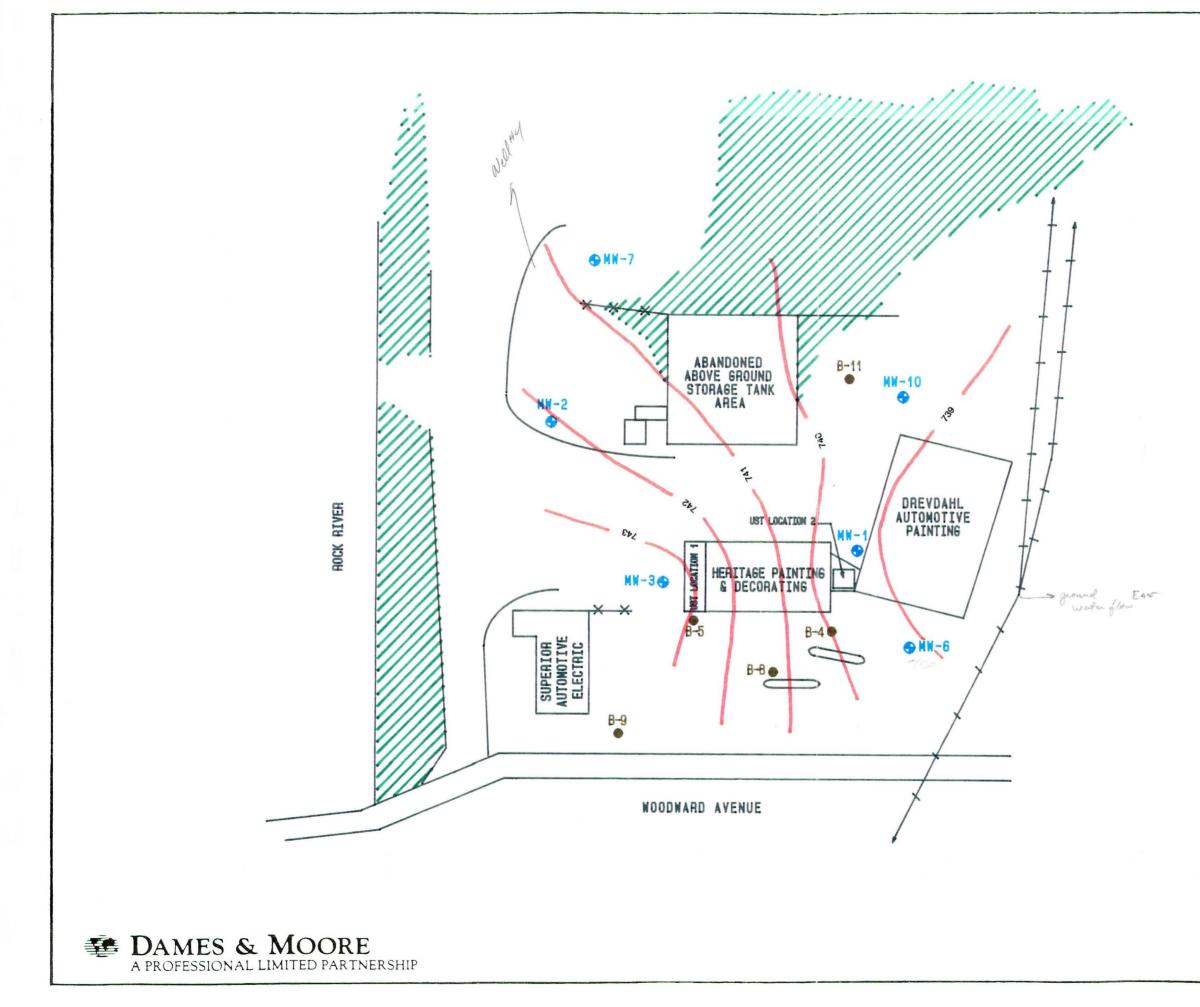




♦ SOIL BORING LOCATION
 ♦ MONITORING WELL LOCATION
 → FENCE
 → ABANDONED RAIL ROAD TRACKS
 /// HEAVILY VEGETATED AREA

# FIGURE 5

SOIL BORING AND MONITORING WELL LOCATION MAP SAMPLING LOCATIONS 1 THROUGH 11







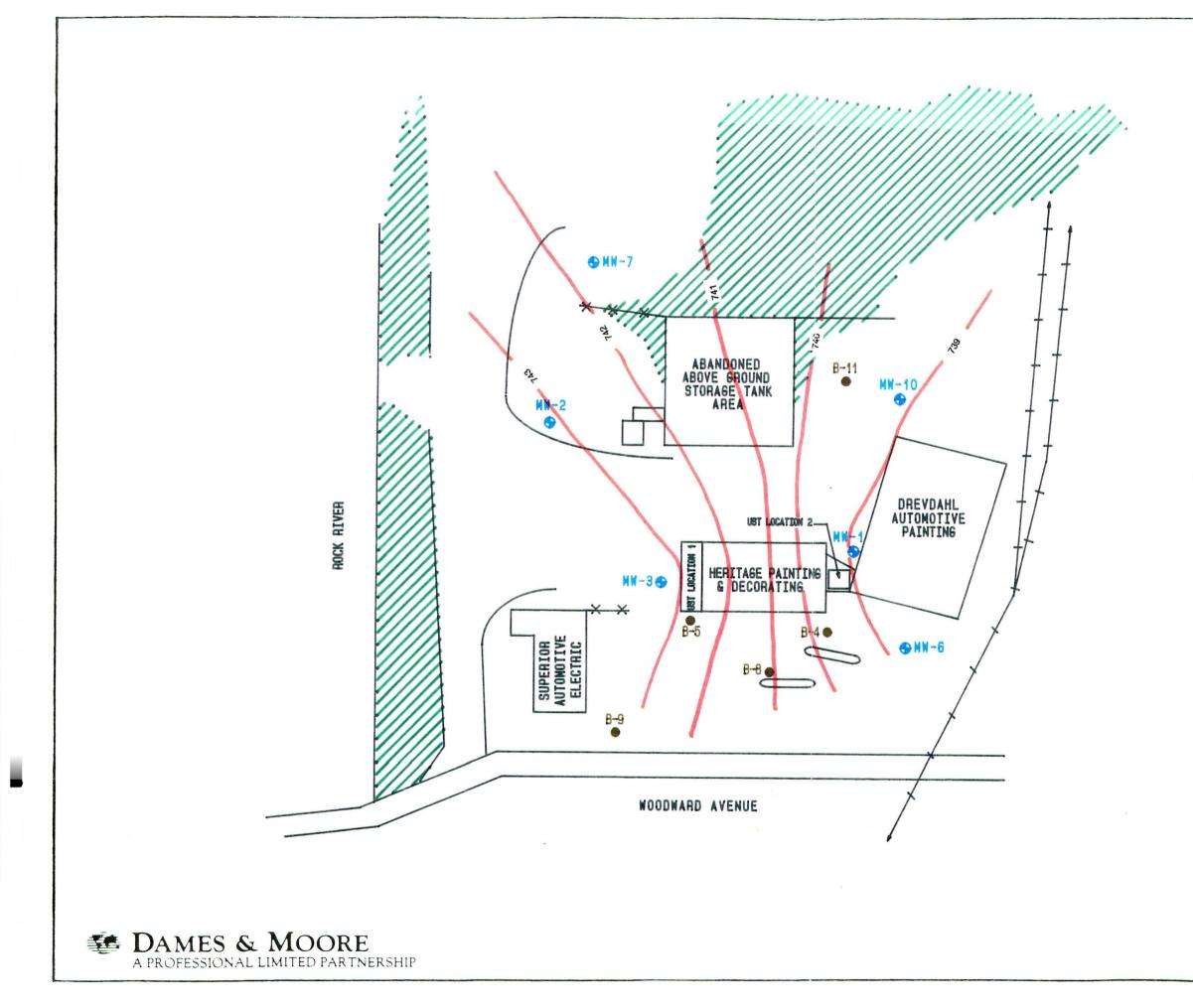
SOIL BORING LOCATION
 MONITORING WELL LOCATION

---- GROUND WATER CONTOURS

----- ABANDONED RAIL ROAD TRACKS

HEAVILY VEGETATED AREA

# FIGURE 6 GROUND WATER CONTOUR MAP JULY 11, 1990







SOIL BORING LOCATION

MONITORING WELL LOCATION

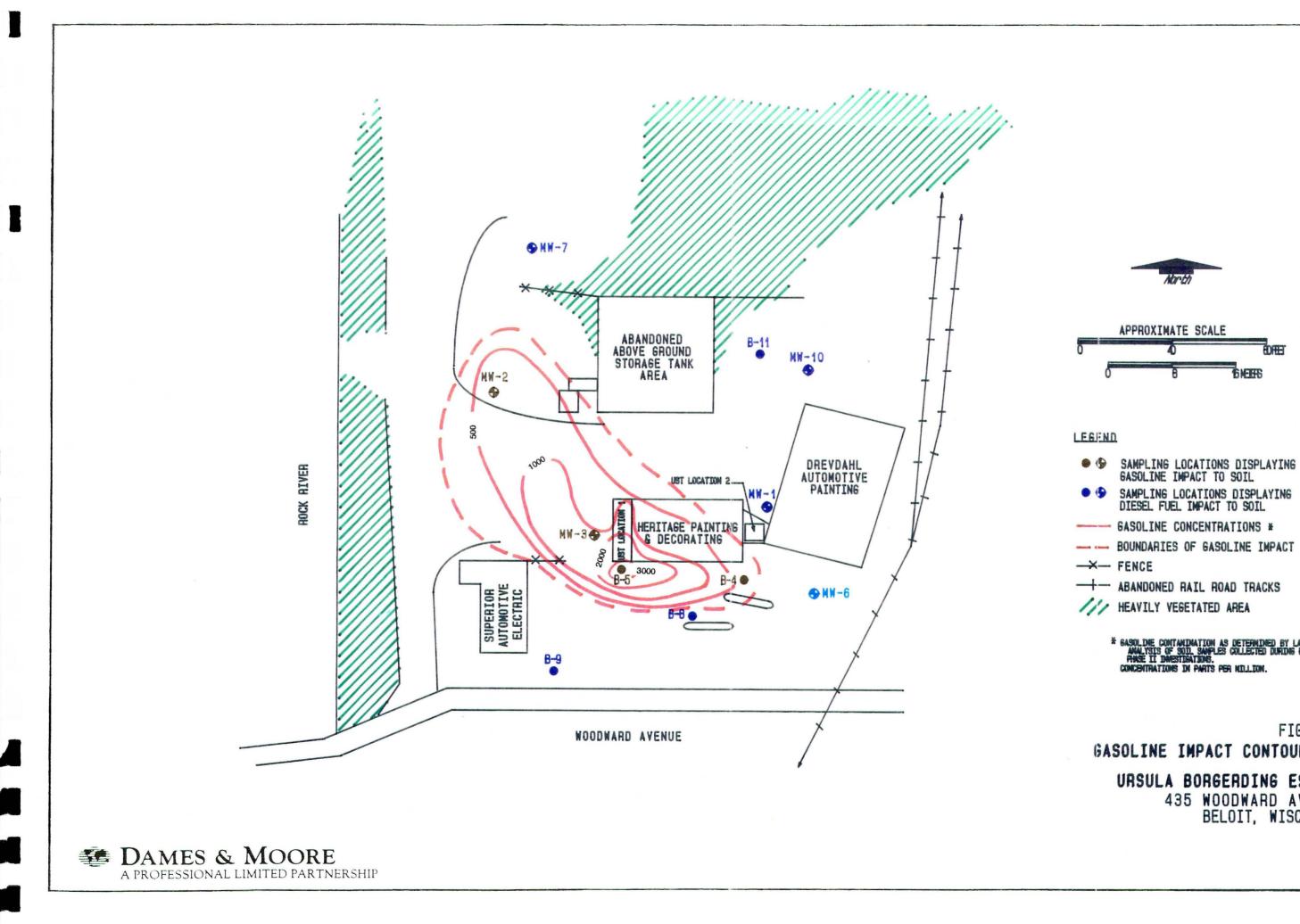
----- GROUND WATER CONTOURS

------ FENCE

------ ABANDONED RAIL ROAD TRACKS

HEAVILY VEGETATED AREA

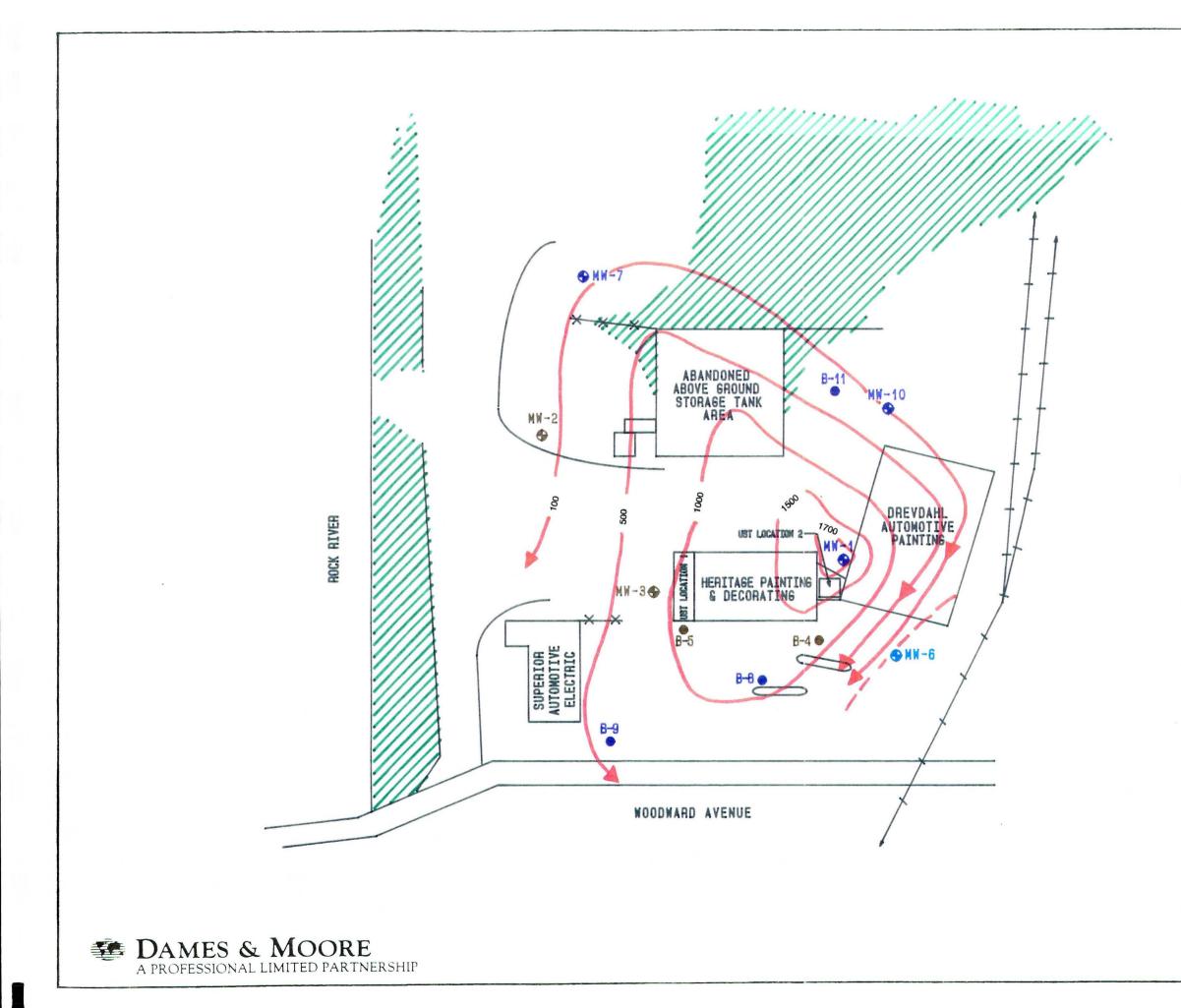
# FIGURE 7 GROUND WATER CONTOUR MAP JULY 24, 1990





COLLECTED DURIDAS PHASE I AND

# FIGURE 8 GASOLINE IMPACT CONTOUR MAP URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN



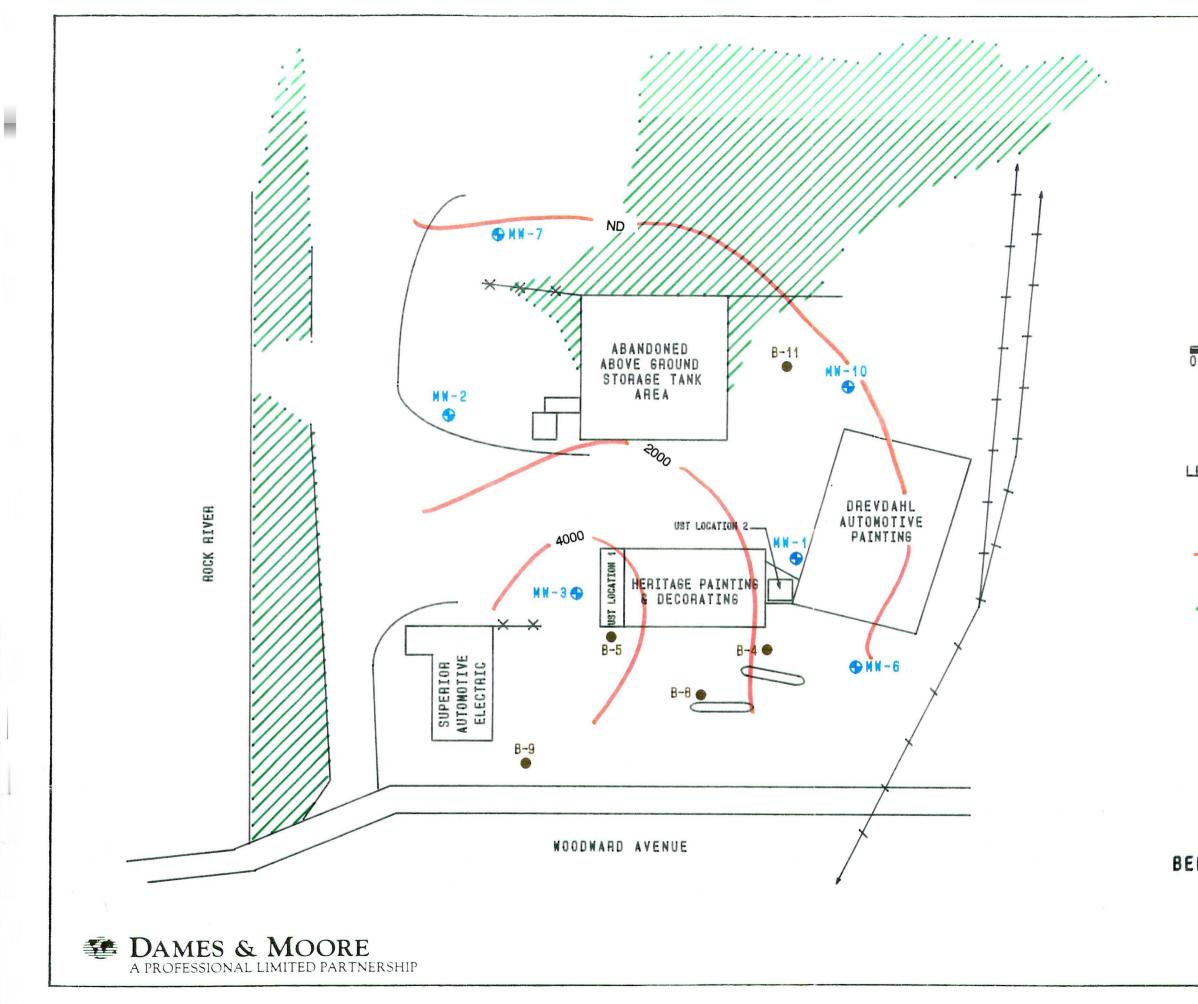




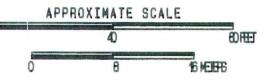
- SAMPLING LOCATIONS DISPLAYING GASOLINE IMPACT TO SOIL
- • SAMPLING LOCATIONS DISPLAYING DIESEL FUEL IMPACT TO SOIL
- ----- DIESEL FUEL CONCENTRATIONS \*
- ----- BOUNDARIES OF DIESEL IMPACT
- -X- FENCE
- ----- ABANDONED RAIL ROAD TRACKS
- /// HEAVILY VEGETATED AREA

\* DIESEL FUEL CONTAMINATION AS DETERMINED BY LABORATORY ANALYSIS OF SOIL SAMPLES COLLECTED DURING PHASE I AND PHASE II DAMESIDATIONS. CONCENTRATIONS IN PARTS PER MILLION.

FIGURE 9 DIESEL FUEL IMPACT CONTOUR MAP URSULA BORGERDING ESTATE



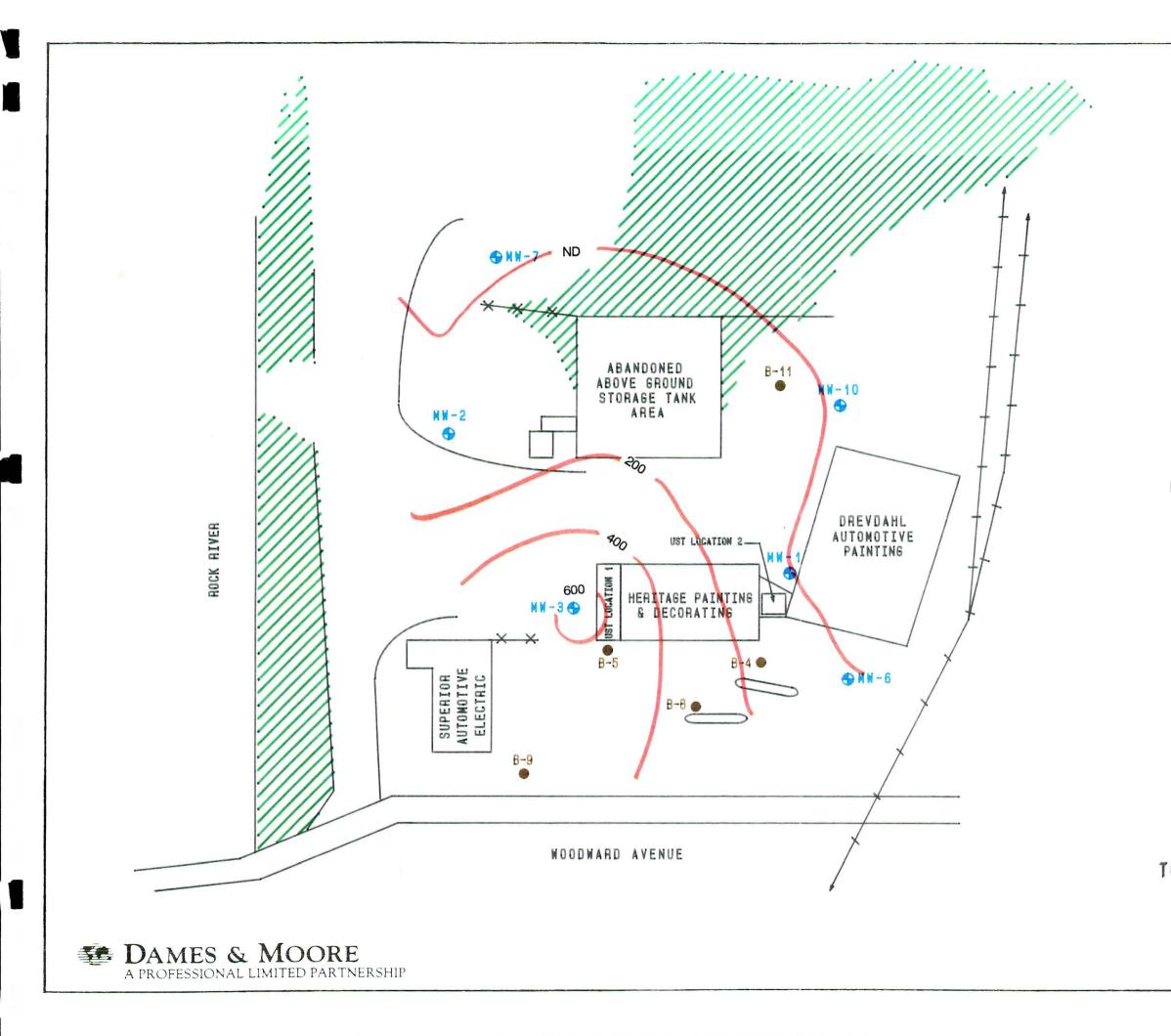


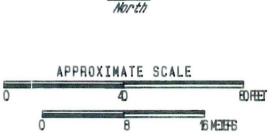


SOIL BORING LOCATION
 WONITORING WELL LOCATION
 BENZENE CONCENTRATIONS \*
 CONCENTRATIONS BELOW DETECTION LIMITS
 HEAVILY VEGETATED AREA

\* BTEX CONCENTRATIONS AS DETERMINED BY LABORATORY ANALYSIS OF WATER SAMPLES COLLECTED DURING PHASE I AND PHASE II DAVESTIGATIONS. CONCENTRATIONS IN PARTS PER BILLION.

FIGURE 10a BENZENE IMPACT TO GROUND WATER URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN

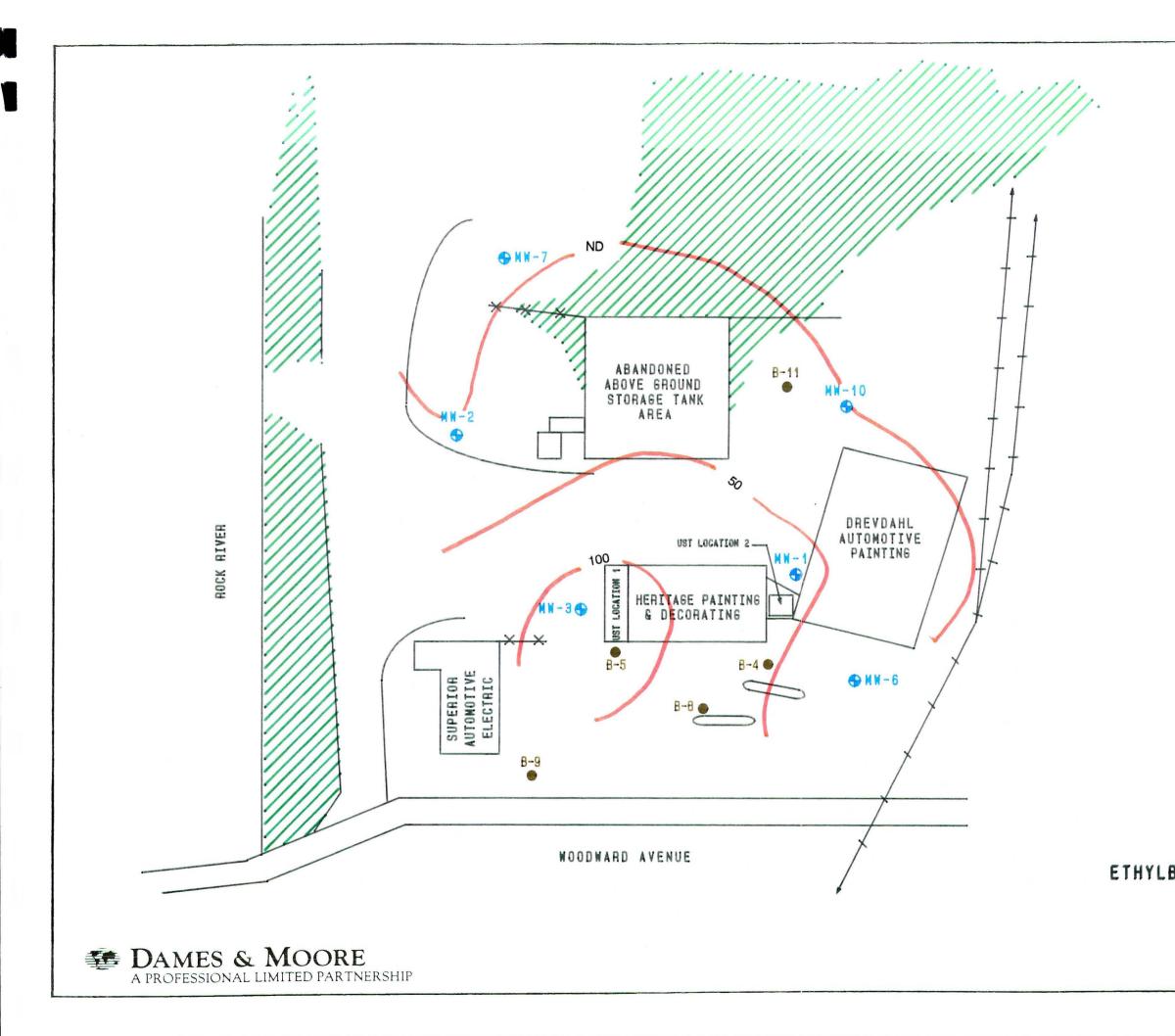


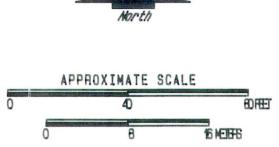


	SOIL BORING LOCATION	
()	MONITORING WELL LOCATION	
	TOLUENE CONCENTRATIONS *	
ND	CONCENTRATIONS BELOW DETECTION	LIMITS
111	HEAVILY VEGETATED AREA	

\* BTEX CONCENTRATIONS AS DETERNINED BY LABORATORY ANALYSIS OF WATER SAMPLES COLLECTED DURING PHASE I AND PHASE II INVESTIGATIONS. CONCENTRATIONS IN PARTS PER BILLION.

FIGURE 10b TOLUENE IMPACT TO GROUND WATER URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN

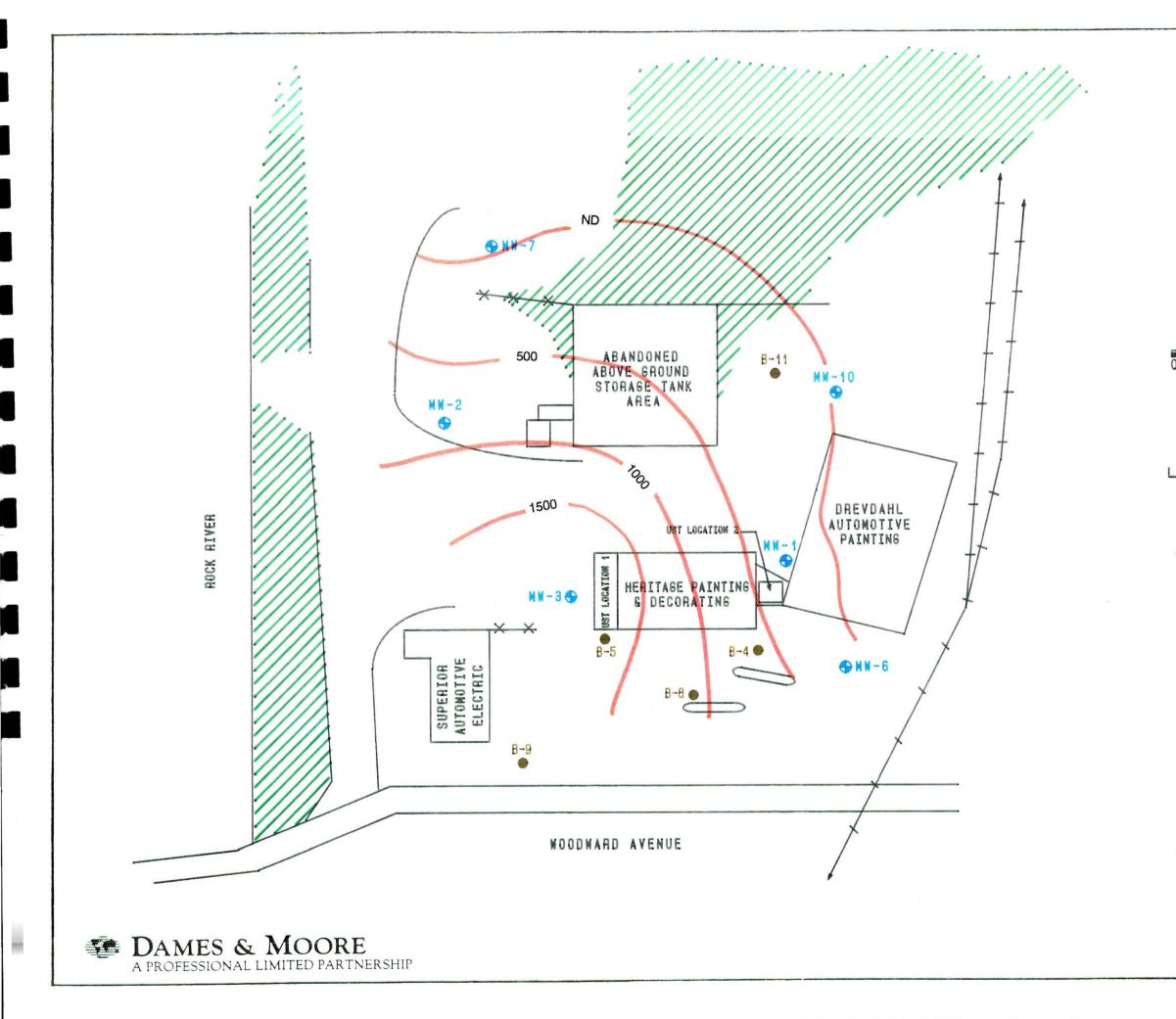




SOIL BORING LOCATION
 MONITORING WELL LOCATION
 ETHYLBENZENE CONCENTRATIONS \*
 CONCENTRATIONS BELOW DETECTION LIMITS
 HEAVILY VEGETATED AREA

\* BTEX CONCENTRATIONS AS DETERMINED BY LABORATORY ANALYSIS OF MATER SAMPLES COLLECTED DURING PHASE I AND PHASE II INVESTIGATIONS. CONCENTRATIONS IN PARTS PER BILLION.

FIGURE 10c ETHYLBENZENE IMPACT TO GROUND WATER URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN







SOIL BORING LOCATION
 MONITORING WELL LOCATION
 XYLENE CONCENTRATIONS #
 ND CONCENTRATIONS BELOW DETECTION LIMITS
 HEAVILY VEGETATED AREA

\* BTEX CONCENTRATIONS AS DETERMINED BY LABORATORY ANALYSIS OF WATER SAMPLES COLLECTED DURING PHASE I AND PHASE II DWESTIGATIONS. CONCENTRATIONS IN PARTS PER BILLION.

FIGURE 10d XYLENE IMPACT TO GROUND WATER URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN

# APPENDIX A

# SOIL BORING LOGS

#### URSULA BORGERDING ESTATE **435 WOODWARD AVENUE BELOIT, WISCONSIN** OBSERVATION WELL: MW-1 BORING NUMBER: B-1 DRILLING CONTRACTOR: TWIN CITY TESTING CORP. **GEOLOGIST: KRISTINE STEHR** DRILLER: GARY WELLNER HELPER: TIM GELICHOWSKI DRILL RIG: CME 55 START DATE: MARCH 14, 1990 HOLE ADVANCED BY: H.S. 41/4" AUGER COMPLETION DATE: MARCH 14, 1990 **GROUND WATER** DEPTH TO WATER **READING DATE/TIME OBSERVATIONS Encountered During Drilling** 7.0' Oily sheen on wash water and puddled water around spoil. After Auger or Casing Pulled Strong petroleum odor from hole. DEPTH TO CAVED MATERIAL: --CAVE IN: NO YES Sample Recovery Material Change Sample Number Blows on Sampler MATERIAL CLASSIFICATION PID COMMENTS 6 Sheh (ppm) 0 12 12/18 Signature: rich 6 21.1 Petroleum odor. 3 17 1'-2.5' 2 3 Grey to black sand, some local silt or clay with pieces of cinder and brick fill material, some organic matter in bottom 4". 109\* Moist. 3.5'-5' Top 6": Grey to black sand, some local silt or clay, 3 3 2 10 5-Strong petroleum some foundry fill. odor, bottom 4". Bottom 4": Black sandy clay, few pebbles. Top 10": Black sandy clay, few pebbles. 2 6 8 16 6'-7.5' Oily sheen, top 10". Strong petroleum odor. 20.4 Middle 2": Black sand and pebbles. Bottom 4": Brown sand and silt, some pebbles. Bottom 6" wet. 10 No sample recovery. -----6 8.5'-10' 7 7 ---242 Petroleum-1 1 7 9 11'-12.5' Brown and grey silty sand, some pebbles. saturated soil. 15 20 25 Boring terminated at 14' \* Sample submitted for analysis 30

URSULA B 435 WOOD BELOIT, W	WA	RD /					
BORING NUMBE DRILLING CONT DRILLER: GARY HELPER: TIM G DRILL RIG: CMI HOLE ADVANCE	RACT ( WEI IELIC E 55	OR: 1 LNEI HOW	/SKI	OBSERVATION WELL CORP. GEOLOGIST: KRIST START DATE: MARC COMPLETION DATE	TINE STE	HR 990	990
GROUND W	ATER	1	DEPTH TO WATER	READING DATE/TIME	.	OBSE	RVATIONS
Encountered Du	ring D	rilling	2.0'		Oily shee	en on wa	ash water and
After Auger or C	asing l	Pulled					around spoil.
CAVE IN:		YES	DEPTH TO CAV	'ED MATERIAL:	Strong pe Two pho		n odor from hole. s.
Blows on Sampler Blows on Sampler Blows on Sampler Blows on Sampler Blows on Sampler Blows on Sampler Blows on Sampler	Sample Recovery	Material Change	MATERI Signature:	AL CLASSIFICATION		PID (ppm)	COMMENTS
		- 5 - - 10 - - 15 - - 20 - - 22 - - 25 -	fill. Bottom 4": fill. Underlying sandy cl with dep Boring	rown clay, sand and pebble fe Black clay, sand and pebble soils consist of dark brown to ay, silty sand and pebbles; co th; gravel at approximately 1 terminated at 12' submitted for analysis	foundry black barsens	67.4*	Wet, bottom 6". Heavily saturated soils and free product.

4	URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN											
BORING NUMBER:       B-3       OBSERVATION WELL:       MW-3         DRILLING CONTRACTOR:       TWIN CITY TESTING CORP.       GEOLOGIST:       KRISTINE STEHR         DRILLER:       GARY WELLNER       GEOLOGIST:       KRISTINE STEHR         HELPER:       TIM GELICHOWSKI       START DATE:       MARCH 14, 1990         DRILL RIG:       COMPLETION DATE:       MARCH 14, 1990         GROUND WATER       DEPTH TO WATER       READING DATE/TIME       OBSERVATIONS											990	
	GRC	DUN	D W/	ATER	1	DEPTI	H TO WATER	READING DATE/TIME		OBSE	RVATIONS	
-	ncour			-			5.0'		Strong p	etroleum	n odor from hole.	
					Pulled	•.				on orouri		
C	AVE II		NO			]	DEPTH TO CAVE	ED MATERIAL:	 			
Sample Number	Blows of 6	on San	npler 12 18	Sample Recovery	Material Change	Signatu	· · · ·	L CLASSIFICATION		PID (ppm)	COMMENTS	
	3	6	7	13		1.5'-3'	Black fine sa	nd foundry fil.		373	Petroleum odor.	
	6	8	8	13	-5-	3.5'-5'	Black sand f	oundry fill, pebbles at 8"-10" at 8"-10"	; pieces	134*	Petroleum- saturated soil.	
	4	3	1	11		6'-7.5'	Top 6": Black	s sand and pebble foundry fi Black clayey silt, little fine sar		27	Petroleum- saturated soil.	
					- 10 -							
					- 15 -							
					-20 -							
					.25 .		Boring	terminated at 13'				
								ubmitted for analysis				
					- 30 -		outpre of					
					· · · · · · · · · · · · · · · · · · ·							

4	35 \	WO	OD	WA		AVENU	STATE E						
BORING NUMBER:       B-4       OBSERVATION WELL:       —         DRILLING CONTRACTOR:       TWIN CITY TESTING CORP.       DRILLER:       GEOLOGIST:       KRISTINE STEHR         DRILLER:       GARY WELLNER       GEOLOGIST:       KRISTINE STEHR         HELPER:       TIM GELICHOWSKI       DRILL RIG:       CME 55       START DATE:       MARCH 14, 1990         HOLE ADVANCED BY:       H.S. 4¼ * AUGER       COMPLETION DATE:       MARCH 14, 1990         GROUND WATER       DEPTH TO WATER       READING DATE/TIME       OBSERVATIONS											990		
	GRO	DUN	D W/	TER	1	DEPTH	TO WATER	READING DATE/TIME		OBSE	RVATIONS		
					rilling		0.5'						
A	fter A	uger	or Ca	sing	Pulled								
C	AVE II					DI	EPTH TO CAVE	ED MATERIAL:					
Sample Number	Blows	on San 6/12	npler 12 18	Sample Recovery	Material Change	Signatur	A/	L CLASSIFICATION		PID (ppm)	COMMENTS		
						1'-2.5'	No sample i	recovery.					
	3	5	4	9	-5-	2.5'-4'	2.5'-4' Black sand, silt, clay and pebble foundry fill. 50.1 Slight petrole odor.						
	1	3	5	9		4.5'-6' 7'-8.5'	Middle 3": B	c sand, silt, clay and pebble for rown clayey sand. Black gravely sand.	oundry fill	5.3  2.8			
	4	6	6	16	- 10 -	9.5'-11'	Top 6": Brow	nne sand. vn clayey sand and gravel. Brown clayey sand.		109*	Slight petroleum odor. Wet, bottom 8".		
					- 15 -								
					-20 -								
		 			25								
					Boring terminated at 11'								
					30 - * Sample submitted for analysis								
									1				

URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN										
BORING NUMBER:       B-5       OBSERVATION WELL:       -         DRILLING CONTRACTOR:       TWIN CITY TESTING CORP.       GEOLOGIST:       KRISTINE STEHR         DRILLER:       GARY WELLNER       GEOLOGIST:       KRISTINE STEHR         HELPER:       TIM GELICHOWSKI       GEOLOGIST:       KRISTINE STEHR         DRILL RIG:       CME 55       START DATE:       MARCH 14, 1990         HOLE ADVANCED BY:       H.S. 4¼ " AUGER       COMPLETION DATE:       MARCH 14, 1990         GROUND WATER       DEPTH TO WATER       BEADING DATE/TIME       OBSERVATIONS										
GROUND WATE	R	DEPTH TO WATER	READING DATE/TIME	OBSERVATIONS						
Encountered During	Drilling	6.5'		Olly sheen on wash water.						
After Auger or Casin	g Pulled			Strong petroleum odor from hole.						
		DEPTH TO CAVE	ED MATERIAL:							
Blows on Sampler edung ungung 0 6 6 12 12 18 8 0 0	Material Change	MATERIA Signature:	L CLASSIFICATION	PID (ppm) COMMENTS						
	5 5-	4'-5.5 Black sand a 6.5'-8' Black sand a Boring t	ecovery. y fill up on augers. nd silt, some pebbles. nd silt, some pebbles.	658       Petroleum-saturated soil.         377*       Wet.         Petroleum oclor.						

4	URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN											
BORING NUMBER:       B-6       OBSERVATION WELL:       MW-6         DRILLING CONTRACTOR:       ENVIRONMENTAL & FOUNDATION DRILLING, INC.         DRILLER:       BRANDON       GEOLOGIST:       KRISTINE STEHR         HELPER:       LONNIE       START DATE:       JULY 5, 1990         HOLE ADVANCED BY:       H.S. 4¼ * AUGER       COMPLETION DATE:       JULY 5, 1990												
	GRC	DUNI	D WA	TER	ł	DEPTH	TO WATER	READING DATE/TIME		OBSE	RVATIONS	
			_		rilling		13'					
		<u> </u>			Pulled	· · · ·	<u></u>		1			
C	AVE II				YES	DE	EPTH TO CAVE	ED MATERIAL:				
Sample Number	Blows of 6	on San	npler 12 18	Sample Recovery	Material Change	Signatur	// . /	L CLASSIFICATION		PID (ppm)	COMMENTS	
4 4 3 3 3.5'-5' Gravel - No sample collected												
• • • • • • • • • • • • • • • • • • •	1	1	7	_	-5-	6'-7.5'	No sample red	-				
	3	6	5	4		7.5'-9'	Dark brown ar	nd black sandy clay foundry	fill.	5.0	Moist.	
	5	7	-9	8	- 10 -	9.5'-11'	Brown mediun	n sand and pebbles.		10.8	Moist,	
	8	11	13	14		12'-13.5'	Brown sand ar Dark grey silty	nd pebbles, little silt or clay. v sand layer at 7"-8".		16.2*	Wet, bottom 8".	
	4	5	11	12	- 15 -	14.5'-16'		n medium and coarse sand a	and	1.6	Wet. Slight petroleum	
							pennies.				odor.	
	4	5	9	12		17'-18.5'	Top 6": Greyis and pebble	sh-brown medium and coars	e sand	1.0	Wet.	
					20 -			own medium sand, few pebb	oles.			
	<b> </b>											
					25							
		Boring terminated at 19'										
					- 30 -		* Sample si	ubmitted for analysis				
							•	-				

4	URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN											
DF DF HE DF	BORING NUMBER:       B-7       OBSERVATION WELL:       MW-7         DRILLING CONTRACTOR:       ENVIRONMENTAL & FOUNDATION DRILLING, INC.         DRILLER:       BRANDON       GEOLOGIST:       KRISTINE STEHR         HELPER:       LONNIE       START DATE:       JULY 5, 1990         HOLE ADVANCED BY:       H.S. 4 <sup>1</sup> /4 * AUGER       COMPLETION DATE:       JULY 5, 1990											
	GRC	UN	D WA	TER	1	DEPTH	TO WATER	READING DATE/TIME		OBSE	RVATIONS	
					rilling		4.5'		Oily shee	en on wa	ash water.	
					Pulled							
C/	AVE IN		NO		YES	DE	PTH TO CAVE	ED MATERIAL:				
Blows on Sampler Blows on Sampler 0 6 6 12 12 18 8 8 8 1 12 18 8 8 8 1 12 18 8 8 8										COMMENTS		
	5	9	7	13		1'-2.5'		brown sandy clay, some pet ht brown clayey silt, some pe		15.7	Foundry glass.	
	30	11	3	10	-5-	3.5'-5'	Bottom 5": Da	ark brown to black sandy fou foundry fill. wn sand and pebbles.	ndry fill.	21	Wet, bottom 5". Petroleum odor.	
	wt	1	1	8		6'-7.5'		ark brown clayey foundry fill.		21.6*	Oily sheen. Strong petroleum	
	wt	wt	wt	15	- 10 -	8.5'-10'	Top 3": Black, Bottom 12": E	, sandy foundry fill. Black clay		15.7	odor. Petroleum odor. Organic texture.	
	3	3	3	18		11'-12.5'	Top 6": Black	, organic clay. Grey and black clay.		11.7	Pieces of wood, roots.	
					- 15 -					····	Moist.	
					-20 -							
2525												
	Boring terminated at 12'											
							-					
					-30		* Sample si	ubmitted for analysis				

4	35 \	NO	OD	WA		AVENU	STATE E							
DR DR HE DR	RILLIN RILLE ELPEI RILL F	IG C R: <b>B</b> R: <b>L</b> ( RIG: 1	ONTI RAN ONN CME	IDON IIE 55	OR: E	ENVIRONI		OBSERVATION WELL DUNDATION DRILLING, GEOLOGIST: KRIST START DATE: JULY COMPLETION DATE:	INC. INE STE 5, 1990					
	GRC	UNI	D WA	ATER	1	DEPTH	TO WATER	READING DATE/TIME		OBSEI	RVATIONS			
Er	ncour	ntere	d Dur	ing D	rilling		3'		Oily sh		wash water.			
Af	ter Au	lger	or Ca	sing	Pulled						rasi i water.			
CA						DE	EPTH TO CAVE	ED MATERIAL:						
Sample Number	Blows of 6	on San 6 12	npler 12 18	Sample Recovery	Material Change	Signatur		L CLASSIFICATION		PID (ppm)	COMMENTS			
	-			-		1'-2.5'								
	1	1	1	_5		3.5'-5'		a sandy clay and pebbles. In brown silty clay, some fine	sand.	_57	Wet. Petroleum odor.			
	wt	1	1	8	- 5-	6'-7.5'		Ity clay, some fine sand.	Carlar	14.4	Wet. Oily sheen on soil. Petroleum odor.			
	1	1	1	18		8.5'-10'	Dark brown in	terbedded sand and organic	clay.	1.7*	Petroleum odor. Wet. Oily sheen on soil.			
	wt	wt	1		10 -	11'-12.5'	No sample re	coverv			Petroleum odor.			
	3	6	6	10			•	n fine sand, few pebbles.		2.2	Wet			
		-			15 -	10.0 10					Oily sheen on soil. Petroleum odor.			
					-20 -									
										·				
					25									
						Boring terminated at 13.5'								
					- 30 -	* Sample submitted for analysis								
			<b></b>											

4	URSULA BORGERDING ESTATE 435 WOODWARD AVENUE BELOIT, WISCONSIN											
DI DI HI DI	RILLE ELPEI RILL F	NG C ir: <b>b</b> r: <b>l</b> rig:	ONTI RAN ONN CME	RACT I <b>DON</b> IIE 55	TOR: E	ENVIRON . 4 <sup>1</sup> ⁄4 • AU		OBSERVATION WELL OUNDATION DRILLING, GEOLOGIST: KRIST START DATE: JULY COMPLETION DATE:	INC. INE STE 6, 1990			
	GRC	DUN	D W/	<b>\TE</b> F	ł	DEPTH	TO WATER	READING DATE/TIME		OBSE	RVATIONS	
E	ncour	ntere	d Dur	ing D	rilling		3.5'		Black (		en on wash water.	
A	fter Au	uger	or Ca	sing	Pulled	1			Diack, C	my snee	an on wash water.	
C,	AVE II					D	EPTH TO CAVE	ED MATERIAL:				
Sample Number	Biows 06	on San 6 12	npler 12 18	Sample Recovery	Material Change	Signatu		L CLASSIFICATION		PID (ppm)	COMMENTS	
	3	3	2	8		1'-2.5'	Top 3": Concre	ete spoil.		5.5		
Middle 1": Black foundry fill.												
	2	2	1	6	- 5-	3.5'-5'		nd pebbles, silty at tip.		60.8	Wet. Petroleum odor.	
	3	5	7	4		6'-7.5'	Black sand and	d pebble foundry fill.		128*	Wet.	
	wt	wt	3	_		8.5'-10'	Brown sand - I	No sample recovery.		-	Petroleum odor. Black water.	
			<u> </u>		10 -						Oily sheen. Petroleum odor.	
	wt	wt	wt			11'-12.5'	Black organic	sandy clay.		8.6	Black water. Oily sheen.	
											Petroleum odor.	
	1	 		<u> </u>	15 -							
					- 20 -							
							•					
					25							
						Boring terminated at 8.5'						
<u> </u>												
					- 30 -		* Sample si	ubmitted for analysis				

4	35 \	NO	OD	WA		AVENU	ESTATE IE				
Di Di Hi Di	RILLIN RILLE ELPEI RILL F	ig C R: <b>B</b> R: <b>L</b> Rig:	ONTI RAN ONN CME	RACT I <b>DON</b> IIE 55	1	ENVIRON . 4¼ • AU		OBSERVATION WEL OUNDATION DRILLING GEOLOGIST: KRIS START DATE: JULY COMPLETION DATE	, INC. IINE STE 6, 1990	HR	
	GRC	DUN	D W/	ATER	1	DEPTH	I TO WATER	READING DATE/TIME		OBSE	RVATIONS
					rilling		3.5'		Oily sh	een on v	vash water.
					Pulled				4		
C/	AVE IN		NO		YES	C	EPTH TO CAVE	ED MATERIAL:			
Sample Number	Blows of 0 6	on San 6/12	npler 12 18	Sample Recovery	Material Change	Signatu				PID (ppm)	COMMENTS
	5	3	3	10		1'-2.5'	Top 2": Sand a	and gravel.		429	Layers of waste
								ck sand, little clay, pebble fo	oundry		paint and paper. Strong solvent
	4	2	4	12	_ 5_	3.5'-5'		ill and reddish-brown sand.		12.1	odor. Wet, bottom 4".
	2	3	5	16		6'-7.5'	Dark brown an	id black sandy clay, some p	ebbles.	42.5*	Solvent odor. Black water. Petroleum odor.
	4	4	2	6	40	8.5'-10'	Grey medium a	and fine sand and pebbles.		119	Wet. Oily sheen.
					- 10 -						Petroleum odor.
					- 15 -						
					- 20 -						
				 	25						
							Boring	terminated at 8.5'			
					- 30 -		* Sample si	ubmitted for analysis			
									i		

4	35 \	NO	OD	WA		AVENU	estate Je				
DF DF HE DF	RILLE ELPEI RILL F	IG C R: <b>B</b> R: L R: L R: C	ONTI RAN ONN CME	RACT Don IIE 55	OR: I	ENVIRON		OBSERVATION WELL DUNDATION DRILLING, GEOLOGIST: KRIST START DATE: JULY COMPLETION DATE:	INC. INE STE 6, 1990		
	GRC	UN	D WA	TER	1	DEPTH	I TO WATER	READING DATE/TIME		OBSE	RVATIONS
					rilling		4.5'		Oilv she	een on v	vash water.
A	fter Au	lger	or Ca	sing	Pulled						
	AVE IN		NO		YES			ED MATERIAL:			·
걸구	Blows of 6	on San 6/12	npler 12 18	Sample Recovery	Material Change	Signatu				PID (ppm)	COMMENTS
	2	3	4	12		1'-2.5'	Top 11" Brown	n sand and pebbles.		15.2	
	2	3	4	12		1-20		ck sand and pebbles.	fill.		
	2	4	8	8		3.5'-5'		black medium and cosrse s		9.1	Wet, bottom 5". Petroleum odor.
				- 10	- 5-	$\alpha = c$	•	•		13.6*	Wet.
	1	1	_1	13		6'-7.5'	Black organic	sandy clay, few pebbles.		10.0.	Oily sheen on soil. Petroleum odor.
	3	5	5	3	10	8.5'-10'	Black clayey sa collected.	and, few pebbles - No sampl	e		Wet. Oily sheen on soil.
					- 10 -						Petroleum odor.
					- 15 -						
					- 20 -						
					25						
			•								
							Boring	terminated at 8.5'			
							<b>* O</b>	demonstrated for a second sector			
					- 30 -		* Sample si	ubmitted for analysis			

#### APPENDIX B

### WELL CONSTRUCTION LOGS

State of Wisconsin			ONITORING WELL CONST rm 4400-113A	RUCTION 8-89
Department of Natural Resources	Grid Location	ro.		0-09
	Und Location	ft. 🖸 N. 🗖 S.	Well Name	
COLD SPRING RESOURCES Facility License, Permit or Monitoring Number			MW-1 Wis. Unique Well Number	DNR Well Number
		ft. 🖸 E. 🖸 W.		
Type of Well Water Table Observation Well 🖾 11	Section Location		Date Well Installed	
Piezometer 12	NE 1/4 of ALE	$1/4$ of Section $5^{+}$ ,	m r	$\frac{3}{m}$ $\frac{1}{d}$ $\frac{4}{d}$ $\frac{9}{y}$ $\frac{9}{y}$
Distance Well Is From Waste/Source Boundary	T N. R	E W E U W	Well Installed By: (Person's GARY WELLNER	i Name and Firm)
ft. Is Well A Point of Enforcement Std. Application?	Location of Well Relati	ve to Waste/Source	GARI WEDDNER	
☐ Yes □ No	Downgradient		TWIN CITY TES	TING CORP.
A. Protective pipe, top elevation f	I. MSL	1. Cap and lo		12 Yes [] No
B. Well casing, top elevationSf	. MSL	2. Protective a. Inside di	••	_ <u>4</u> .0 in.
C. Land surface elevation95.77 f	· MSL	b. Length:		<u>7</u> .0 fr.
D. Surface seal, bottom ft_MSL or _1		c. Material	1:	Steel 1 × 04
				Other 🛛 🛄
12. USCS classification of soil near screen:	/ where it		nal protection? lescribe:	□ Yes Ď No
				Bentonite 🛛 30
Bedrock		3. Surface sea	<b>п</b> :	Concrete 🖾 01
13. Sieve analysis attached?  Yes	N 100			Other 🛛 🧾
14. Drilling method used: Rotary Hollow Stem Auger		• 4. Material be	tween well casing and protect	Bentonite 🔲 30
			Annu	ular space seal
				Other 🛛
15. Drilling fluid used: Water 🛛 02 Air 🖾		5. Annulær sp		ular Bentonite 🖾 33
Drilling Mud 🔲 03 None 🕰	″   📓		s/gal mud weight Bentoni	
16. Drilling additives used? 🖸 Yes XI N	ნ 👹		s/gal mud weight Be Bentonite Bentonite	
			Ft <sup>3</sup> volume added for any	
Describe	👹	How install	icd:	Tremie 🔲 01
17. Source of water (attach analysis):			Tre	emie pumped 🔲 02
	💹		_	Gravity 🖸 08
	10.	6. Bentonite s		onite granules 🔲 33
E. Bentonite scal, top ft. MSL or	1.9 m.		in. 🛛 3/8 in. 🗖 1/2 in. Ben NE	
F. Fine sand, top ft. MSL or	2 <u>0</u> ft.	7. Fine sand r	naterial: Manufacturer, prod	luct name and mesh size
			#9099 SILICA S dedft <sup>3</sup>	SAND
G. Filter pack, top ft. MSL or	= .=		material: Manufacturer, prod	luct name and mesh size
H. Well screen, top ft. MSL or	<u>4</u> <u>0</u> ft	RED_F	LINT, #30 FLINT	
I. Well screen, bottom ft. MSL or _1_	3.0 ".	Volume ad 9. Well casin	g: Flush threaded PVC	schedule 40 🔯 23
J. Filter pack, bottom ft. MSL or _1_			Flush threaded PVC	schedule 80 🔲 2.4 Other 🔲
J. Piller pack, boltom L		10. Screen mat	enial: FLUSH THREWED PV	
K. Borchole, bottom ft. MSL or _1_	4.0 ft.	Screen type	e:	Factory cut XI 11
			Co	ntinuous slot 🔲 01
L. Borchole, diameter <u>8</u> 0 in.			er MONOFIEX, INC.	Other 🛛
M. O.D. well casing <u>225</u> in.		Slot size:		0.010_ in.
M. O.D. well casing $222$ p in.		Slotted len	gth:	10.Q ft.
N. I.D. well casing $200$ in.		11. Backfill ma	iterial (below filter pack):	None 🖸
I hereby certify that the information on this	form is true and c	correct to the best of m	y knowledge.	
Signature	Firm	TY TESTING CORP		

TWIN CITY TESTING CORPORATION Please complete and return both sides of this form as required by chs. 144, 147 and 160, Wis, Stats., and cn. NR 141, Wis, Adm. Code. In accordance with ch. 144, Wis Stats., tailure to file this form may result in a forfeiture of not less d.an 510, nor more than \$5,000 for each day of violation. In accordance with .n. 147, Wis, Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. In accordance with .n. 147, Wis, Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. #OTE: Shaded areas are for DNR use only. See instructions for more information. .

Facility/Project Name	£ 1:	Well Name DI ///////				
License, Permit or Monitoring Nymber		Wis. Unique Wéll Nu	mber DNR W	ell Number		
1. Can this well be purged dry?	Gra DNo	11. Depth to Water	Before Development	After Development		
2. Well development method surged with bailer and bailed surged with bailer and pumped	×127 <sup>2</sup> 4 1 □ 6 1	(from top of well casing)	<u>2</u> ft.	ft.		
surged with block and bailed surged with block and pumped surged with block, bailed and pumped	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Date		$\frac{23115}{m m d d y y}$		
compressed air bailed only		Time	<u>-28</u> : <u>15</u> p.m.	<u>@j:@j=p.m.</u>		
pumped only pumped slowly Other		<ul><li>12. Sediment in well bottom</li><li>13. Water clarity</li></ul>	Clear 10			
3. Time spent developing well	min.	statut win . at a time them	Turbid 22-2 5 (Describe) Georgish U	Turbid [] 25 (Describe) <u>Aleur if Kru</u>		
4. Depth of well (from top of well casisng)	_ <u>3.4</u> îr.	lande fel 30 in to recherge	Shin, sitist	466's pury rel		
5. Inside diameter of well	<u>/8</u> in.			******		
6. Volume of water in filter pack and well casing	gal.	Fill in if drilling fluids	were used and well is a	t solid waste facility:		
7. Volume of water removed from well	<u> </u>	14. Total suspended	mg/l			
8. Volume of water added (if any)	<u></u> gal.	solids				
9. Source of water added		15. COD	mg/l	mg/l		
10. Analysis performed on water added? (If yes, attach results)	Yes No	•	'			

Additional comments on development:

Well developed by: Person's Name and Firm	I hereby certify that the above information is true and correct to the best of my knowledge.
Name: Kistille M. Sihr	Signature: Brifin Ida Sector
Firm: Dunies & Moore Ltd.	Firm: Drilles + Maire, Hel.

NOTE: Shaded areas are for DNR use only. See instructions for more information.

State of Wisconsin Department of Natural Resources			ONITORING WELL CONSTRU rm 4400-113A	UCTION 8-89	
Facility/Project NameURSULA BORGERDING	Grid Location		Well Name	<u></u>	
COLD SPRING RESOURCES		fL. 🖸 N. 🗖 S.	MW-2		
Facility License, Permit or Monitoring Number		ft. 🖸 E. 🗖 W.	Wis. Unique Well Number	DNR Well Nu	mber
Type of Well Water Table Observation Well [211]	Section Location		Date Well Installed 03	$\frac{1}{4}\frac{4}{4}\frac{90}{y}$	
Piezometer 12		1/4 of Section <u>35</u> ,	Well Installed By: (Person's N	<u>' a a ' y y</u>	
Distance Well Is From Waste/Source Boundary	T_/_N, R_/?	MED W	GARY WELLNER	vame and rim)	
ft. Is Well A Point of Enforcement Std. Application?	Location of Well Relative	to Waste/Source			
	Downgradient	Not Known	TWIN CITY TESTI	NG CORP.	
A. Protective pipe, top elevation f	1. MSL	1. Cap and lo		🛛 Yas 🛛	No
B. Well casing, top elevation $-97.9$ f		2. Protective a. Inside di		_4.	0 in
C. Land surface elevation $-15.17$ f	MSL	b. Length:		_2.	
D. Surface seal, bottom ft. MSL or	7 ft.	c. Materia	l:		
12. USCS classification of soil near screen:		d Addition	nal protection?	Other []	
$\Box GP \Box GM \Box GC \Box GW \Box SW \Box SP$	1 ( 100 C		lescribe:	-	140
					30
Bedrock		3. Surface sea	d:	· · · · · · · · · · · · · · · · · · ·	01
13. Sieve analysis attached? I Yes I Yes	1 100	X		Other 🗖	loch. Mar an
14. Drilling method used: Rotary		4. Material be	etween well casing and protective	• •	
Hollow Stem Auger		×.		Bentonite 🛛	30
Other 🛛	\ 🐰		Amula	ur space seal	÷
15. Drilling fluid used: Water 0 02 Air 0	01	5. Annular sp	Cranuli	Other D ar Bentonite X	33
Drilling Mud 🖸 03 None 🖾	99		s/gal mud weight Bentonite		35
			s/gal mud weight Benta		31
16. Drilling additives used? 🖸 Yes 🖾 N	•o 🕺		Bentonite Bentonite-co	ement grout	50
Describe			6 Ft <sup>3</sup> volume added for any o		<u>.</u> .
17. Source of water (attach analysis):		How install		Tremie	01
			1101	Gravity	02 08
			Benton	ite granules	
fr AISL or	7 6	6. Bentonite s	in. $\Box 3/8$ in. $\Box 1/2$ in. Bento		33
E. Bentonite scal, top ft. MSL or	- /; "`\ 📓		ONE	Other 🛛	52
F. Fine sand, top ft. MSL or	1.2 <sup>ft</sup>	7. Fine sand r ARCO	material: Manufacturer, produc #9099 SILICA SA	t name and mesh	1 size
G. Filter pack, top ft. MSL or	1 5 1	Volume ad	2 2 2 3		
• • •			material: Manufacturer, produc	ct name and mesh	h size
H. Well screen, top ft. MSL or	2_0 ft	RED F		SAND	
		Volume ad		hadula 40 57	23
I. Well screen, bottom ft. MSL or _1		9. Well casin	Flush threaded PVC sc		
J. Filter pack, bottom ft. MSL or _ 1	2 0 ft.			Other 🛛	
6 MGT 1	2 0 6		terial: FLUSH TIREADED	<u>PAC_SLHED</u> Factory cut	11
K. Borchole, bottom ft. MSL or _1	<u></u>	Screen typ		inuous slot	01
L. Borchole, diameter 8 0 in.		A A	Com	Other 🛛	01
L. Borchole, diameter _ 8 0 in.		Manufactur	er MONOFLEX, INC.		
M. O.D. well casing $2225$ in.		Slot size:		0.QL	
		Slotted len			. Q ft.
N. I.D. well casing <u>2</u> <u>0</u> o in.			aterial (below filter pack):	None 🖄	
I hereby certify that the information on this	form is true and co	rrect to the best of m	y knowledge.	<u></u>	
Signature Wark A trautar	Firm	TY TESTING COR			

TWIN CITY TESTING CORPORATION Please complete and return both sides of this form as required by chs. 144, 147 and 160, Wis, Stats., and cn. NR 141, Wis, Adm. Code. In accordance with the 144, Wis Stats., failure to file this form may result in a forteiture of not less data \$10, nor more than \$5,000 for each day of violation. In accordance with the 147, Wis, Stats., failure to file this form may result in a forteiture of not more than \$10,000 for each day of violation. In accordance with the 147, Wis, Stats., failure to file this form may result in a forteiture of not more than \$10,000 for each day of violation. SOTE: Shaded areas are for DNR use only. See instructions for more information.

Facility/Project Name		Well Name			
License, Permit or Moritoring Number		Wis. Unique Well Number DNR Well Number			
<ol> <li>Can this well be purged dry?</li> <li>Well development method surged with bailer and bailed surged with bailer and pumped surged with block and bailed surged with block and pumped surged with block, bailed and pumped compressed air</li> </ol>	☐ Yes ☐ Pho ☐ Yes ☐ Pho ☐ 4 1 ☐ 6 1 ☐ 4 2 ☐ 6 2 ☐ 7 0 ☐ 2 0	<ul> <li>11. Depth to Water (from top of well casing)</li> <li>Date</li> <li>Time</li> </ul>		After Development	
bailed only pumped only pumped slowly Other 3. Time spent developing well 4. Depth of well (from top of well casisng) 5. Inside diameter of well	$ \begin{array}{c}     1     0 \\                          $	12. Sediment in well bottom 13. Water clarity /apt bischy to che v. 14w-1	Clear 10 Turbid	Clear 220 Turbid 25 (Describe)	
<ul> <li>6. Volume of water in filter pack and well casing</li> <li>7. Volume of water removed from well</li> <li>8. Volume of water added (if any)</li> </ul>	43 gal. 3 gal. gal.	Fill in if drilling fluids 14. Total suspended solids	were used and well is a	mg/l	
<ul> <li>9. Source of water added</li> <li>10. Analysis performed on water added? (If yes, attach results)</li> </ul>	Yes No	15. COD	mg/l	mg/l	

Additional comments on development:

.

ì.

Well dev	eloped by: Person's Name and Firm	l hereby cer of my know	tify that the above information is true and correct to the best $edge. 2^{-\alpha}$
Name:	Gistine M. Sehr	Signature:	Betall. Stehr
Firm:	Dances 4 Moore, Ud.	Firm:	Dan + Picca Itdi

NOTE: Shaded areas are for DNR use only. See instructions for more information.

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State of Wisconsin Department of Natural Resources			DNITORING WELL CON rm 4400-113A	STRUCTION 8-89
Facility/Project Name URSULA BORGERDING	Grid Location		Well Name	
COLD SPRING RESOURCES				
Facility License, Permit or Monitoring Number		ft. 🖸 E. 🖸 W.	Wis. Unique Well Numbe	r DNR Well Number
Type of Well Water Table Observation Well [21]	Section Location		Date Well Installed	
Piezometer	NE 1/4 of MEI	14 of Section 54		$\frac{3}{m} \frac{3}{14} \frac{14}{4} \frac{90}{5}$
Distance Well Is From Waste/Source Boundary			Well Installed By: (Pers	on's Name and Firm)
ft.	TN, R Location of Well Relative		GARY WELLNEI	
Is Well A Point of Enforcement Std. Application?	Upgradient	Sidegradient		
	Downgradient	Not Known	TWIN CITY TI	
	i. MSL	1. Cap and lo 2. Protective		Yes 🖸 No
B. Well casing, top elevation $- \frac{9 \times 11}{2}$ f	1. MSL	a. Inside di	ameter:	$\frac{4}{2} \cdot \frac{0}{2}$ in.
C. Land surface elevation $-16.17$ f	MSL	b. Length: c. Material		$\begin{bmatrix} 7 & 0 \\ 5teel \end{bmatrix} \begin{bmatrix} 7 & 0 \\ 0 \end{bmatrix} fL$
D. Surface seal, bottom ft. MSL or	1.0 ft.	N	•	Other 🔲
12. USCS classification of soil near screen:		d. Addition	nal protection?	Yes X No
		If yes, d	escribe:	
		3. Surface sea	.t.	Bentonite 🔲 30
	. \ 🕅		ц.	Concrete 🖾 01
13. Sieve analysis attached? 🖸 Yes 🎦 N		× · · · · · · · · · · · · · · · · · · ·		Other 🛛 🔄
14. Drilling method used: Rotary		NA. Material be	tween well casing and prot	· · ·
Hollow Stem Auger				Bentonite 🔲 30
Other 🖸			A	mular space seal
15. Drilling fluid used: Water 🛛 02 Air 🗖	01			anular Bentonite 🖾 33
Drilling Mud 03 None 2	- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5. Annulær sp	s/gal mud weight Bent	
			s/gal mud weight	
16. Drilling additives used? 🖸 Yes 🖄 N	√o   ∭	§ %	Bentonite Bentor	uite-cement grout 50
		0.19	Ft <sup>3</sup> volume added for	
Describe	🕅 🕅	How install		Tremie 🗖 01
17. Source of water (attach analysis):				Tremie pumped 0 02
	&			Gravity 🖄 08
	× 1	6. Bentonite s		entonite granules 🔲 33
E. Bentonite seal, top ft. MSL or	1.0 m		in. $\Box 3/8$ in. $\Box 1/2$ in. 1	
F. Fine sand, top ft. MSL or	2.0 ft.	NOI 7. Fine sand p		roduct name and mesh size
		ARCO,	#9099 SILICA	SAND
G. Filter pack, top ft. MSL or	≤. <sup>2</sup> , <sup>™</sup> \	Volume add		roduct name and mesh size
H. Well screen, top ft. MSL or	3.0 ft		INT, #30 <u>FLIN</u>	
		Volume add		3
I. Well screen, bottomft. MSL or _1	3 0 ft.	9. Well casin	0	VC schedule 40 X 23 VC schedule 80 24
fr MSL or 1	30 // 图		Plusit uncaded 1	Other 🛛
J. Filter pack, bottom ft. MSL or _ 1			enial:FLUSH THREADED F	
K. Borchole, bottom ft. MSL or $1$	30 ft.	Screen type		Factory cut 🖾 11
K. Borenole, Boltom				Continuous slot 🔲 01
L. Borchole, diameter 8 0 in.		<u>ع</u> ر		Other 🛛 🔤
		Manufacture	er MONOFLEX, INC.	0.010 in.
M. O.D. well casing $225$ in.		Slot size:	arb •	10.0_10.m.
		Slotted leng		None 🖾
N. I.D. well casing $2.00$ in.		`11. Backfill ma	iterial (below filter pack):	Other
I hereby certify that the information on this	form is true and cor	rect to the best of m	y knowledge.	
Signature	Firm			
		PV TESTING COE	DODATION	

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Please complete and return both sides of this form as required by chs. 144, 147 and 160, Wis, Stats., and cn, NR 141, Wis, Adm. Code. In accordance with ch. 144, Wis Stats., failure to tile this form may result in a forteiture of not less data 510, nor more than \$5,000 for each day of violation. In accordance with i.n. 147, Wis, Stats., failure to tile this form may result in a forteiture of not more than \$10,000 for each day of violation. In accordance with i.n. 147, Wis, Stats., failure to tile this form may result in a forteiture of not more than \$10,000 for each day of violation. In accordance with i.n. 147, Wis, Stats., failure to tile this form may result in a forteiture of not more than \$10,000 for each day of violation. SoTE: Shaded areas are for DNR use only. See instructions for inore information.

Facility/Project Name	Well Name					
License, Permit or Moniforing Number		Wis. Unique Well Number DNR Well Number				
1. Can this well be purged dry?	□Yes y⊒⊂No	11. Depth to Water	Before Development			
2. Well development method surged with bailer and bailed surged with bailer and pumped	→ <b>E</b> 41 □ 61	(from top of well casing)	<u>f</u> . <u>Ze</u> , ft.	ft.		
surged with block and bailed surged with block and pumped surged with block, bailed and pumped	□ 4 2 □ 6 2 □ 7 0	Date		$\frac{\omega \beta}{m m} \frac{1}{d} \frac{\beta}{d} \frac{\beta}{y} \frac{\beta}{y}$		
compressed air bailed only		Time				
pumped only pumped slowly Other		<ul><li>12. Sediment in well bottom</li><li>13. Water clarity</li></ul>	inches			
3. Time spent developing well	pin.	Kept bischig	Turbid 2 1 5 (Describe)	Turbid □ 25 (Describe) <u></u>		
4. Depth of well (from top of well casisng)	_ <u>/</u> 2.Zn	10 6 6.1 11 (1.5-1	String sites	funger		
<ol> <li>Inside diameter of well</li> <li>Volume of water in filter pack and well</li> </ol>	<u> </u>					
casing	<u> </u>	Fill in if drilling fluids	were used and well is a	t solid waste facility:		
<ol> <li>Volume of water removed from well</li> <li>Volume of water added (if any)</li> </ol>	gal.	14. Total suspended solids	mg/l	mg/l		
9. Source of water added (in ally)	Kai.	15. COD	mg/l	mg/l		
10. Analysis performed on water added? (If yes, attach results)	Yes No			· · ·		

Additional comments on development:

Well dev	eloped by: Person's Name and Firm	l hereby cer of my know	tify that the above information is true and correct to the best reduct ~ ~
Name:	Toish. M. Sull	Signature:	Bisti II. Shi
Firm:	Duris + Maine, Ucl.	Firm:	Tyrais & Marie, Hel.

NOTE: Shaded areas are for DNR use only. See instructions for more information.

State of Wisconsin Department of Natural Resources		M	ONITORING WELL CO prm 4400-113A	
Faculty/Project Name	Grid Location		Well Name	8-89
Dorijerding Estate Facility License, Permit or Monitoring Number		fL □ N. □ S.	Wis. Unique Well Num	- 6
Facility License, Fernit of Monitoring Humber		ft. 🖸 E. 🖸 W.	Wis. Unique Well Num	ber DNR Well Number
Type of Well Water Table Observation Well 1911	Section Location		Date Well Installed	
Piezometer (112	NE 1/4 of NE 1	14 of Section 35	CARE WEI INSUMED	<u>07.105196</u>
Distance Well Is From Waste/Source Boundary	T / N.R 12	A	Well Installed By: (Per	son's Name and Firm)
Is Well A Point of Enforcement Std. Application?	Location of Well Relative	10 Waste/Source	proton	Brandon
	Upgradieni	Sidegradient		We Foundation
	Downgradient	Not Known 1. Cap and lo		
() 4 6 9 4		2. Protective		Yes D No
•		a. Inside du	••	21 in.
C. Land surface elevation $-97.25$ f	· MSL	b. Length:		211
D. Surface seal, bottomfL MSL or	-7 m	c. Material		Stoel DX 04
12. USCS classification of soil near screen:	- Joint -	d. Addition	al protection?	
			scribe:	D Yes DÍ No
D SM D SC D ML D MH D CL É CH		3. Surface seal		Bentonite 🛛 30
13. Sieve analysis attached? 🖸 Yes 🖓 N	. \ 📓 🕅		•	Concrete 🖉 01
14. Drilling method used: Rotary [] 5	N 124 12			Other D
Hollow Stem Auger [2] 4		V. <b>- 4. IVIALES LEL DEL</b>	ween well casing and pro	Bentonite 🔲 30
		X	A	mular space seal
		H		Other 🛛
15. Drilling fluid used: Water □ 02 Air □ 0 Drilling Mud □ 03 None 1 9		5. Annular spa	ce seal: Gr	anular Bentonite EX 33
		4	gal mud weight Bent	=
16. Drilling additives used? 🖸 Yes 💷 No	, <u> </u>	1 Lbs/	gal mud weight Bentunite – – – – – – – – – – – – – – – – – – –	Bentonite slurry  3 1 ute-coment grout  3 50
Describe		0.88	_Ft <sup>3</sup> volume added for a	any of the above
17. Source of water (attach analysis):		How installed	1:	Tremme 🔂 01
			·	Tramic pumped [] 02
	J 🔯 🕅			Gravity 15 08
E. Benionite scal, top fi. MSL or	50n. 🗑 🕅	6. Bentonile sei		ntonite granules 📋 33
	··- ·· 🛛 📓	C11/4 III.	$\square 3/8 \text{ in. } \square 1/2 \text{ in. } B$	enionite pellets 🔲 32
F. Fine sand, up fL MSL or 4	/ o fi~ 🔪 🕅 🖉	7. Fine sand ma	/	oduci name and mesh size
		ARCO	#9090 SIL	CA SAND
G. Filter pack, top ft. MSL cr		Volume added	"	
H. Well screen, cop ft. MSL or				oduct name and mesh size
		Volume addee		FILA)TSAND
. Well screen, bottom ft. MSL or _ 17	On I	9. Well casing:		C schedule 40 🐹 23
			Flush threaded PV	C schedule 80 🔲 24
. Filter pack, bottom ft. MSL or $\_//$			The Third	Other D
(. Borchole, bottom ft. MSL a ]	70 ft.		1: FICH IHREA	DEDPLCSCHEDCH
		Screen type:	С	Factory cut 2 11 ontinuous slot 0 01
. Borehole, diameter <u>80</u> in.				Other 🛙
		Manufacturer	HOND FIFX,	INC.
1. O.D. well casing $222$ in.		Slot size:		0. [2] [ <u>C</u> in.
		Sloued length:		<u>لو.ن</u> ft.
1. 1.D. well casing _ <u>2.0</u> in.			al (below filter pack):	None )8.
hereby certify that the information or this fo	orm is true and corre-	ct to the best of my k	nowledge.	
isruptice	Firm		111	·····
This Mo Yill	1 Xipicis	Y Milite, L.	108.	

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PRESE complete and return both sides of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with ch. 144, Wis Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not nore than \$10,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. Next Press Shaded areas are for DNR use only. See instructions for more information.

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Facility/Project Name Participa Estate License, Permit or Monitoring Number	Well Name M110-4				
License, Permit br Monitoring Number		Wis. Unique Well Number DNR Well Number			
1. Can this well be purged dry?	Yas LA No	11. Depth to Water	Before Deve	lopment	After Development
2. Well development method surged with bailer and bailed surged with baler and pumped surged with block and bailed surged with block, bailed and pumped compressed arr bailed only pumped only pumped slowly Other	6 1 4 2 6 2 7 0 2 0 1 0 5 1 5 0	(from top of well casing) Date Time 12. Sediment in well bottom 13. Water clarity	<u>07, 11</u> m m d d <u>2</u> : <u>00</u>  Clear <b>1</b> 10	$\frac{190}{y}$	$-\underline{12} \cdot \underline{97} \text{ ft.}$ $\overline{\text{m m d d y y}}$ $\underline{3} : \underline{30} \underbrace{\text{m m.}}_{\text{m m.}}$ $\underline{-} \cdot \underline{\text{inches}}$ Clear $\underline{320}$
4. Depth of well (from top of well casising) 5. Inside diameter of well			Turbid (20) ( Describe)	5	Turbid [] 25 (Describe) <u>Clittering after</u> <u>- 30 gals purp</u> ect
	<u>5.7</u> gal. 15. gal.	Fill in if drilling fluids	were used and	 well is at	solid waste facility:
8. Volume of water added (if any)		14. Total suspended solids		mg/l	mg/l
9. Source of water added		15. COD .		my∕l	mg/l
10. Analysis performed on water added?	Yes D No	ſ		1	

Additional comments on development:

Well dev	eloped by: Person's Name and Firm	I hereby cer of my know	rify that the above information is true and correct to the best vietge.
Name:	Kristing M. Stehr	Signature:	Joisin My Silver
Fum:	Damis & Mittle	Firm:	Dames + Moore, 14.

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NOTE: Shaded areas are for DNR use only. See instructions for more information.

Facility License, Permit or Monutoring Number       Image: Constant of Monutoring Number         Type of Well       Water Table Observation Well-Cldd       Section Location         Pictometer       Total       NE       1/4 of NE         Distance Well Is From Waste/Source Boundary       T       N. R       N. R         Is Well A Point of Enforcement Std. Application?       Distance Well Relative to Was	<ul> <li>N. D. S.</li> <li>E. D. W.</li> <li>Ction 35</li> <li>W.</li> <li>Course degradient of Known</li> <li>1. Cap and loc</li> <li>2. Protective of a. Inside dua b. Length:</li> <li>c. Material:</li> <li>d. Additional If yes, degradient of Yes, degradient</li></ul>	cover pipe:
Exact Control       Control<	E. W. Ction <u>35</u> W. Characteria Normalized Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control C	Mis. Unique Well Number       DNR Well Number         Date Well Installed $() 10517$ $mm$ $d$ $y$ Well Installed       By: (Person's Name and Firm) $DR$ $A$ $DCA$ $L$ $A$ $DCA$ $L$ $A$ $DCA$ $Ck?$ $Ck$ $Ck$ cover pipe: $1/2$ $2/2$ uncter: $1/2$ $2/2$ $al$ $protection?$ $Dk$ $scnbe:$ $Bentonite$ $30$
Type of Well Water Table Observation Well-Old Piczometer Distance Well Is From Waste/Source Boundary It Is Well A Point of Enforcement Std. Application? Yes No A Protective pipe, top elevation Section of Well Relative to Wasters Well casing, top elevation C. Land surface elevation Surface seal, bottomft. MSL orft. Surface seal, bottomft. Surface seal, bottom	E. W. Ction <u>35</u> W. Characteria Normalized Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control C	Wis. Unique Well Number       DNR Well Number         Date Well Installed $(2) + 0 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1$
Type of Well Water Table Observation Well-Cldi Prezonneter Distance Well Is From Waste/Source Boundary Is Well A Point of Enforcement Std. Application? Yes No Yes No Yes No A. Protective pipe, top elevation ft. MSL B. Well casing, top elevation ft. MSL C. Land surface elevation ft. MSL D. Surface seal, bottom ft. MSL or ft. 12 USCS classification of soil near screen: GP GM GC GW SW ESP SM SC DML MH GCL CCH Bedrock 13. Sieve analysis attached? Yes SNo 14. Drilling method used: Rotary 50 Hollow Stem Auger St 41 Other 0 15. Drilling fluid used: Water [] 02 Air [] 01 Drilling Mud [] 03 None \$= 99 16. Drilling additives used? [] Yes \$No Describe 17. Source of water (attach analysis):	ction <u>55</u> W CNource degradient of Known 1. Cap and loc 2. Protective of a. Inside dia b. Length: c. Material: d. Additional If yes, des 3. Surface seal:	Dete Well Installed $(P) = (Q + V) = (Q + V)$ Well Installed By: (Person's Name and Firm) BR = A + DCA L = A + C = MENTAL = 3 + C + C + C + C + C + C + C + C + C +
Pictometer       III         Distance Well Is From Waste/Source Boundary       I         Is Well A Point of Enforcement Sul. Application?       I         I Yes       No         I Yes       No         A. Protective pipe, top elevation       Image: State	W C/Source degradient of Known 1. Cap and loc 2. Protective of a. Inside dia b. Length: c. Material: d. Additioni If yes, des 3. Surface seal:	Well Installed By: (Person's Name and Firm) $BR + A 'DCAL$ LAP'CONMENTAL 3 FEACHER         LAP'CONMENTAL 3 FEACHER
Distance Well is From Waste/Source Boundary       11         Is Well A Point of Enforcement Sul. Application?       11         Location of Well Relative to Waste/Source Boundary       11         A. Protective pipe, top elevation       11         B. Well casing, top elevation       12.5 5 6 f MSL         D. Surface seal, bottom       12.5 5 6 f MSL         D. Surface seal, bottom       14. MSL or         I2. USCS classification of soil near screen:       12.0 CM I CC I GW I SW MSP         I3. Sieve analysis attached?       Yes         Millow Stem Auger       50         Hollow Stem Auger       51 41         Other       13.         Diffing fluid used: Water       02         Air       01         Drilling fluid used: Water       02         Millow Stem Auger       999         16. Drilling ackliuves used?       Yes         17. Source of water (attach analysis):       10	W C/Source degradient of Known 1. Cap and loc 2. Protective of a. Inside dia b. Length: c. Material: d. Additioni If yes, des 3. Surface seal:	Well Installed By: (Person's Name and Firm) $BR + A 'DCAL$ $LAP'CONMEN'TRL 3 FEBRICATION         ck?         Cover pipe:         unneter:         2.26ft         Steel D > 04         Other \Box         al protection?         Bentonite \Box         30   $
Distance Well is From Waste/Source Boundary       11         Is Well A Point of Enforcement Sul. Application?       11         Location of Well Relative to Waste/Source Boundary       11         A. Protective pipe, top elevation       11         B. Well casing, top elevation       12.5 5 6 f MSL         D. Surface seal, bottom       12.5 5 6 f MSL         D. Surface seal, bottom       14. MSL or         I2. USCS classification of soil near screen:       12.0 CM I CC I GW I SW MSP         I3. Sieve analysis attached?       Yes         Millow Stem Auger       50         Hollow Stem Auger       51 41         Other       13.         Diffing fluid used: Water       02         Air       01         Drilling fluid used: Water       02         Millow Stem Auger       999         16. Drilling ackliuves used?       Yes         17. Source of water (attach analysis):       10	W C/Source degradient of Known 1. Cap and loc 2. Protective of a. Inside dia b. Length: c. Material: d. Additioni If yes, des 3. Surface seal:	Weil Installed By: (Person's Name and Firm) <u>DR 4 A 'DCA</u> <u>L A.P. 'CONMENTAL 3 FEBRIA</u> ck? ck? cver pipe: uncler: <u>1. Conmental 3</u> cver pipe: <u>1. Conmental 30</u> scribe: <u>Benionite</u> 30
Is Well A Point of Enforcement Stil. Application? Upgratiers S Upgratiers S Downgratient N A. Protective pipe, top elevation ft. MSL B. Well casing, top elevation ft. MSL C. Land surface elevation ft. MSL or ft. MSL D. Surface seal, bottom ft. MSL or ft. 12. USCS classification of soil near screen: GP GM GC GW SW 25SP SM SC DML MH CL CCH Bectrock 13. Sieve analysis attached? Yes SN 14. Drilling method used: Rotary 50 Hollow Stern Auger St 41 Other G 15. Drilling fluid used: Water 02 Air 01 Drilling Mud 03 None 9 99 16. Drilling ackliuves used? Yes SNNO Describe	degradieni of Known 1. Cap and loo 2. Protective of a. Inside dia b. Length: c. Material: d. Additiona If yes, de 3. Surface seal:	
Image: State of the formation of the control of th	degradieni of Known 1. Cap and loc 2. Protective of a. Inside dia b. Length: c. Material: d. Additiona If yes, des 3. Surface seal:	LAP'CONMENTAL 3 FOR rate 1::         ck?         Cover pipe:         streter:         1. 2. 2ft.         Steel 25. 04         Other 0         al protection?         1. Yes 26. No         sente:         1. Bentonite 0         30
A. Protective pipe, top elevationf. MSL B. Well casing, top elevationf. MSL C. Land surface elevationft. MSL orft. MSL D. Surface seal, bottomft. MSL orft. D. Surface seal, bottomft. MSL orft. 12. USCS classification of soil near screen: GPGMCCGWSW DESP SMSCMLMHCLCH Bedrock 13. Sieve analysis attached?YesNo 14. Drilling method used: RotaryS0 Hollow Stern Auger SI 41 Other 15. Drilling fluid used:WaterO2Air01 Drilling schlitves used?YesNo  Describe 17. Source of water (attach analysis):	1. Cap and loc 2. Protective c a. Inside dia b. Length: c. Material: d. Additiona If yes, de 3. Surface seal:	ck?       Ck Yes □ No         cover pipe:       1/0in         umeter:       1/0in          20in          20in          20in          20in          20in          20in          20in          20in          20in          0.0in
B. Well casing, top elevation	2. Protective of a. Inside dia b. Length: c. Material: d. Additiona If yes, de 3. Surface seal:	ck?       Ck Yes □ No         cover pipe:       1/0in         umeter:       1/0in          20in          20in          20in          20in          20in          20in          20in          20in          20in          0.0in
C. Land surface elevation ft. MSL or ft. MSL	a. Inside dia b. Length: c. Material: d. Addition If yes, de 3. Surface seal:	imeter:       1/
C. Land surface elevation ft. MSL or ft. MSL	b. Length: c. Material: d. Additions If yes, de 3. Surface seal:	_7. 2ft. Steel 25 04 Other 0 al protection? 1 Yes 13 Scribe: Benionite 1 30
D. Surface seal, bottomft. MSL orft. 12. USCS classification of soil near screen: GP GM GC GW SW 25SP SM SC ML MH CL CH Bedrock 13. Sieve analysis attached? Yes SNo 14. Drilling method used: Rotary 50 Hollow Stern Auger St 41 Other C 15. Drilling fluid used: Water 02 Air 01 Drilling Mud 03 None 999 16. Drilling additives used? Yes SNo Describe 17. Source of water (attach analysis):	c. Material: d. Additioni If yes, de 3. Surface seal:	Sizel         25         0.4           Other
12. USCS classification of soil near screen:         GP GM GC GW SW 25 SP         SM SC ML MH CL CL CH         Bedrock         13. Sieve analysis attached?         Yes         Hollow Stem Auger         St 41         Other         Other         Drilling fluid used: Water         02         Air         01         Drilling fluid used: Water         02         Air         03         None         99         10. Drilling additives used?         Yes         Procente         17. Source of water (attach analysis):	d. Addition If yes, de 3. Surface seal:	al protection? Other scribe; Benionite [] 30
12. USCS classification of soil near screen:         GP       GM       GC       GW       SW       SP         SM       SC       ML       MH       CL       CH         Bedrock       Bedrock       MH       CL       CH         13. Sieve analysis attached?       Yes       Yes       Yes         14. Drilling method used:       Rotary       50         Hollow Stem Auger       SI 41         Other	lf yes, de 3. Surface seal:	al protection?  Yes by No scribe: Benionite  30
GP GM GC GW SW 24SP SM SC ML MH CL CH Bedrock 13. Sieve analysis attached? Yes ANO 14. Drilling method used: Rotary 50 Hollow Stem Auger 541 Other G 15. Drilling fluid used: Water 02 Air 01 Drilling Mud 03 None 999 16. Drilling additives used? Yes SNO Describe	lf yes, de 3. Surface seal:	sente:Benionite [] 30
SM □ SC □ ML □ MH □ CL □ CH □ Bedrock 13. Sieve analysis attached? □ Yes ★□ No 14. Drilling method used: Rotary □ 50 Hollow Stem Auger 54 41 Other □ 15. Drilling fluid used: Water □ 02 Air □ 01 Drilling Mud □ 03 None 59 99 16. Drilling additives used? □ Yes \$\$_No Describe	3. Surface seal:	Benionite [] 30
□ Bedrock 13. Sieve analysis attached? □ Yes X□ No 14. Drilling method used: Rotary □ 50 Hollow Stem Auger St 41 Other □ 15. Drilling fluid used:Water □ 02 Air □ 01 Drilling Mud □ 03 None 9 99 16. Drilling additives used? □ Yes S.No Describe 17. Source of water (attach analysis):	$\mathbf{N}$	
14. Drilling method used:       Rotary □ 50         Hollow Stem Auger SI 41         Other □         15. Drilling fluid used:       02         Air □ 01         Drilling Mud □ 03       None 51.99         16. Drilling additives used?       □ Yes         17. Source of water (attach analysis):	$\mathbf{N}$	Concrete DEC 01
14. Drilling method used:       Rotary □ 50         Hollow Stem Auger SI 41         Other □         15. Drilling fluid used:       02         Air □ 01         Drilling Mud □ 03       None 51.99         16. Drilling additives used?       □ Yes         Provide the state of the	4. Material bety	
Hollow Stem Auger 51 4 1 Other  Other  Othe	<ol> <li>Material bety</li> </ol>	Other D
Other  Ot		ween well casing and protective pipe:
15. Drilling fluid used: Water [] 02 Air [] 01 Drilling Mud [] 03 None [9.99 10. Drilling additives used? [] Yes [9.No Describe		Bentomie 🔲 30
Drilling Mud 🔲 0.3 None 🔁 99 10. Drilling additives used? 🛄 Yes 🖾 No Describe 17. Source of water (attach analysis):		Annular space scal B.
Drilling Mud 🔲 0.3 None 🔁 99 10. Drilling additives used? 🔲 Yes 😰 No Describe 17. Source of water (attach analysis):		Other 🖸
16. Drilling ackliuves used?  Yes Describe I7. Source of water (attach analysis):	🚬 5. Annular spac	ce seal: Granular Benionite 🖄 33
Describe		gal mud weight Bentonite-sand slurry 🔲 35
Describe	Lbs/	gal mud weight Benionite slurry 🔲 3.1
17. Source of water (attach analysis):	% H	Sentonite Bentonite-cement grout 🔲 50
	How installed	_Ft <sup>3</sup> volume added for any of the above
Bentonite scal, top fi. MSL or2 5 ft.	now installed	
. Benionite seal, top ft. MSL or _ 2.5 ft.		Tramic pumped 0 02
Benionite seal, top fi. MSL or $2.5$ ft.		Gravity 🔍 08
Benionite seal, top fi. MSL or? fi.	6. Bentonite sea	i: Bentonite granules 🗋 33
	4	$\square 3/8$ in. $\square 1/2$ in. Bentonite pellets $\square 3/2$
		Alt Other
. Fine sand, top ft. MSL or 5 ft.	7. Fine sand mai	terial: Manufacturer, product name and mesh size
	HACC	H 969421fica Saull
. Filter pack, top ft. MSL cr 5.5 ft.	Volume ackled	1.75_n <sup>3</sup>
	8. Filter pack m	sterial: Manufacturer, product name and mesh size
. Well screen, top ft. MSL or 25 ft	KER F.	MAT, # 30 FUNTSIN'N
	Volume added	10.25 11
Well screen, bouom fr. MSL or _ 1 L . 5 fr.	9. Well casing:	Flush threaded PVC schedule 40 🖄 23
		Flush threaded PVC schedule 80 📋 24
Filter pack, bottom ft. MSL or _/_ / S ft.		Other D
	10. Screen materi	N: HISH THEFTED PUCSH
Borchale, bouam ft. MSL a _ 11.5 ft.	Screen type:	Factory cut DK 11
		Conunuous slot 🖆 01
Borehole, diameter $\underline{0}$ in.	·····	Other D
22.5		MONOFIEY, INC.
0.D. well casing $225$ in.	Slot size:	0. <u>Q_/</u> Qin.
	Sloued length:	/
1.D. well casing $200$ in.	11. Backfill materia	al (balow filter pack): Nons S
	·- <u></u> · · ·	
wreby certily that the information or this form is true and correct to th	e best of my k	
nuture in king Firm k		, , , , , , , , , , , , , , , , , , ,
Tristi la Ville Dances 1		· If d.

Þī ch. 144, Wis Stats, failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5,000 for each day of violation. In accordance with ch. 147, Wis Stats, failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. In accordance with ch. 147, Wis Stats, failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation.

Facility/Project Name <u>L'Y (11'11'11'11'11'EState</u> License, Permit or Monitoring Number	Well Name MILU-T				
License, Perinit or Monitoring Number		Wis. Unique Well Number DNR Well Number			
1. Can this well be purged dry?	D Yas D No	11. Depth to Water	Before Deve	lopment	Alter Development
2. Well development method surged with bailer and bailed surged with bailer and pumped surged with block and bailed surged with block, bailed and pumped surged with block, bailed and pumped compressed air bailed only pumped only pumped slowly Other	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(from top of well casing) Date Time 12. Sediment in well bottom 13. Water clarity	<u>27111</u> mmdd _9:45	1 <u>90</u> y y m. inches	$\frac{5 \cdot 88}{m m d d y y}$ $\frac{2}{m} \frac{1}{y} \frac{1}{y} \frac{5}{y}$ $\frac{1}{y} \frac{1}{y} \frac{5}{y}$ $\frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y}$ $\frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y}$ $\frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y}$ $\frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y}$ $\frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y}$ $\frac{1}{y} \frac{1}{y} \frac{1}{y}$
	<u> </u>	,	Turbid Describe) /////	5	Turbid 2=25 Describe) Still plack Inot as direse
	L_L in.				as start). Let still betor
		Fill in if drilling fluids	were used and	. well is at	solid waste facility:
7. Volume of water removed from well	<u>\$0</u> gal.	14. Total suspended	ļ	mg/l	mg/l
8. Volume of water added (if any)	gal.	solids			·
9. Source of water added		1 <b>5. COD</b> .	· .	mg/1	mg/l
10. Analysis performed on water added? (If yes, attach results)	QY CB Q No	i I		i	

Additional comments on development:

Well dev	eloped by: Person's Name and Firm	I hereby cer of my know	tily that the above information is true and correct to the best dedge.
Name:	Duane A. Stillings	Signature:	10%. M. Selir
Firm:	Damos & Moore, Ud.	Firm:	Sames & Micake, U.d.

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NOTE: Shaded areas are for DNR use only. See instructions for more information.

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State of Wisconsin Department of Natural Resources		M Fc	ONITORING WELL CONS' prim 4400-113A	TRUCTION 8-89
Facility/Project Name	Irid Location		Weil Name 11	
BRCSERDING STATE Facility License, Permit or Monitoring Number		fL O N. O S.	Wis. Unique Well Number	
Type of Well Water Table Observation Well 241	Section Location		Date Well Installed	
Piezometer (112	DE 1/4 of NE	1/4 of Section		212617 C
Distance Well Is From Waste/Source Boundary	T / N.R / 6	- MEDW	Well Installed By: (Person	s Name and Firm)
Is Well A Point of Enforcement Sud. Application?	OCAtion of Well Relati	ve to Waste/Source	-LIANDON!	
	D Downgradicat		ENVIRONMENTAL	3 tour at 10,14
A. Protective pipe, top elevation ft.	MSL	1. Cap and lo	ck?	A Ya D No
B. Well casing, top elevation98.7.7 ft.	MSL	2. Protective a. Inside di	••	110
C. Land surface elevation $-15.93$ f	MSL_	b. Length:		<u>-7.9</u> 11.
D. Surface seal, bottomft. MSL or		C. Material	:	Steel 151, 04
12. USCS classification of soil near screen:			· - · · · · · · · · · · · · · · · · · ·	Uther 🗋
			al protection?	Yes (A, No
DSM DSC DML DMH DCL CCH DBedrock		3. Surface seal		Bentonite 🖸 30
13. Sieve analysis attached?  Yes  Yo				Concrete \$ 01
14. Drilling method used: Rotary D 50			·	Other 🖸 🔔
Hollow Stem Auger 🖾 41			tween well casing and protecti	
Other D		ж.	Amu	Benionite [] 30
				Other D
15. Drilling fluid used:Water [] 02 Air [] 01 Drilling Mud [] 03 None [25, 99		5. Armular spa	ce seal: Granu	
Drilling Mud [] 03 None [3.99			/gal mud weight Bentonit	
16. Drilling additives used? 🖸 Yes 🏹 No		Lbs/	/gal mud weight Ben Bentonite Bentonite-s	ionite slurry 1 31
			Ft <sup>3</sup> volume added for any (	of the above
Describe	-   📓	How installe	d:	Tremie 🔲 01
			Tree	mus pumped 🔲 02
				Gravity 21-08
E. Bentonite seal, top fi. MSL or2	0.	6. Bentonite sei		nite granules 13 33
	- "	$\mathcal{L}$	. $\Box$ 3/8 in. $\Box$ 1/2 in. Benu $\Lambda$ 4	Onite pellets [] 32
F. Fine sand, top ft. MSL or	_ ſı	7. Fine send ma		ct name and mesh size
G. Fuller pack, top ft. MSL cr	o n	Volume adde		HANC'
• • • • • • • • • • • • • • • • • • • •			aterial: Manufacturer, produ	ct name and mesh aize
H. Well screen, top ft. MSL or		LED T		INT Stain
1. Well screen, bottom ft. MSL or _ 12.		9. Well casing:	d <u>Creded BVC sc</u> Flush threaded BVC sc	inadula 40 <b>111</b> 22
		. Wen cashig.	Flush threaded PVC sc	•
J. Filter pack, bottom ft. MSL or _ 12.	9 m.			Other
		10. Screen materi	al: Fling H THREANE	D PIC SCHE.
K. Borchole, bottom ft. MSL a		Screen type:		Factory cut 🛛 11
L. Borchole, diameter $50^{\circ}$ in.			Conu	unuous slot [] 01 Other []
		Manufacturer	HONIG FIEX IN	VC
M. O.D. well casing _2.25 in.		Slot size:	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	$0. \frac{\partial}{\partial} \frac{\partial}{\partial} \frac{\partial}{\partial} un.$
		Sloued length		_ <u>5</u> . <u>v</u> ft.
N. I.D. well casing2.00 in.		11. Backfill mater	ial (below filter pack):	None 54-
I hereby curtily that the information or this for		ect to the best of my l	เกอพโษปฏษ.	
Signature	Firm Nin	IS & PROSA	2. 14.11	
Please complete and return both sides of this form as requir				accordance with

• .

Please complete and return both sides of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Adm. Code In accordance with ch. 144, Wis Stats., failure to file this form may result in a forfeiture of not less than \$10,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information.

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Facility/Project Name		Well Name	· · · · · · · · · · · · · · · · · · ·	
License, Permil or Monitoring Number	Æ		0-10	
License, Permit or Monitoring Number		Wis. Unique Well No	unber DNR W	ell Number
1. Can this well be purged dry?	I Yas The	11 Depth to Weter	Before Development	After Development
<ol> <li>Well development method         <ul> <li>surged with bailer and bailed</li> <li>surged with block and bailed</li> <li>surged with block and pumped</li> <li>surged with block, bailed and pumped</li> <li>surged with block, bailed and pumped</li> <li>surged with block, bailed and pumped</li> <li>compressed ar</li> <li>bailed only</li> <li>pumped only</li> <li>pumped slowly</li> <li>Other</li> </ul> </li> <li>Time spent developing well</li> <li>Depth of well (from top of well casisng)</li> <li>Inside diameter of well</li> <li>Volume of water in filter pack and viell casing</li> <li>Volume of water removed from well</li> <li>Volume of water added (if any)</li> </ol>	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	<ul> <li>11. Depth to Water (from top of well casing)</li> <li>Date</li> <li>Time</li> <li>12. Sediment in well bottom</li> <li>13. Water clarity</li> <li>Fill in if drilling fluids</li> <li>14. Total suspended solids</li> </ul>		$\begin{array}{c} \underline{} \\ \underline{} \\$
9. Source of water added		15. COD	mg/l	mg/l
10. Analysis performed on water added? (If yes, attach results)			i <b>i</b>	

Additional comments on development:

Well dev	eloped by: Person's Name and Firm	Thereby cer of my know	nify that the above information is true and correct to the best vietge.
Name:	Kristine Stehr	Signature:	Bish Mi Stelir
Fum:	Dames & Moore, U.d.	Firm:	Dames & Moore, Utcl.

•

NOTE: Shaded areas are for DNR use only. See instructions for more information.

#### APPENDIX C

#### CHAINS OF CUSTODY

CHEM BHO		ENVIRONA SERVICES	CRIAL OA	) E - RYAN H[) K CHEEK, WI 53154 4) 764-7005 00-365-3840	CLIENT Barger String	y é state. Karazo	
		<b>OF CUSTODY</b> 207	F	ASE PRESS FIRMLY N WRITING	Beloit QUOTE NUMBER 84471	-163	(3-16-9C
F	r . 5/54	ANALYSIS		IATION ).AMES+	Moure	DATE 3-1-1-7	TIME
		TPH			`		
ITEM		NUMBER AND SIZE OF CONTAINERS		DESCRIP	TION $Q_1/170$	TRAN	SFER NUMBER
1-1 2-1 3-1 4-1 5-1	40	12. glass	B-4/9.5 B-5/6. ₩ Plea	0'-2.5' -1-5.0' 	report w/	time #	07413 07414 07418 07418 07410 07417
TRANSFER	ITEM NUMBER	RELINQUISHED BY (S	₩₩ AH,	n: Kristin	ercling Estate & Stchr D BY (Signature)	DATE	TIME
1		Loit. H.C.	Hely	D. XI	Into	3/14/20	8:10

NUMBER	NUMBER	RELINCUISAED BT (Signature)	ACCEPTED BT (Signature)	DATE	TIME
1		Griffe M. Stelly	D. Kuhto	3/16/20	8:10
2		D. Kuttz	mile howard	5.8.90	6:00
3		Imie Murrok			
4					
5					

			• 140 E RYAN RD	CLIENT DOC	)		•		· )
	ENVIRONM SERVICES	<u>kniai</u>	OAK CREEK, WI 53154 (414) 764 7005	BORGERDING	est est	ATE	-		
CHEM BIO	CORPORATION		1-800-365-3840	PROJECT LOCATION					
СН	AIN OF CUSTODY			BELOT					
•••		$\int$	PLEASE PRESS	QUOTE NUMBER					
No.	31206		FIRMLY WHEN WRITING	844	746	4			
SAMP	LER_(Signature)	<u> </u>	AFFILIATION		DATE	···-			a fl
	Sisti In Star	-	DAMES + W	DORE	3/1	5		-	
PURPC	SE OF ANALYSIS		· · · · · · · · · · · · · · · · · · ·		<u> </u>				
	BTEX								
TTEM	NUMBER AND SIZE	1				TRANS	FER N	UMBE	R
NUMBER	OF CONTAINERS	<u> </u>	DESCRIP	TION 90075		1 2	3	4	5
1-1	4×40ml glass	mio	-1 007	419					
			, 90	•	1				
2-1		mw. mw.	-2 DOT	420					
3-1		mw	-3 DO	1421					
an									
424									
		K P	lease totle u	o/ crding Estate	//				
			(Irsula Dorg	erding Cotare					
		tore A	Hn: Kristine	Stehr					
$\Box$		L			l				

transfer Number	item Number	RELINQUISHED BY (Signature)	ACCEPTED BY (Signature)	DATE	TIME
1		Jisti Un Secher	D. Kuhty	3/14/90	8:10
2		N. Kultz	0		
3		$\bigcirc$			
4					
5					

ROL NO. AMPLERS: A. NO. DA ;/	TE TIM	9	- 5	Y MOORE, (7). STATION LOCATION	- NO. OF CON- TAINERS	K				SAMPLE DESCRIPTION
A. NO. DA			<b></b> 1	STATION LOCATION	OF CON-		\$    			
			GRAB		CON- TAINERS		/ / /	' / / /		
	~					V				
				5-6/MW-6/5/12:13.5	1				<u>^</u>	
			<b> </b>	B-7/MW-7/3/6'-7.5'	1					
	1:1		–	B-8/4/ 8.5'-10'	<u> </u>		╉╌┠╴╏		<u> </u>	
	<u> </u>		–	B-9/3/6'-7.5'		$\mathbf{X}$	+ + +			
			+	B-10/MW-10/3/6'-7.5' B-11/3/6'-7.5'			┼╌┼╶┤		$\longrightarrow$	
				B-11/3/6'-7.5'			╉╌╂╌┨			
			╉╌			┼─┼─				
			$\uparrow$							
									N.C.	
									· · · · · · · · · · · · · · · · · · ·	
Helinguished B	r. // 🗸			Date / Time Received By:	1.7.6	Relinqu	ished By:		Date / Time	Received By:
elinquished E	<u>4 / y-</u> ly:	4/		7/5/50 4.55 5-10 Date / Time Received By:	<u>Allou (</u>	Relinqu	lahed By:		Date / Time	Received By:
		(		24156-58 Haggerty Rd. 315	<b>y Services:</b> 0 North Brookfi okfield, WI 530	ield Rd.		Remarks:		l
	₹			(313) 478-2700 (414	(414) 783-575			Report To:		

CHEM BO COPPORATION	TAL DAK CREEK, WY 53154 (114) 764-7005 (1-800-365-3840	PROJECT LOCATION
CHAIN OF CUSTODY		Ursula Borgerding Estate
No. 31229	PLEASE PRESS FIRMLY WHEN WRITING	QUOTE NUMBER 7-1-1-2 845-2474
SAMPLEB (Signature)	AFFILIATION	DATE / TIME
PURPOSE OF ANALYSIS	CSR/D+H	n 7/11/50
<b></b>	le BTEX) 8240	O Volatiles

ITEM	NUMBER AND SIZE	DESCRIPTION	T	RANSI	ER N	UMBE	R
NUMBER	OF CONTAINERS		1	2	3	4	5
123	4×40 ml dass	MW-6 MW-7 MW-7 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10					
		Atni Kristin Stebr Atni Kristin Stebr Arsula Burgarding Estate"					

transfer Number	item Number	RELINQUISHED BY (Signature)	ACCEPTED BY (Signature)	DATE	TIME
1	3	Join M Del	Danille Underte	1/10/10	10:25
2		Danelle Unike.	Culip phil	-1/12 190	1125
3		Cla fil	()		
4		$\mathcal{O}$			
5					

CLIENT 140 E. RYAN RD CSR/DAM ENVIRONMENTAL OAK CHEEK, WI 53154 SERVICES (414) 764-7005 1-800-365-3840 PROJECT LOCATION NO COPPORATION Borgerding Estate CHAIN OF CUSTODY PLEASE PRESS FIRMLY WHEN WRITING No. 39027 SAMPLER (Signature) AFFILIATION DATE TIME CSR/D+M 20 PURPOSE OF ANALYSIS Phenols norganic மல TRANSFER NUMBER ITEM NUMBER AND SIZE DESCRIPTION NUMBER **OF CONTAINERS** 5 mw 4 gt. glass mesned mw-7 901971 2 munu 3 Attn: Fristine Stehr AR Land rpl. w/"Ursula Borgarding Estate"

transfer Number	item Number	RELINQUISHED BY (Signature)	ACCEPTED BY (Signature)	DATE	TIME
1	3	Forth Sel	William L. English	1/14/90	V: 00 Am
2		William J. English	N. Kut	7/16/90	دح : 4
3		D. Mut	CuQu 12	7/143	Dis
4		Cilq 1	$\bigcirc$		
5		$\bigcirc$ ,			

### APPENDIX D

#### LABORATORY REPORTS SOIL SAMPLES



03/23/90

LABORATORY REPORT

PAGE 1

D325 8447463 W31

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DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90075-D07413 URSULA BORGERDING ESTATE/BELOIT/B-1/3.5-5.0' DATE COLLECTED 03/14/90 DATE RECEIVED 03/16/90

TEST NAME RESULT UNITS

TOTAL PETROLEUM HYDROCARBONS

1800 PPM BASED ON SIMILARITIES TO THE DIESEL STANDARD.

PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS. <u>REMAINING WASTE SAMPLES WILL</u> <u>BE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE</u>. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT. WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED. ! = REPRINT N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL  $\underline{M_{I}M_{I}}$ .



140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005 03/27/90 LABORATORY REPORT

PAGE 1

D325 8447463 W31

!

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90075-D07414 URSULA BORGERDING ESTATE/BELOIT/B-2/1.0-2.5' DATE COLLECTED 03/14/90 DATE RECEIVED 03/16/90

TEST	NAME	RESULT	UNITS
TOOT	11212-113	ACOULT	OULTO

TOTAL	PETROLEUM	HYDROCARBONS	920 PPM	
			GASOLINE	

PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS. <u>REMAINING WASTE SAMPLES WILL</u> <u>BE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE</u>. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT. WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED. <u>! = REPRINT</u> N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL  $MT_{1}$ 



03/27/90

LABORATORY REPORT

PAGE 1

D325 8447463 W31

!

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90075-D07415 URSULA BORGERDING ESTATE/BELOIT/B-3/3.5-5.0' DATE COLLECTED 03/14/90 DATE RECEIVED 03/16/90

TEDI NAME REDULI UNIT	TEST	NAME	RESULT	UNITS
-----------------------	------	------	--------	-------

TOTAL PETROLEUM HYDROCARBON		HYDROCARBONS	1100	PPM
			GASOLINE	



03/28/90

LABORATORY REPORT

PAGE 1

D325 8447463 W31

1

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90075-D07416 URSULA BORGERDING ESTATE/BELOIT/B-4/9.5-11.0' DATE COLLECTED 03/14/90 DATE RECEIVED 03/16/90

TEST	NAME	RESULT	UNITS

TOTAL PETROLEUM HYDROCARBONS

43 PPM BASED ON SIMILARITIES TO GASOLINE STANDARD GASOLINE

PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS.REMAINING WASTE SAMPLES WILLBERETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE.WATER SAMPLES ARE DISPOSED OF 30DAYS AFTER RECEIPT.WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED....................................................................................................................................</t



03/29/90

LABORATORY REPORT

PAGE 1

D325 8447463 W31

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DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90075-D07417 URSULA BORGERDING ESTATE/BELOIT/B-5/6.5-8.0' DATE COLLECTED 03/14/90 DATE RECEIVED 03/16/90

TEST	NAME	RESULT	UNITS

TOTAL	PETROLEUM	OLEUM HYDROCARBONS 3100		PPM
			GASOLINE	

 PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS.
 REMAINING WASTE SAMPLES WILL

 BE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE.
 WATER SAMPLES ARE DISPOSED OF 30

 DAYS AFTER RECEIPT.
 WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED.

 ! = REPRINT
 N/T = NOT TESTED

 N/A = NOT APPLICABLE
 APPROVAL

 FAX #414-764-0486
 WI DNR LAB CERTIFICATION #241283020

### SWANSON ENVIRONMENTAL INC.

3150 North Brookfield Road Brookfield, Wisconsin 53005 telephone (414) 783-6111 facsimile (414) 783-5752



AIHA Accreditation #352 WDNR Certification #268181760

#### **ANALYTICAL REPORT**

REPORT NUMBER: BIS23

Dames & Moore 250 East Wisconsin Avenue, Suite 1500 Milwaukee, WI 53202 DATE: July 26, 1990 PURCHASE ORDER: SEI JOB NO: WL3421 DATE COLLECTED: 07/05&06/90 DATE RECEIVED: 07/06/90

Attn: Ms. Kristine Stehr

Soil Samples

Units: mg/kg (ppm) Detection Limit: 5

<u>SEL ID</u>	<u>Sample ID</u>	<u>Total Petroleum Hydrocarbons</u> *		
3421-1	B-6/MW-6/5/12'-13.5'	ND		
3421-2	B-7/MW-7/3/6'-7.5'	88		
3421-3	B-8/4/8.5'-10'	154		
3421-4	B-9/3/6'-7.5'	604		
3421-5	B-10/MW-10/3/6'-7.5'	41		
3421-6	B-11/3/6'-7.5'	136		

 Concentration based on fuel oil #2 standard using the State of California Method.

ND--Not Detected

Reviewed & Approved by:

annary

Rosemary L. Dineen Laboratory Director

ORIGINAL

## APPENDIX E

## LABORATORY REPORTS GROUND WATER SAMPLES



140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005 04/04/90 LABORATORY REPORT

PAGE 1

D325 8447464 W31

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DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90075-D07419 URSULA BORGERDING ESTATE/BELOIT/WATER/MW-1 DATE COLLECTED 03/15/90 DATE RECEIVED 03/16/90

TEST NAME	RESULT	UNITS
BENZENE	1300	PPB
TOLUENE	<20	PPB
	HIGH DETEC	TION LIMITS DUE TO SAMPLE
	CONCENTRAT	ION.
XYLENE	100	PPB
ETHYL BENZENE	71	PPB

PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS. <u>REMAINING WASTE SAMPLES WILL</u> <u>BE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE</u>. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT. WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED. <u>! = REPRINT</u> N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL  $M_{1}^{M}$ 



04/04/90

LABORATORY REPORT

PAGE 1

D325 8447464 W31

!!!

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90075-D07420 URSULA BORGERDING ESTATE/BELOIT/WATER/MW-2 DATE COLLECTED 03/15/90 DATE RECEIVED 03/16/90

TEST NAME	RESULT	UNITS
BENZENE	220	PPB
TOLUENE	9.0	PPB
XYLENE	660	PPB
ETHYL BENZENE	<2.0	PPB

PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS. REMAINING WASTE SAMPLES WILL BE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT. WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED. ! = REPRINT N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL  $M_1M_2$ 



04/04/90

LABORATORY REPORT

PAGE 1

D325 8447464 W31

! ! !

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90075-D07421 URSULA BORGERDING ESTATE/BELOIT/WATER/MW-3 DATE COLLECTED 03/15/90 DATE RECEIVED 03/16/90

TEST NAME	RESULT	UNITS
BENZENE	5400	PPB
TOLUENE	660	PPB
XYLENE	2100	PPB
ETHYL BENZENE	130	PPB

PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS.REMAINING WASTE SAMPLES WILLBE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE.WATER SAMPLES ARE DISPOSED OF 30DAYS AFTER RECEIPT.WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED.! = REPRINTN/T = NOT TESTEDN/A = NOT APPLICABLEAPPROVAL $\mathcal{M}_{\mathcal{M}}$ 



07/24/90

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LABORATORY REPORT

PAGE 1

D325 8452474 W61

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE	90193-D07413	MW-6/WATER/COLD	SPRING RESOURCES/URSULA BORGERDING
	i	ESTATE	
DATE COLLECT	ED 07/11/90	DATE RECEIVED	07/12/90

TEST NAME	RESULT	UNITS
GCMS BENZENE	<5.0	PPB
GCMS BROMODICHLOROMETHANE	<5.0	PPB
GCMS BROMOFORM	<5.0	PPB
GCMS BROMOMETHANE	<10	PPB
GCMS CARBON TETRACHLORIDE	<5.0	PPB
GCMS CHLOROBENZENE	<5.0	PPB
GCMS CHLOROETHANE	<10	PPB
2-CHLOROETHYLVINYL ETHER	<10	PPB
GCMS CHLOROFORM	<5.0	PPB
GCMS CHLOROMETHANE	<10	PPB
GCMS DIBROMOCHLOROMETHANE	<5.0	PPB
GCMS 1,1-DICHLOROETHANE	<5.0	PPB
GCMS 1,2-DICHLOROETHANE	<5.0	PPB
GCMS 1,1-DICHLOROETHENE	<5.0	PPB
1,2-DICHLOROETHENE (MIXED)	<5.0	PPB
GCMS 1,2-DICHLOROPROPANE	<5.0	PPB
GCMS CIS-1,3-DICHLOROPROPE	<5.0	PPB
GCMS TRANS-1,3-DICHLORPROP	<5.0	PPB
GCMS ETHYL BENZENE	<5.0	PPB
GCMS METHYLENE CHLORIDE	<5.0	PPB
GCMS 1,1,2,2-TETRACHLORETH	<5.0	PPB
GCMS TETRACHLOROETHENE	<5.0	PPB
GCMS TOLUENE	<5.0	PPB
GCMS 1,1,1-TRICHLOROETHANE	<5.0	PPB
GCMS 1,1,2-TRICHLOROETHANE	<5.0	PPB
GCMS TRICHLOROETHENE	<5.0	PPB
GCMS TRICHLOROFLUOROMETHAN	<10	PPB
GCMS VINYL CHLORIDE	<10	PPB
GCMS ACROLEIN	<100	PPB
GCMS ACRYLONITRILE	<100	PPB
GCMS DICHLORODIFLUOROMETHA	<10	РРВ
GCMS ACETONE	<10	PPB
GCMS CARBON DISULFIDE	32	PPB

we this with Sources.

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

IL EPA CERTIFICATION # 100243; AIHA ACCREDITED. N/T = NOT TESTED N/A = NOT APPLICABLE

APPROVAL /UKS

FAX #414-764-0486

WI DNR LAB CERTIFICATION #241283020



07/24/90

LABORATORY REPORT

PAGE 2

D325 8452474 W61

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90193-D07413 MW-6/WATER/COLD SPRING RESOURCES/URSULA BORGERDING ESTATE DATE COLLECTED 07/11/90 DATE RECEIVED 07/12/90

TEST NAME	RESULT	UNITS
GCMS 2-BUTANONE (MEK)	<10	PPB
GCMS VINYL ACETATE	<10	PPB
4-METHYL-2-PENTANONE(MIBK)	<10	PPB
GCMS 2-HEXANONE	<10	PPB
GCMS STYRENE	<5.0	PPB
XYLENES TOTAL	<5.0	PPB
GCMS DIBROMOMETHANE	<5.0	PPB
GCMS ETHYL METHACRYLATE	<5.0	PPB
GCMS IODOMETHANE	<5.0	PPB
GCMS 1,2,3-TRICHLOROPROPAN	<5.0	PPB
GCMS 1,4-DICHLORO-2-BUTENE	<100	PPB

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

IL EPA CERTIFICATION # 100243; AIHA ACCREDITED. N/T = NOT TESTED WI DNR LAB CERTIFICATION #241283020 CLIENT SERVICES DIRECT LINE 414-768-7460

APPROVAL 11115

FAX #414-764-0486



07/20/90

140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005 LABORATORY REPORT

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PAGE 1

D325 8452610 W70

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90197-D07413 WATER/MW-6/COLD SPRING RESOURCES/BORGERDING ESTATE DATE COLLECTED 07/12/90 DATE RECEIVED 07/16/90

TEST	NAME	RESULT	UNITS
IFZL	NAME	RESULT	UNITS

PHENOLICS 0.01 MG/L

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

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FAX #414-764-0486



07/24/90

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LABORATORY REPORT

PAGE 1

D325 8452474 W61

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90193-D07414 MW-7/WATER/COLD SPRING RESOURCES/URSULA BORGERDING ESTATE DATE COLLECTED 07/11/90 DATE RECEIVED 07/12/90

TEST NAME	RESU	T UNITS
GCMS BENZENE	11 -	РРВ
GCMS BROMODICHLOROMETHAN	E <5.0	PPB
GCMS BROMOFORM	<5.0	PPB
GCMS BROMOMETHANE	<10	PPB
GCMS CARBON TETRACHLORID	E <5.0	PPB
GCMS CHLOROBENZENE	<5.0	PPB
GCMS CHLOROETHANE	<10	PPB
2-CHLOROETHYLVINYL ETHER		PPB
GCMS CHLOROFORM	<5.0	PPB
GCMS CHLOROMETHANE	<10	PPB
GCMS DIBROMOCHLOROMETHAN		PPB
GCMS 1,1-DICHLOROETHANE	<5.0	PPB
GCMS 1,2-DICHLOROETHANE	<5.0	PPB
GCMS 1,1-DICHLOROETHENE	<5.0	PPB
1,2-DICHLOROETHENE (MIXE	•	PPB
GCMS 1,2-DICHLOROPROPANE	<5.0	PPB
GCMS CIS-1,3-DICHLOROPRO		PPB
GCMS TRANS-1,3-DICHLORPRO		PPB
GCMS ETHYL BENZENE	<5.0	PPB
GCMS METHYLENE CHLORIDE	<5.0	PPB
GCMS 1,1,2,2-TETRACHLORET		PPB
GCMS TETRACHLOROETHENE	<5.0	PPB
GCMS TOLUENE	<5.0	PPB
GCMS 1,1,1-TRICHLOROETHAN		PPB
GCMS 1,1,2-TRICHLOROETHAN		PPB
GCMS TRICHLOROETHENE	<5.0	PPB
GCMS TRICHLOROFLUOROMETHA		PPB
GCMS VINYL CHLORIDE	<10	PPB
GCMS ACROLEIN	<100	PPB
GCMS ACRYLONITRILE	<100	РРВ
GCMS DICHLORODIFLUOROMETH	IA <10	PPB
GCMS ACETONE	26	PPB
	BLANK	= 17 PPB

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

IL EPA CERTIFICATION # 100243; AIHA ACCREDITED. N/T = NOT TESTED N/A = NOT APPLICABLE WI DNR LAB CERTIFICATION #241283020

CLIENT SERVICES DIRECT LINE 414-768-7460

1-800-365-3840

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07/24/90

LABORATORY REPORT

PAGE 2

D325 8452474 W61

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90193-D07414 MW-7/WATER/COLD SPRING RESOURCES/URSULA BORGERDING ESTATE DATE COLLECTED 07/11/90 DATE RECEIVED 07/12/90

TEST NAME	RESULT	UNITS
GCMS CARBON DISULFIDE	32	PPB
GCMS 2-BUTANONE (MEK)	<10	PPB
GCMS VINYL ACETATE	<10	PPB
4-METHYL-2-PENTANONE(MIBK)	<10	PPB
GCMS 2-HEXANONE	<10	PPB
GCMS STYRENE	<5.0	PPB
XYLENES TOTAL	<5.0	PP8
GCMS DIBROMOMETHANE	<5.0	PP8
GCMS ETHYL METHACRYLATE	<5.0	PPB
GCMS IODOMETHANE	<5.0	PPB
GCMS 1,2,3-TRICHLOROPROPAN	<5.0	PPB
GCMS 1,4-DICHLORO-2-BUTENE	<100	PPB

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES\_WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

CLIENT SERVICES DIRECT LINE 414-768-7460

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07/20/90

LABORATORY REPORT

PAGE 1

D325 8452610 W70

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE	90197-0	07414	WATER/M	-7/COLD	SPRING	<b>RESOURCES/BORGERDING</b>	ESTATE
DATE COLLECT	TED 074	/12/90	DATE	RECEIVED	07/16	5/90	

TEST NAME	RESULT	UNITS

PHENOLICS 0.06 MG/L

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

IL EPA CERTIFICATION # 100243; AIHA ACCREDITED. N/T = NOT TESTED WI DNR LAB CERTIFICATION #241283020 CLIENT SERVICES DIRECT LINE 414-768-7460

FAX #414-764-0486



LABORATORY REPORT

07/25/90

PAGE 1

D325 8452474 W61

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90193-D07415 MW-10/WATER/COLD SPRING RESOURCES/URSULA BORGERDING ESTATE DATE RECEIVED 07/12/90 DATE COLLECTED 07/11/90

TEST NAME	RESULT	UNITS
GCMS BENZENE	12	РРВ
GCMS BROMODICHLOROMETHANE	<10	PPB
GCMS BROMOFORM	<10	PP8
GCMS BROMOMETHANE	<20	PPB
GCMS CARBON TETRACHLORIDE	<10	PPB
GCMS CHLOROBENZENE	<10	PPB
GCMS CHLOROETHANE	<20	PPB
2-CHLOROETHYLVINYL ETHER	<20	PPB
GCMS CHLOROFORM	<10	PPB
GCMS CHLOROMETHANE	<20	PPB
GCMS DIBROMOCHLOROMETHANE	<10	PPB
GCMS 1,1-DICHLOROETHANE	<10	PPB
GCMS 1,2-DICHLOROETHANE	<10	PPB
GCMS 1,1-DICHLOROETHENE	<10	PPB
1,2-DICHLOROETHENE (MIXED)	<10	PPB
GCMS 1,2-DICHLOROPROPANE	<10	PPB
GCMS CIS-1,3-DICHLOROPROPE	<10	PPB
GCMS TRANS-1,3-DICHLORPROP	<10	PPB
GCMS ETHYL BENZENE	<10	PPB
GCMS METHYLENE CHLORIDE	<10	PPB
GCMS 1,1,2,2-TETRACHLORETH	<10	PPB
GCMS TETRACHLOROETHENE	<10	PPB
GCMS TOLUENE	<10	PPB
GCMS 1,1,1-TRICHLOROETHANE	<10	PPB
GCMS 1,1,2-TRICHLOROETHANE	<10	PPB
GCMS TRICHLOROETHENE	<10	PPB
GCMS TRICHLOROFLUOROMETHAN	<20	PPB
GCMS VINYL CHLORIDE	<20	PPB
GCMS ACROLEIN	<200	PPB
GCMS ACRYLONITRILE	<200	PPB
GCMS DICHLORODIFLUOROMETHA	<20	PPB
GCMS ACETONE	42	PPB
GCMS CARBON DISULFIDE	54	PPB

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT : NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

IL EPA CERTIFICATION # 100243; AIHA ACCREDITED. N/A - NOT APPLICABLE N/T = NOT TESTED

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FAX #414-764-0486

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WI DNR LAB CERTIFICATION #241283020



07/25/90

LABORATORY REPORT

PAGE 2

D325 8452474 W61

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE ,WI 53202 ATTN: KRISTINE STEHR

SAMPLE 90193-D07415 N	W-10/WATER/COLD	SPRING RESOURCES/URSULA		
BORGERDING ESTATE				
DATE COLLECTED 07/11/90	DATE RECEIVED	07/12/90		
TEST NAME	RESULT	UNITS		
GCMS 2-BUTANONE (MEK)	<20	РРВ		
GCMS VINYL ACETATE	<20	PPB		
4-METHYL-2-PENTANONE(MIBK)	69	PPB		
GCMS 2-HEXANONE	400	РРВ		
GCMS STYRENE	<10	РРВ		
XYLENES TOTAL	<10	РРВ		
GCMS DIBROMOMETHANE	<10	РРВ		
GCMS ETHYL METHACRYLATE	<10	РРВ		
GCMS IODOMETHANE	<10	PPB		
GCMS 1,2,3-TRICHLOROPROPAN	<10	PPB		
	HIGH DETECT	TION LIMITS DUE TO MATRIX INTERFERENCE.		
GCMS 1,4-DICHLORO-2-BUTENE	<200	PPB		

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT : NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

IL EPA CERTIFICATION # 100243; AIHA ACCREDITED. N/T = NOT TESTED IDNR LAB CERNIFICATION #241283020

CLIENT SERVICES DIRECT LINE 414-768-7460



LABORATORY REPORT

07/20/90

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D325 8452610 W70

DAMES & MOORE 250 E. WISCONSIN AVE MILWAUKEE .WI 53202 ATTN: KRISTINE STEHR

SAMPLE	90197-007415	WATER/MW-10/COLD ESTATE	SPRING RESOURCES/BORGERDING
DATE COLLEC	TED 07/12/90	DATE RECEIVED	07/16/90
TEST NAME		RESULT	UNITS
PHENOLICS		0.04	MG/L

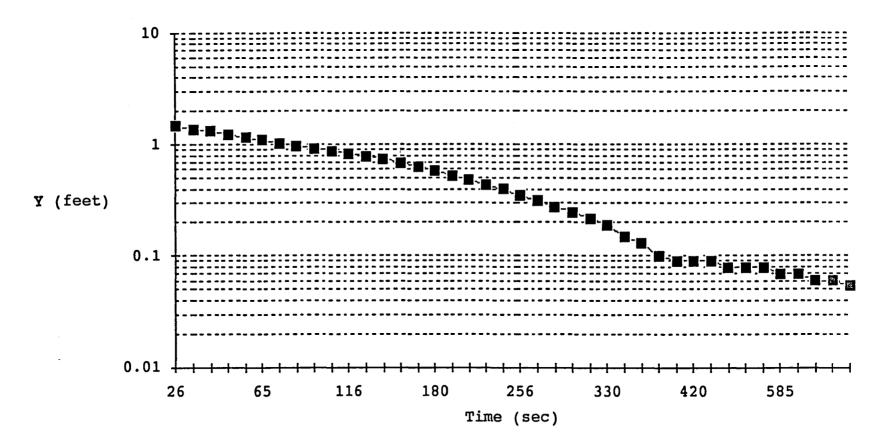
PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

APPROVAL

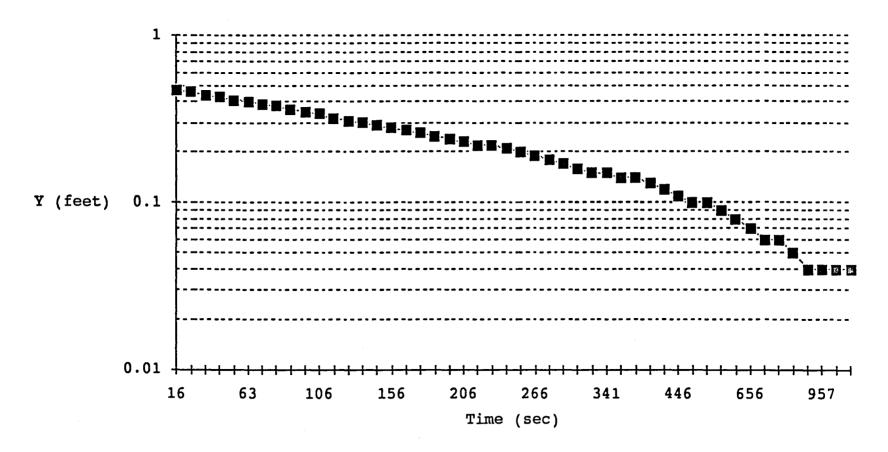
FAX #414-764-0486

# APPENDIX F

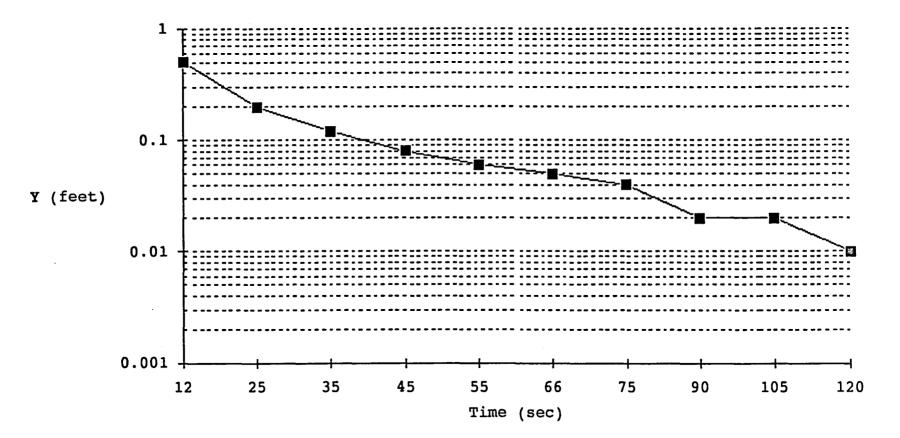
## SLUG TEST DATA GRAPHS



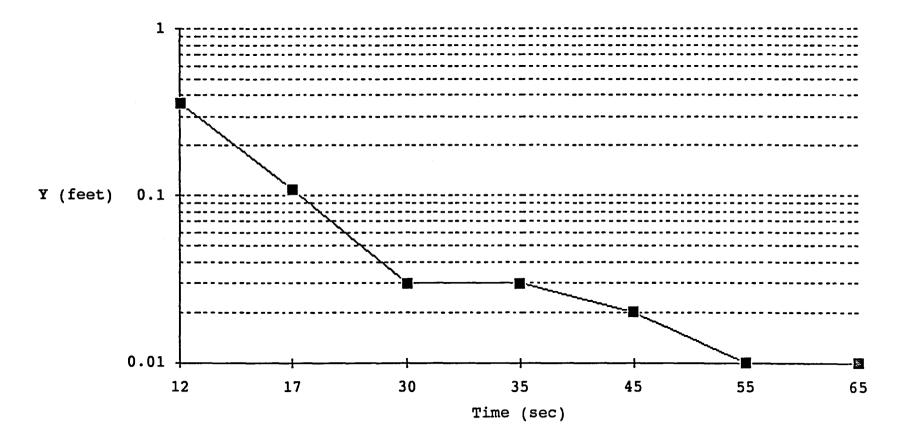
Slug Test - MW1



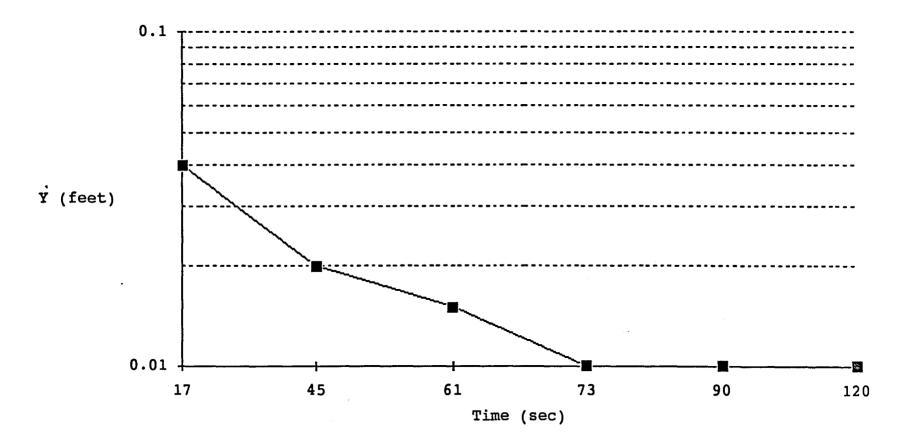
Slug Test - MW2



Slug Test - MW3

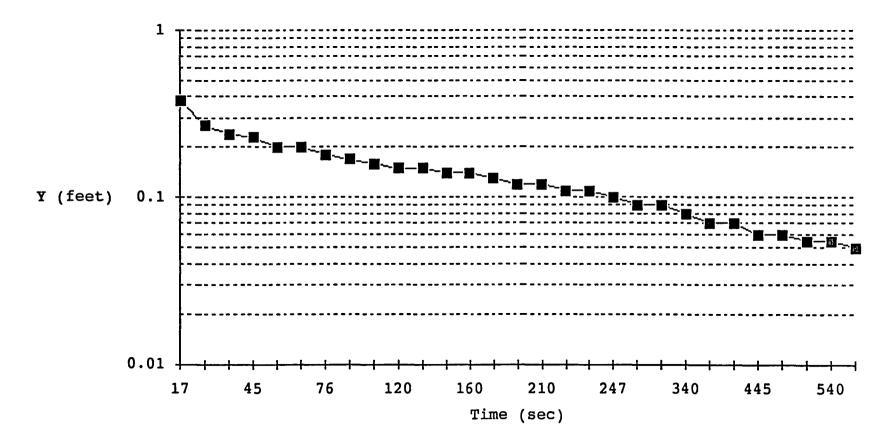


Slug Test - MW6



Slug Test - MW7

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Slug Test - MW10