Environmental
Resources
Management

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January 12, 2010

Mr. Mostafa Mehran
Arkansas Department of Environmental Quality
Hazardous Waste Division
8001 National Drive
Little Rock, AR 72219-8913

Project No. 0097932

Subject: Interim Measure Status Report;
Whirlpool Corporation, Fort Smith, Arkansas

Dear Mr. Mehran:

On behalf of Whirlpool Corporation, Environmental Resources Management Southwest, Inc. (ERM) is pleased to provide this status report on the interim measure (IM) activities as conducted in accordance with the approved Interim Measure Work Plan dated March 17, 2008.

Introduction

Whirlpool Corporation (Whirlpool) has been working with The Arkansas Department of Environmental Quality (ADEQ) to address potential risks to human health and the environment associated with a historical release of trichloroethylene (TCE) at the Whirlpool Fort Smith facility (the site) located at 6400 Jenny Lind Avenue, Fort Smith, Arkansas (Figure 1). Based on site investigations conducted between 1999 and 2006, TCE and associated degradation products (primarily cis-1,2-dichloroethene) are present in shallow ground water at the site and have migrated off-site into a residential area north of the facility.

Whirlpool's Risk Evaluation Report (RER) for the site, submitted June 13, 2007, summarized area land use, site geology and hydrogeology, and evaluated exposure scenarios and assessed potential risks to human health. The RER characterized the approximate extent of the off-site ground water plume as having two general components: the "core" and the "fringe" (Figure 2). The "core" is roughly identified as the area where TCE concentrations exceed approximately 0.8 mg/L. The "fringe" is identified as the remainder of the off-site plume where TCE concentrations are below 0.8 mg/L and above the EPA Maximum Concentration Level (MCL) of 0.005 mg/L.

The RER concluded that there were two exposure pathways that could pose potential risk to human health and the environment near the "core" of the off-site plume: 1) ground water ingestion via use of a hypothetical future well, and 2) inhalation of vapors via volatilization of affected ground water. Based on current conditions, neither of these pathways is expected to be complete. The ground water ingestion pathway is not complete since there

are no private or public water supply wells within the footprint of the plume and the homes in the area are on municipal water service. Additionally, potential exposure by vapor intrusion into homes is also not likely. Observations from boring logs indicate clayey soils are present at the surface to depths of approximately 10 to 15 feet. The clays serve as a significant barrier to vapor transport to the ground surface. Additionally, all but two of the residences near the plume's "core" are pier and beam-type homes, having crawl spaces that would vent vapors to ambient air and interrupt the intrusion pathway.

Objectives

The IM is being conducted as a two-phased program. The initial phase (started in April 2009) included two in-situ chemical oxidation (ISCO) treatment events along with a ground water pumping test. The purpose of the initial phase was to evaluate 1) the effectiveness of ISCO at treating the core of the off-site plume and 2) the feasibility of ground water pumping to induce gradients and subsequent flow through the aquifer. Based on preliminary data presented herein, the second phase (tentatively scheduled for 1Q 2010) will involve ground water pumping from at least one well to induce gradients and pull permanganate through the plume to effect treatment of the entire core of the plume.

Interim Measures Technical Approach – In-situ Chemical Oxidation (ISCO)

Methods

Prior to conducting ISCO treatments, 13 wells (one ground water recovery well, three monitor wells and nine ISCO injection wells) were installed in January 2009 throughout the "core" of the off-site plume as shown in Figure 2. The actual location of the ISCO wells varied slightly from the proposed arrangement in the Work Plan due to underground utilities, trees and property access.

Wells were installed using a combination Geoprobe/hollow-stem auger drilling rig to depths ranging from approximately 24 to 30 feet below ground surface (bgs). Wells were constructed in general accordance with ADEQ guidance. The well locations are shown in Figure 2. Well completion details for all new wells are provided on Table 1.

Descriptions of each soil core, including the lithology, color, moisture content and other features such as texture and plasticity were recorded in the field. Only six of the 13 wells were logged, due to the close proximity of the wells. Soil cores were field-screened for the potential presence of volatile organic compounds utilizing an Organic Vapor Meter (OVM). Boring logs are provided in Attachment 1.

Upon reaching total depth, well materials consisting of 10 feet of 2-inch ID Schedule 40 PVC 0.010-inch machine slotted well screen with sufficient 2-inch OD PVC riser to reach the surface were installed in the each boring. A fine (e.g., 20/40 sieve) silica sand filter pack was placed in the annular space between the well string and the borehole to a minimum of two feet above the top of the well screen. A well seal consisting of bentonite pellets was installed on top of the sand pack and allowed to hydrate. The remainder of the annulus was filled to the surface

with a bentonite/Portland cement grout mixture. The wells were completed at grade with 4-foot by 4-foot concrete pads, steel manway and a manhole cover (Figure 3).

Following well installation, each well was developed using a surge block and bailer. A surge block was used to flush water in and out of the well screen, and then the suspended sediment was removed using a 2-inch PVC bailer. Soil cuttings and purge water generated from the drilling and well development activities were stored in 55-gallon steel drums on-site for management and disposal by Whirlpool.

Following well installation, ISCO treatment was conducted in general accordance with the approved IM Work Plan and UIC authorization. A sodium permanganate solution was applied to eight of the injection well locations during two separate ISCO treatment events (April 2009 and July 2009) of the initial phase of the IM. A total volume of approximately 1,105 gallons was used during the two treatment events and while injection pressure varied throughout, it was generally less than 5 pounds per square inch (psi). Injection volumes and pressure for individual wells during each event are summarized on Table 2.

ISCO Performance Evaluation

Following each ISCO treatment, performance monitoring was conducted in accordance with the Work Plan including:

- Periodic water level gauging of selected wells to assess potential changes in ground water flow resulting from injection activities;
- Periodic sampling of selected monitor wells to assess the changes in TCE concentration from the ISCO injections; and
- Periodic field screening of selected wells for water quality parameters (e.g., oxidation-reduction potential (ORP), dissolved oxygen (DO), temperature, pH, specific conductivity (SC) and chloride (Cl)) to assess the level of impact on the ground water chemistry from the ISCO treatment.

Wells with visible permanganate in the ground water (IW-72, IW-73, IW-74, IW-75, IW-76, IW-78, IW-79, IW-80, MW-35R and MW-65) were not sampled during performance monitoring events or the October 2009 semiannual sampling event. With two exceptions, all of the treatment area wells with no visible permanganate in the ground water were sampled and analyzed after each ISCO treatment and during the October 2009 sampling event.

Two wells located along Jacobs street immediately downgradient of the treatment area (MW-42B and MW-43) were damaged between the April and October sampling events. To prevent further damage and potential unauthorized access, each well was temporarily capped and sealed. The wells could not be sampled during performance monitoring activities or during the October sampling event.

ISCO Treatment Results

ORP performance monitoring between the treatments, suggests the radius of influence for ISCO treatment ranges from 5 to 45 feet. It appears the variation is generally consistent with lithological characterizations of the aquifer: wells in gravel-rich areas have larger radius of influence than wells in clay-rich areas.

Based on ORP measurements and qualitative field observations, unreacted permanganate remains within 40 to 50 feet of ISCO treatment wells; even three months after treatment. ORP values from the April and October 2009 sampling events are presented in Figures 5 and 6. The inferred area of unreacted permanganate is indicated on Figure 6.

Figures 4 and 5 also illustrate TCE concentrations in ground water from the April and October 2009 sampling events. Wells with unreacted permanganate were not sampled, since the presence of unreacted permanganate generally implies complete destruction of the TCE. Additionally, purging those wells would effectively remove the treatment solution.

Data from monitoring points adjacent to ISCO treatment wells appear to exhibit a slight decrease in concentration after treatments. The changes in concentration in wells adjacent to ISCO treatment wells are shown in Table 3. Of note is that monitoring well 46R (located approximately 400 feet downgradient of the treatment area) exhibited elevated ORP and a slight concentration decrease.

The analytical data suggest permanganate treatment is very effective within the radius of influence of the injection well. The fact that permanganate has not migrated further away from the treatment wells supports conclusions from earlier site data that the aquifer is characterized by highly permeable soils within the gravel-rich zone but given the limited amount of saturated thickness, has low transmissivity. Therefore, ground water in the areas where treatment was applied is fairly stagnant. It is expected that migration of unreacted permanganate into the plume will be slow due to the very low gradients in the area between Ingersoll and Jacobs. The exception to this conclusion (potentially evidenced by data from 46R) may be the presence of some flow along interconnected gravel rich zones or channels. While such interconnectedness has not been observed directly, it may be responsible for the current configuration of the plume and the fact that impact of ISCO is apparent at 46R.

Interim Measures Technical Approach – Ground Water Pumping Evaluation

Methods

During installation of injection and observation wells, a 4-inch diameter well (RW-69) was installed north of Jacobs at the southeast corner of Whirlpool property. The well was installed and developed in the same manner as injection wells described earlier in this report.

Aquifer testing was conducted during May 4 and 5, 2009. Initially, a series of three step tests was conducted over approximately 12 hours to assess the maximum flow rate which the aquifer could sustain while pumping over an extended period of time. Results from the step

testing indicated that pumping rates of approximately 0.5 gal/min enabled a stable drawdown and sustainable rate of ground water extraction over a longer period of time. These results are shown in Figure 6. A significant rain event occurred during the aquifer test, which led to a substantial amount of uncertainty in the water level data.

Following step testing, an aquifer pumping test was performed using well RW-69. Two nearby monitor wells (MW-70 and MW-71) were used as primary observation wells. Field personnel used a combination of electronic dataloggers with transducers and manual water level indicators to record depth-to-ground water levels over a 38.5-hour monitoring period. Data from the pumping well and two observation wells approximately 10 and 15-feet north of RW-69 were evaluated to assess aquifer characteristics.

Performance Evaluation

Performance monitoring during the pumping test was conducted in accordance with the Work Plan including:

- Periodic water level gauging of selected wells to assess the change in ground water flow resulting from the extraction of ground water;

Ground Water Pumping Results

Evaluation of the ground water level data from observation wells over the limited duration of the pumping test suggest that the approximate area of influence related to pumping may be as much as 45 feet (Figure 7). A more quantitative evaluation of distant drawdown relationships was not possible due to the significant noise in the data caused by heavy rainfall and barometric changes during the test. Pumping test and recovery test data were input into Aqtesolv software to assess aquifer parameters such as hydraulic conductivity and specificity. Output from the Aqtesolv analyses are presented in Attachment 2. The hydraulic conductivity of the aquifer is estimated from 5.3×10^{-3} cm/second to 8.1×10^{-3} cm/second generally similar to results from a test conducted at well MW-35R in 2006.

Conclusion and Path Forward

ORP data, visual observations, and analytical data collected during Phase 1 of the IM suggest that ISCO treatments are very effective at the site where treatment is applied. The area over which the treatment is effective, however, appears to be highly dependent on local lithology and static ground water flow gradients. Based on the evaluation of ISCO performance data, permanganate has not migrated a measurable distance away from treatment wells over the three-month evaluation period.

Evaluation of aquifer test data indicated hydraulic conductivity ranges from 5.3×10^{-3} cm/second to 8.1×10^{-3} cm/second and the potential radius of influence of the recovery well is approximately 45 feet. These data indicate that ground water pumping at the well RW-69 could be a viable option for inducing a gradient at the site to help move ISCO reagents through the formation to reach untreated portions of the aquifer.

IM performance monitoring is ongoing. If the aquifer remains stagnant and permanganate does not move adequately through the core of the plume, the second phase of the IM will be initiated. As indicated in the IM Work Plan, the second phase may involve ground water pumping to induce gradients in the aquifer and effect movement of the permanganate into untreated portions of the plume. A schedule for further IM implementation is included in Table 4.

Should you have any questions, please contact us.

Sincerely,

Environmental Resources Management Southwest, Inc.

Troy W. Meinen

Ronald T. Grimes, P.E.

TWM/skd

Attachments

cc: Robert J. Karwowski, Whirlpool Corporation
Jerry Scott Horton, Whirlpool Corporation
H. Reiffert Hedgcoxe, Environmental Resources Management Southwest, Inc.

Tables

January 12, 2010
Project No. 0097932

Environmental Resources Management Southwest, Inc.
15810 Park Ten Place, Suite 300
Houston, Texas 77084-5140
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TABLE 1

Well Construction Details
Interim Measure Field Activities
Fort Smith, Arkansas

Well Identification	Well Location Coordinates (WGS84) X (E)	Y (N)	Surface Elevation (ft)	Top of PVC Casing Elevation (ft)	Total Well Depth (ft)	Total Borehole Depth (ft)	Elevation Bottom of Hole (ft asl) [1]	Well Screen Length Interval (ft)	Top of Well Screen Elevation [2] (ft asl)
IW-72	35.3240	-94.4180	472.2	471.65	25.00	27.50	447.200	15.0-25.0	468.700
IW-73 *	7899.91	9575.14	472.1	471.48	25.00	27.50	447.100	15.0-25.0	468.600
IW-74	35.3240	-94.4180	472.3	472.06	25.50	28.00	446.800	15.0-25.0	468.800
IW-75 *	7905.94	9676.85	472.8	472.17	25.00	27.50	447.800	15.0-25.0	469.300
IW-76 *	7895.32	9498.35	473.2	472.26	27.00	29.50	446.200	17.0-27.0	469.700
IW-77	35.3230	-94.4180	473.8	473.01	27.50	30.00	446.300	17.5-27.5	470.300
IW-78 *	7834.62	9406.82	474.2	473.49	27.50	30.00	446.700	17.5-27.5	470.700
IW-79 *	7868.25	9405.70	474.1	473.84	27.50	30.00	446.600	17.5-27.5	470.600
IW-80	35.3240	-94.4180	473.7	473.30	27.50	30.00	446.200	17.5-27.5	470.200
MW-68	35.3250	-94.4170	470.0	469.81	24.00	24.00	446.000	14.0-24.0	466.500
MW-70 *	7998.72	9761.84	471.7	471.53	25.00	27.50	446.700	15.0-25.0	468.200
MW-71 *	7997.73	9772.17	471.5	471.35	25.00	27.50	446.500	15.0-25.0	468.000
RW-69	35.3250	-94.4180	471.5	471.25	25.00	26.00	446.500	15.0-25.0	468.000

NOTES:

Well screen slot size for all listed wells is 0.01 inches.

* - Coordinates were calculated from the northwest corner of the facility in a site-specific coordinate system.

[1] Surface Elevation minus Total Well Depth.

[2] Surface Elevation minus depth to Top of the Well Screen.

TABLE 2

Phase 1 - ISCO Treatment

Fort Smith Interim Measure
Whirlpool

April 2009 ISCO Treatment (Event #1)

Well ID	Date	Start Time	End Time	Pressure (PSI)	Volume Injected (gal)
Off-Site Areas					
MW-72	Well not used for injected during April Event				
MW-73	4/30/2009	9:55	10:07	<5.0	90
MW-74	5/1/2009	9:10	13:00	<5.0	55
MW-75	4/29/2009	12:35		<5.0	90
MW-76	Well not used for injected during April Event				
MW-78	4/30/2009	12:51	13:09	4.0	90
MW-79	4/30/2009	12:43	17:25	0.0	120
MW-80	Well not used for injected during April Event				

July 2009 ISCO Treatment (Event #1)

Well ID	Date	Start Time	End Time	Pressure (PSI)	Volume Injected (gal)
Off-Site Areas					
MW-72	7/30/2009	1500	1729	~5	90
MW-73	7/29/2009	1550	1605	~4	90
MW-74	7/30/2009	1136	1225	~5	90
MW-75	7/29/2009	1050	1650	Gravity	90
MW-76	7/29/2009	1610	1625	~4	30
MW-78	7/28/2009	1625	1636	~4.5	90
MW-79	7/28/2009	1639	1641	0	90
MW-80	7/30/2009	1106	1125	~5	90

TABLE 3

Trichloroethene (TCE) Concentrations in the Vicinity of Treatment Wells
Pre- and Post- ISCO

Fort Smith Interim Measure
Whirlpool

Well ID	Pre-ISCO April 2009	Post ISCO October 2009
IW-77	0.57	0.380
MW-32	0.047	0.068
MW-33	1.2	1.2
MW-41	0.66	0.18
MW-46R	0.46	0.39

NOTES:

1. TCE concentrations reported in mg/L.
2. NS - Not Sampled due to presence of unreacted permanganate.

TABLE 4

IM Phase 2 Implementation Schedule

Activity	Time Period
IM Pumping Well Design	First Quarter 2010
IM Pumping Well Installation	Second Quarter 2010
ISCO Treatments (if needed)	Second Quarter 2010/Third Quarter 2010
IM Evaluation	First Quarter 2011

Figures

January 12, 2010
Project No. 0097932

Environmental Resources Management Southwest, Inc.
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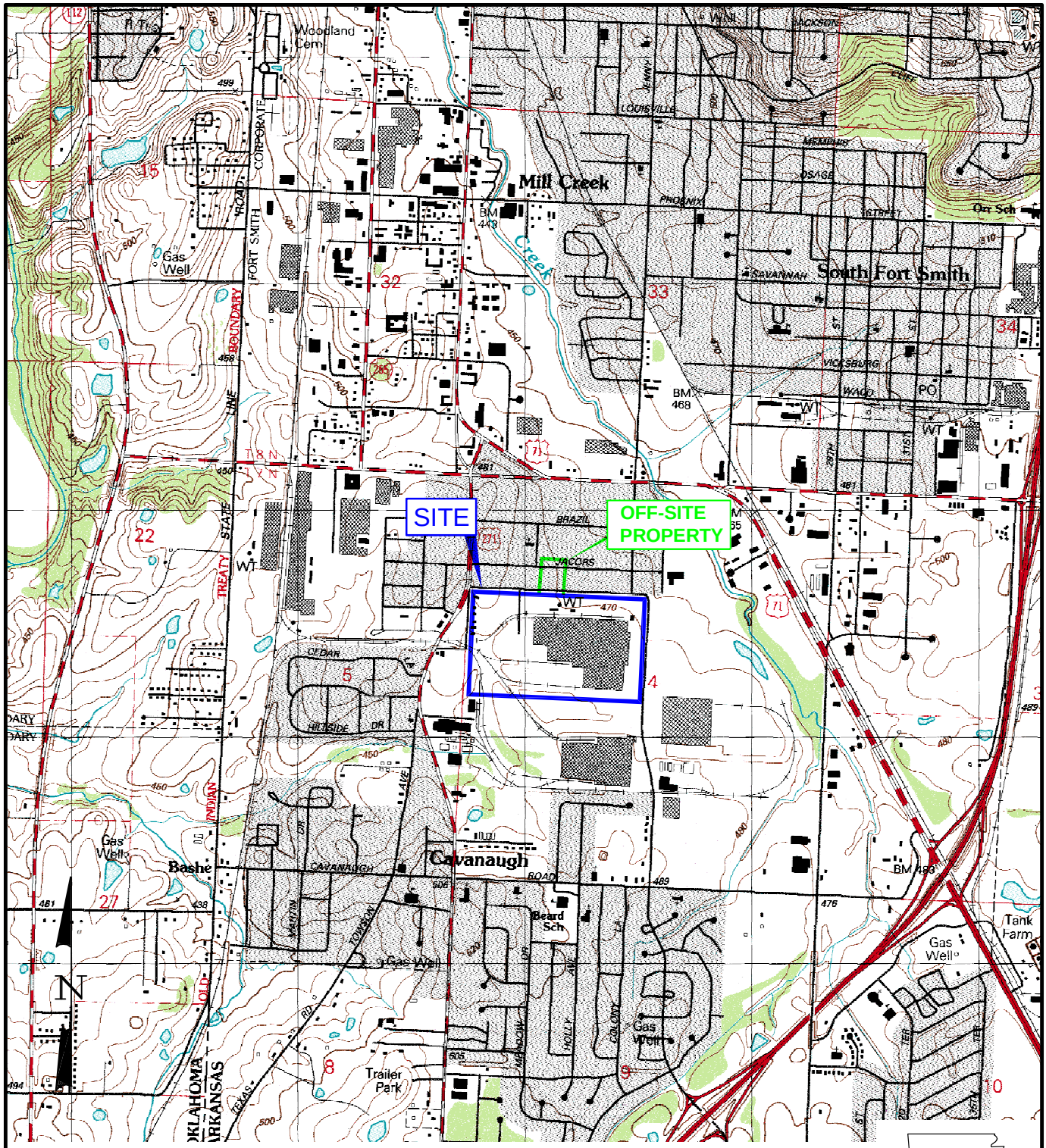

SOURCE: U.S.G.S. 7.5' QUADRANGLE, SOUTH FORT SMITH, ARK.-OKLA., (o35094C4) 1987.

Environmental Resources Management

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DATE: 11/23/2009	SCALE: AS SHOWN	REV.:
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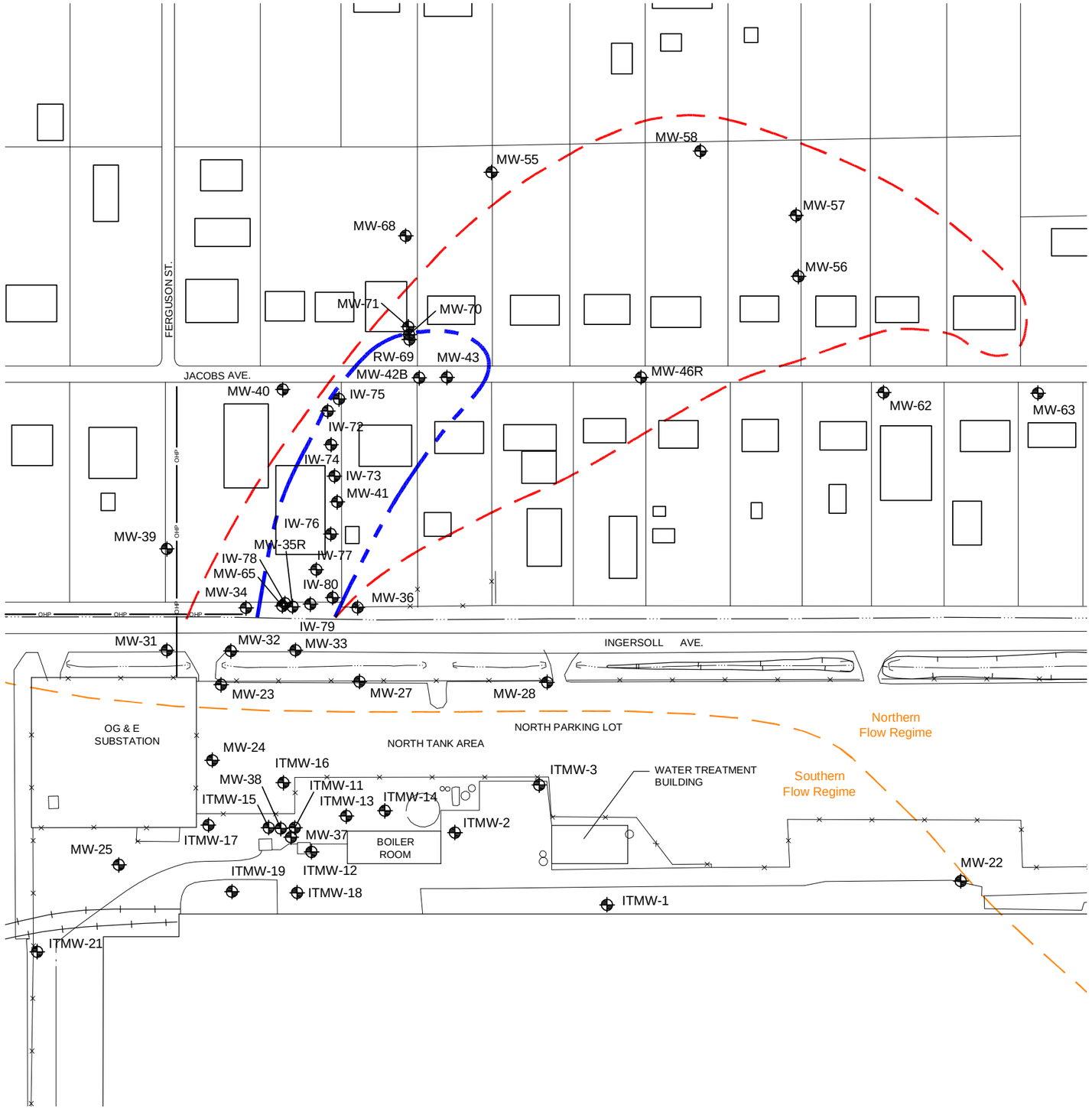
FIGURE 1
SITE LOCATION MAP
Whirlpool Corporation
Fort Smith, Arkansas

ERM



Environmental Resources Management

FIGURE 2
IM WELL LOCATIONS

Whirlpool Corporation
Fort Smith, Arkansas

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ERM

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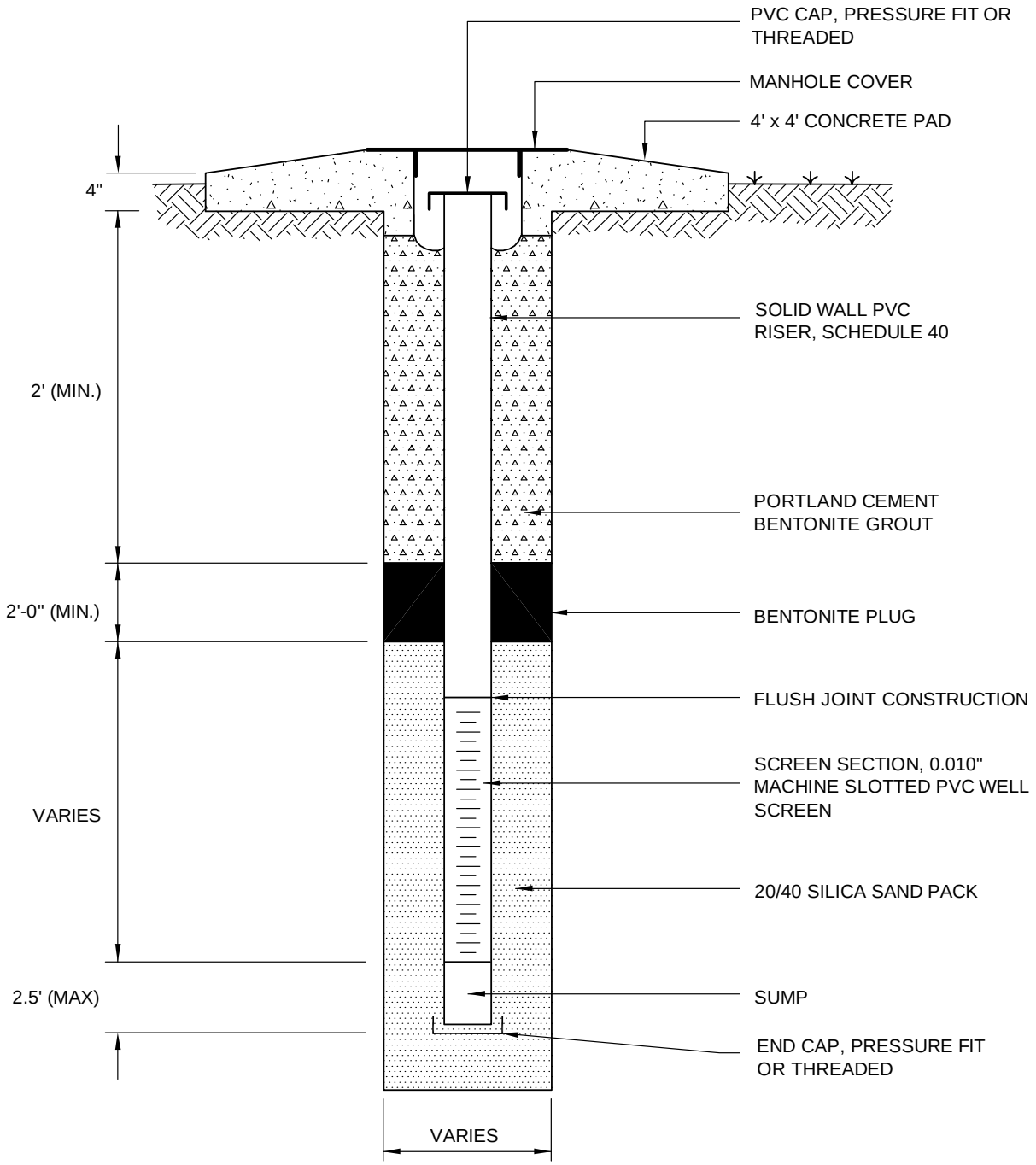

NOT TO SCALE

Environmental Resources Management

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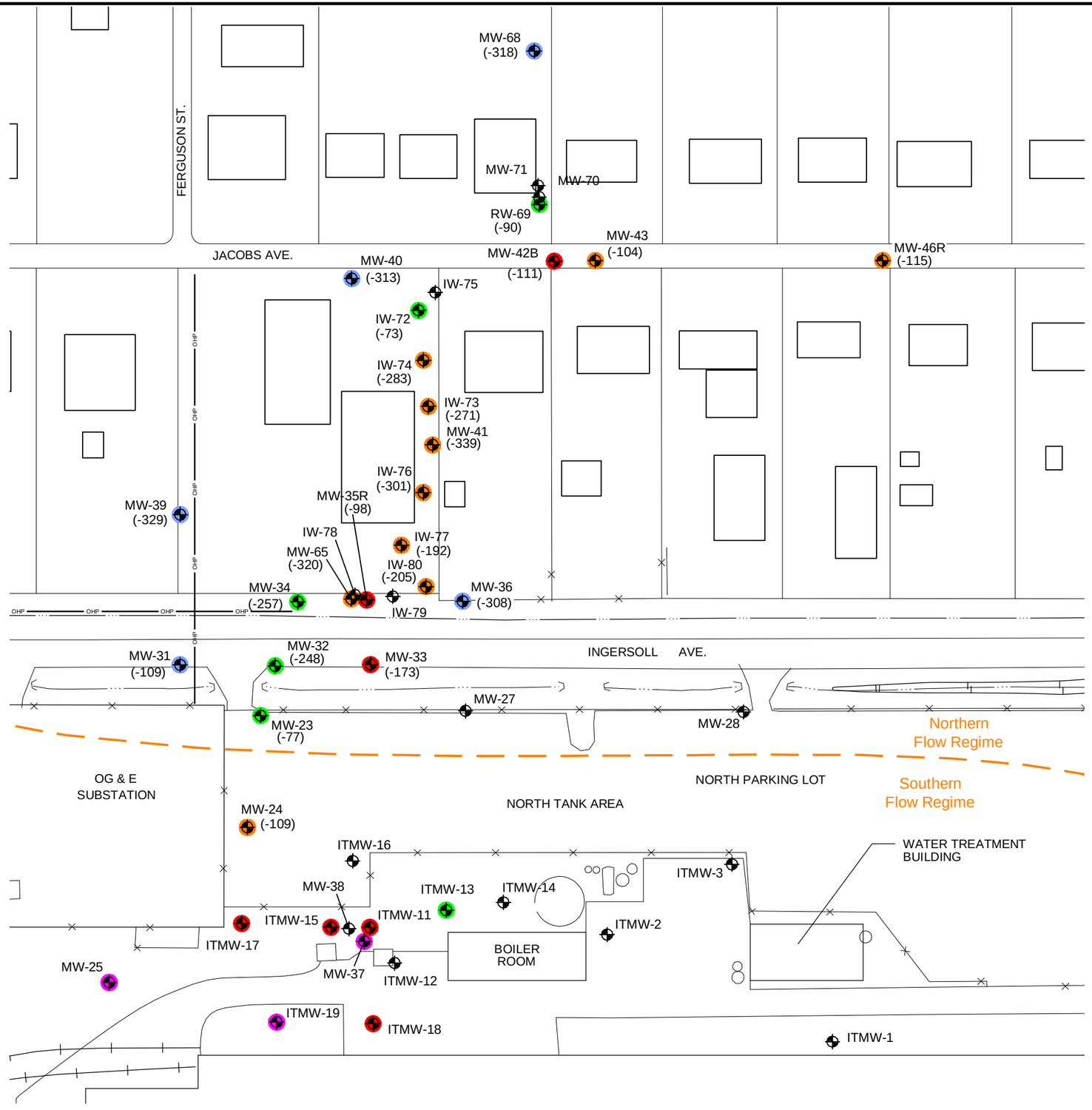
FIGURE 3
TYPICAL CONSTRUCTION WELL
COMPLETED BELOW GRADE
Whirlpool Corporation
Fort Smith, Arkansas

ERM



LEGEND

EXISTING MONITORING WELL

(-73) ORP READING (mV)

TCE CONCENTRATION (mg/l)
APRIL 2009

- < 0.005
- 0.005 to 0.10
- 0.10 to 1.00
- 1.00 to 10.0
- > 10.0

NOTE:

WELLS WITHOUT ANY COLOR WERE NOT SAMPLED DURING THE APRIL SAMPLING EVENT.

0 100 200
SCALE FEET

Environmental Resources Management

FIGURE 4
SPRING TCE ISOCONCENTRATION MAP
APRIL 2009
Whirlpool Corporation
Fort Smith, Arkansas

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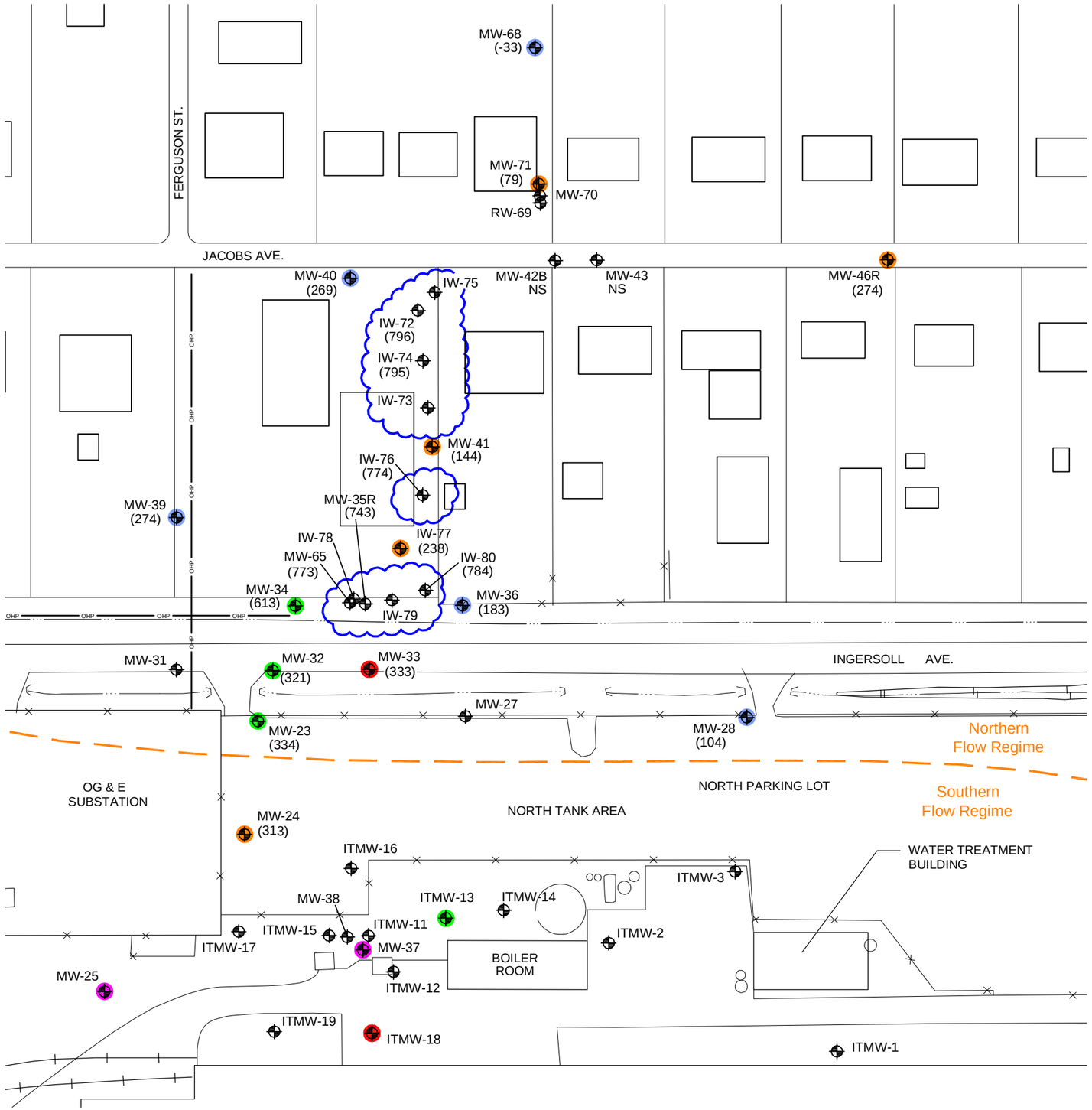

LEGEND

- EXISTING MONITORING WELL
- NS NOT SAMPLED
- (743) ORP READING (mV)

TCE CONCENTRATION (mg/l)
OCTOBER 2009

- < 0.005
- 0.005 to 0.10
- 0.10 to 1.00
- 1.00 to 10.0
- ≥ 10.0
- PERMANGANATE PRESENT IN WELL

NOTE:

WELLS WITHOUT ANY COLOR WERE NOT SAMPLED DURING THE OCTOBER SAMPLING EVENT.

0 100 200
SCALE FEET

Environmental Resources Management

FIGURE 5
FALL TCE ISOCONCENTRATION MAP
OCTOBER 2009
Whirlpool Corporation
Fort Smith, Arkansas

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DATE: 12/11/2009	SCALE: AS SHOWN	REV.:
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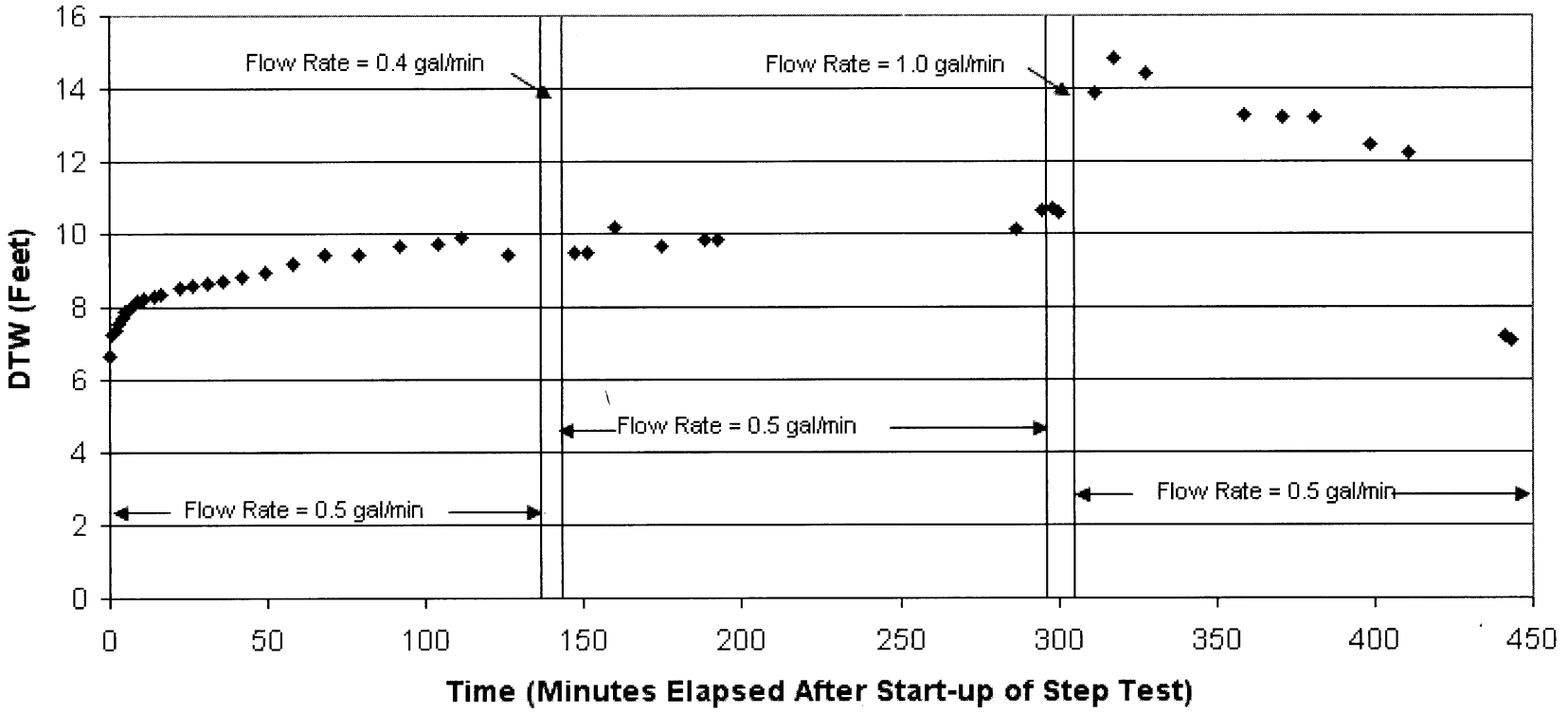

Environmental Resources Management

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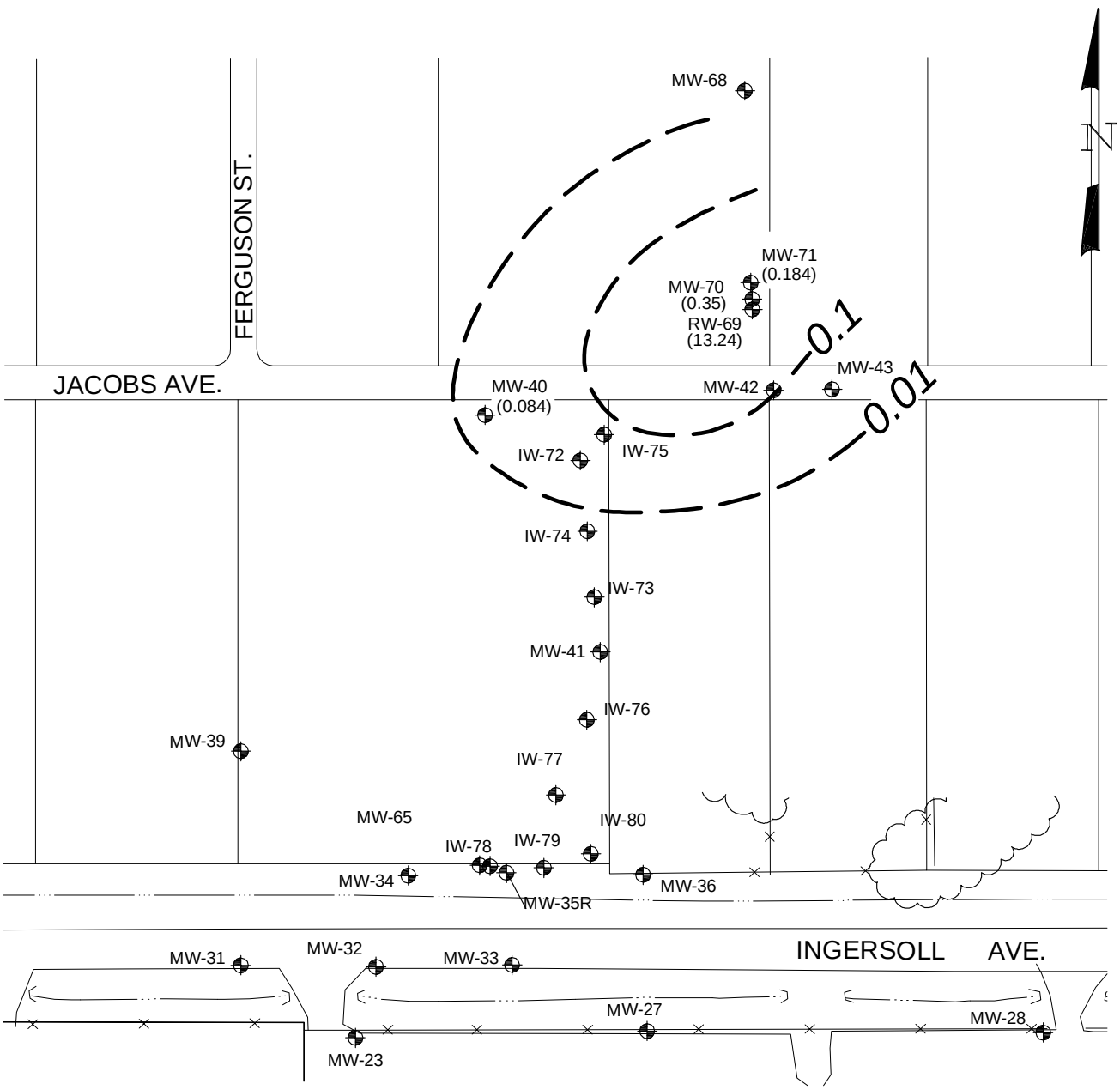
W.O. NO.: H:\DWG\L09\0097933A1.dwg, 12/10/2009 3:20:42 PM		

FIGURE 6
RW-69 STEP TEST
MAY 2009

Whirlpool Corporation
Fort Smith, Arkansas

ERM



NOTE: DRAWDOWN CORRECTED FOR CHANGES IN ATMOSPHERIC PRESSURE

0 100 200

SCALE FEET

LEGEND

MONITOR WELLS

(0.35) MAXIMUM OBSERVED CORRECTED DRAWDOWN

Environmental Resources Management

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DATE: 12/11/2009	SCALE: AS SHOWN	REV.:
W.O. NO.: H:\DWG\L09\0097933A001.dwg , 12/11/2009 2:40:01 PM		

FIGURE 7
OBSERVED DRAWDOWN: RW-69 PUMPING TEST
Whirlpool Corporation
Fort Smith, Arkansas

ERM

Boring Logs

Attachment 1

January 12, 2010
Project No. 0097932

Environmental Resources Management Southwest, Inc.
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Houston, Texas 77084-5140
(281) 600-1000

ERM Environmental Resources Management

IW-72
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-72 Date Drilled 1/8/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 27.5 ' Boring Diam. 6.6 "

N. Coord. 35.324 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 2 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 2 " Length 16 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 8.09 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Zane Ruffen

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
466	0					0-6	0-6	NOT SAMPLED
464	2							
462	4							
460	6				0.0	6-8	6-8	SILTY CLAY: Light gray with yellowish red mottling, moist, slightly plastic to slightly crumbly, minor sand content, abundant roots.
458	8				0.0	8-10	8-10	SILTY CLAY: Light gray to yellowish red, moist, slightly plastic to slightly crumbly, occasional quarter inch gravel. At 9 feet - Black mottling.
456	10							

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ERM Environmental Resources Management

IW-72
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-72 Date Drilled 1/8/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 27.5 ' Boring Diam. 6.6 "

N. Coord. 35.324 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 2 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 2 " Length 16 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 8.09 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Zane Ruffen

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
456	10				0.0	10-12	10-12	SILTY CLAY: Yellowish red, moist, slightly plastic to slightly crumbly with light gray sand pockets.
454	12				0.0	12-14	12-15	CLAYEY SAND: Yellowish red, moist, slightly crumbly, black mottling along root traces with gray sand pockets.
452	14				0.0	14-16		
							15-20	SANDY SILTY CLAY: Light gray with yellowish red mottling, moist, slightly plastic.
450	16				0.0	16-18		At 16-17 feet - Black mottling along root traces.
448	18				0.0	18-20		
446	20							

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ERM Environmental Resources Management

IW-72
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-72 Date Drilled 1/8/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 27.5 ' Boring Diam. 6.6 "

N. Coord. 35.324 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 2 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 2 " Length 16 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 8.09 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Zane Ruffen

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
446	20				0.0	20-22	20-21.5	SANDY CLAY: Light gray with black and yellowish red mottling, moist, slightly crumbly.
							21.5-22	SANDY CLAY: Yellowish red, moist, slightly crumbly with occasional quarter inch gravel.
444	22				0.0	22-24	22-24	CLAYEY GRAVELLY SAND: Strong brown some red and light gray mottling, wet, crumbly, dense, clayey matrix.
442	24				0.0	24-26	24-25.8	GRAVELLY SAND: Strong brown, wet, slightly plastic to slightly crumbly, with occasional one inch diameter gravel.
440	26				0.0		25.8-26	CLAY-SHALE: Dark brown, weathered, fissil, wet, dense.
								T.D. = 27.5 '
438	28							
436	30							

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ERM Environmental Resources Management

IW-74
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-74 Date Drilled 1/9/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 27.5 ' Boring Diam. 6.6 "

N. Coord. 35.324 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 16 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 8.11 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Rick Jones

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
466	0					0-6	0-6	NOT SAMPLED
464	2				0.0			
462	4				0.0			
460	6				0.0	6-8	6-8	SILTY CLAY: Yellowish red with light gray and red mottling, moist, plastic, abundant roots.
458	8				0.0	8-10	8-9	GRAVELLY SANDY CLAY: Yellowish red, moist, slightly crumbly to slighty plastic with minor sand content, abundant roots and occasional red mottling.
							9-10	SILTY CLAY: Yellowish red with light gray mottling with black mottling along root traces, moist, plastic, sandy clay pockets.
456	10							

ERM Environmental Resources Management

IW-74
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-74 Date Drilled 1/9/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 27.5 ' Boring Diam. 6.6 "

N. Coord. 35.324 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 16 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 8.11 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Rick Jones

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
456	10				0.0	10-12	10-12	SILTY CLAY: Strong brown with light gray to reddish yellow mottling, occasional black mottling along root traces, moist to saturated, dense, with gravel, sandy clay pockets.
454	12				0.0	12-14	12-14	SILTY CLAY: Light gray, moist, plastic, occasional quarter inch diameter gravel with minor sand content.
452	14				0.0	14-16	14-18	SANDY CLAY: Light gray with gray mottling, moist, slightly plastic.
450	16				0.0	16-18		
448	18				0.0	18-20	18-22	GRAVELLY SAND: Strong brown, saturated, loose.
								At 19 to 19.5 feet - Light gray silty clay, saturated, plastic.
446	20							

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ERM Environmental Resources Management

IW-74
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-74 Date Drilled 1/9/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 27.5 ' Boring Diam. 6.6 "

N. Coord. 35.324 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 16 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 8.11 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Rick Jones

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
446	20				0.0	20-22		
444	22				0.2	22-24	22-24	SANDY GRAVEL: Strong brown, saturated, loose, darker gravel with depth, generally quarter inch diameter gravel with occasional one inch diameter gravel.
442	24				0.0	24-26	24-26	GRAVELLY SAND: Strong brown, with abundant quarter inch diameter gravel and occasional 2 inch gravel, saturated, loose.
440	26				0.00	26-27	26-27	SHALE: Strong brown to dark brown, weathered, fissil.
								T.D. = 27.5 '
438	28							
436	30							

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ERM Environmental Resources Management

IW-77
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-77 Date Drilled 1/12/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 30 ' Boring Diam. 6.6 "

N. Coord. 35.323 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 19 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 19.4 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Rick Jones

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
466	0					0-3	0-3	NOT SAMPLED
464	2				0.0	3-5	3-7	SILTY CLAY: Light gray mottled with yellowish red and red mottling, moist, plastic with abundant roots, red mottling decreasing with depth.
462	4				0.0	5-7		
460	6							At 6 feet - Light gray to gray.
458	8				0.0	7-9	7-9	SILTY CLAY: Strong brown with small quartzite gravel, occasional black and light gray mottling, moist, plastic.
456	10				0.0	9-11	9-11	SILTY CLAY: Light reddish brown to strong brown mottled, with minimal sand content, occasional quarter inch quartzite gravel, moist, plastic to slightly crumbly.

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ERM Environmental Resources Management

IW-77
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-77 Date Drilled 1/12/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 30 ' Boring Diam. 6.6 "

N. Coord. 35.323 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 19 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 19.4 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Rick Jones

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
456	10				0.0	11-13	11-13	SANDY CLAY: Strong brown with light reddish brown mottling, moist, slightly plastic, with black mottling along root traces.
454	12				0.0	13-15	13-15	SANDY CLAY: Reddish yellow, moist, slighty plastic to slightly crumbly, light gray silty clay pockets and black, mottling along root traces.
452	14				0.0	15-17	15-19	CLAYEY SAND TO SANDY CLAY: Light gray with strong brown mottling, moist, crumbly, with occasional roots.
450	16				0.0	17-19		
448	18				0.0	19-21	19-21	GRAVELLY SAND: Strong brown, saturated, loose, occasional half inch diameter quartzite gravel, light gray silty clay pockets.
446	20							

ERM Environmental Resources Management

IW-77
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-77 Date Drilled 1/12/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 30 ' Boring Diam. 6.6 "

N. Coord. 35.323 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 19 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 19.4 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Rick Jones

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
446	20							
					0.0	21-23	21-28	SANDY GRAVEL: Strong brown, occasional dark brown two inch diameter quartzite gravel, wet, dense.
444	22							
					0.0	23-25		
442	24							
					0.0	25-27		
440	26							
					0.0	27-28.5		
438	28						28-28.5	CLAY: Strong brown, weathered, moist, crumbly.
					0.0		28.5-29	SHALE: Very dark brown, fissil, weathered.
								T.D. = 30 '
436	30							

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ERM Environmental Resources Management

IW-80
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-80 Date Drilled 1/13/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 30 ' Boring Diam. 6.6 "

N. Coord. 35.324 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 18 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 0 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Rick Jones

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
466	0					0-15	0-15	NOT SAMPLED
464	2							
462	4							
460	6							
458	8							
456	10							

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ERM Environmental Resources Management

IW-80
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-80 Date Drilled 1/13/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 30 ' Boring Diam. 6.6 "

N. Coord. 35.324 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 18 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 0 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Rick Jones

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
456	10							
454	12							
452	14							
					0.0	15-17	15-19	SANDY SILTY CLAY: Light gray mottled with strong brown sandy clay pockets, moist, slightly plastic to slightly crumbly, with occasional roots.
450	16				0.0			
					0.1	17-19		At 17 feet - Wet and crumbly.
448	18				0.0			
					0.1	19-21	19-23	GRAVELLY SAND: Strong brown, water saturated, loose, with occasional roots and occasional pinkish red quarter inch diameter quartzite gravel.
446	20							

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ERM Environmental Resources Management

IW-80
DRILLING LOG

Proj. No. 0079781 Boring/Well ID IW-80 Date Drilled 1/13/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 30 ' Boring Diam. 6.6 "

N. Coord. 35.324 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 18 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 0 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Rick Jones

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
446	20				0.0	21-23		
444	22				0.0			
					0.1	23-25	23-27	GRAVELLY SAND: Strong brown, wet, loose.
442	24				0.0			
					0.1	25-27		At 25 feet - dense.
440	26				0.0			
					0.3	27-28	27-28	CLAY: Strong brown, moist, plastic.
438	28				0.0		28-28.2	SHALE: Very dark gray, fissil.
436	30							T.D. = 30 '

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ERM Environmental Resources Management

MW-68
DRILLING LOG

Proj. No. 0079781 Boring/Well ID MW-68 Date Drilled 1/6/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 24 ' Boring Diam. 6.6 "

N. Coord. 35.325 ' E. Coord. -94.417 Surface Elevation 465.5 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 2 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 2 " Length 14 ' Sump Length 0 '

Top of Casing Elevation 465.5 ' Stickup 0 '

Depth to Water: 1. Ft. 6.1 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Zane Ruffen

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
465.5	0					0-2	0-2.2	SILTY CLAY: Reddish brown, damp to wet, soft slightly plastic, with abundant rootlets.
464	2				2.6	2-4	2.2-4	SILTY CLAY: Yellowish red with reddish brown mottling, occasional black mottling along root traces, moist, slightly plastic to slightly crumbly, and occasional quarter inch diameter quartzite gravel increasing with depth.
462	4				2.1	4-6	4-6	GRAVELLY CLAY: Yellowish red, moist, slightly crumbly with abundant half inch diameter quartzite gravel.
460	6				0.6	6-8	6-12	SILTY CLAY: Red brown, yellowish brown and black mottled, moist, slightly plastic to slightly crumbly with occasional root traces.
458	8				1.7	8-10		At 9 to 10.5 feet - One inch sand pocket.
456	10							

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ERM Environmental Resources Management

MW-68
DRILLING LOG

Proj. No. 0079781 Boring/Well ID MW-68 Date Drilled 1/6/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 24 ' Boring Diam. 6.6 "

N. Coord. 35.325 ' E. Coord. -94.417 Surface Elevation 465.5 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 2 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 2 " Length 14 ' Sump Length 0 '

Top of Casing Elevation 465.5 ' Stickup 0 '

Depth to Water: 1. Ft. 6.1 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Zane Ruffen

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
	10				1.6	10-12		
454								
	12				2.7	12-14	12-16	SANDY CLAY: Yellowish red to reddish brown mottled, moist, slightly plastic to slightly crumbly some black mottling, black root traces decreasing with depth.
452								
	14				2.2	14-16		
								At 16 feet - half inch silty sand pocket.
450								
	16				4.6	16-18	16-20	SILTY SANDY CLAY: Yellowish red silty sandy clay, slightly plasitc to slightly crumbly, pockets of moist light gray silty sandy clay with higher sand content.
448								
	18				2.3	18-20		
446								
	20							

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ERM Environmental Resources Management

MW-68 DRILLING LOG

Proj. No. 0079781 Boring/Well ID MW-68 Date Drilled 1/6/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 24 ' Boring Diam. 6.6 "

N. Coord. 35.325 ' E. Coord. -94.417 Surface Elevation 465.5 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 2 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 2 " Length 14 ' Sump Length 0 '

Top of Casing Elevation 465.5 ' Stickup 0 '

Depth to Water: 1. Ft. 6.1 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Zane Ruffen

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
	20				3.8	20-22	20-22	NO RECOVERY
444								
	22				0	22-24	22-23.5	GRAVELLY SAND: Yellowish brown quarter inch diameter quartzite gravel, water saturated, and loose.
442							23.5-24	SHALE: Very dark brown weathered shale, hard, fissil.
	24							T.D. = 24 '
440								
	26							
438								
	28							
436								
	30							

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ERM Environmental Resources Management

RW-69 DRILLING LOG

Proj. No. 0079781 Boring/Well ID RW-69 Date Drilled 1/7/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 26 ' Boring Diam. 8.6 "

N. Coord. 35.325 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 16 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 7.04 (_____) 2. Ft. 0 (_____)

Drilling Company Lewis Drilling Driller Zane Ruffen

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
466	0					0-2	0-4	SILTY CLAY: Dark reddish brown, moist, plastic, with abundant roots.
464	2				0.0	2-4		
462	4				0.0	4-6	4-6	SILTY CLAY: Yellowish red to reddish brown mottled, moist, slightly plastic to slightly crumbly, occasional quarter inch diameter quartzite gravel with abundant roots at 4 feet.
460	6				0.0	6-8	6-10	SILTY CLAY: Yellowish red with light gray mottling, moist, slightly crumbly to slightly plastic.
458	8				0.0	8-10		
456	10							

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ERM Environmental Resources Management

RW-69 DRILLING LOG

Proj. No. 0079781 Boring/Well ID RW-69 Date Drilled 1/7/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 26 ' Boring Diam. 8.6 "

N. Coord. 35.325 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 16 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 7.04 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Zane Ruffen

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
456	10				0.0	10-12	10-14	SILTY CLAY: Reddish yellow, moist, slightly plastic with pockets of light gray, with higher sand concentrations increasing with depth.
454	12				0.0	12-14		
452	14				0.0	14-16	14-20	CLAYEY SAND: Light gray, moist, slightly plastic to slightly crumbly with pockets of yellowish red silty clay.
450	16				0.0	16-18		
448	18				0.0	18-20		At 18 feet - Black mottling along root traces.
446	20							

ERM Environmental Resources Management

RW-69
DRILLING LOG

Proj. No. 0079781 Boring/Well ID RW-69 Date Drilled 1/7/2009

Project Whirlpool Injection Wells Owner Scott Horton

Location Fort Smith, Arkansas Boring T.D. 26 ' Boring Diam. 8.6 "

N. Coord. 35.325 ' E. Coord. -94.418 Surface Elevation 466 ' ft. MSL Datum

Screen: Type Schedule 40 PVC Diam. 4 " Length 10 ' Slot Size 0.01 "

Casing: Type Schedule 40 PVC Diam. 4 " Length 16 ' Sump Length 2.5 '

Top of Casing Elevation 466 ' Stickup 0 '

Depth to Water: 1. Ft. 7.04 ( ) 2. Ft. 0 ( )

Drilling Company Lewis Drilling Driller Zane Ruffen

Drilling Method Hollow Stem Auger Log By Betsy Zunk

SKETCH MAP

NOTES

Elevation (Feet)	Depth (Feet)	Graphic Log	Well Construction	Sample Type	OVM (ppm)	Sample Interval (Feet)	Description Interval (Feet)	Description/Soil Classification (Color, Texture, Structure)
446	20				0.0	20-22	20-22	CLAYEY SAND: Light gray with yellowish red mottling, moist, slightly plastic increasing to slightly crumbly with depth.
444	22				0.0	22-24	22-24	CLAYEY SAND: Pinkish gray, occasional quarter inch quartzite gravel, saturated, loose, mottled with yellowish red silty clay.
442	24				0.0	24-26	24-26	GRAVELLY CLAY: Yellowish red, water saturated, loose to slightly crumbly with depth.
440	26				0.0	26-26.2	26-26.2	SHALE: Very dark brown, weathered and fissil.
								T.D. = 27.5 '
438	28							
436	30							

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Aqtesolv Output

Attachment 2

January 12, 2010
Project No. 0097932

Environmental Resources Management Southwest, Inc.
15810 Park Ten Place, Suite 300
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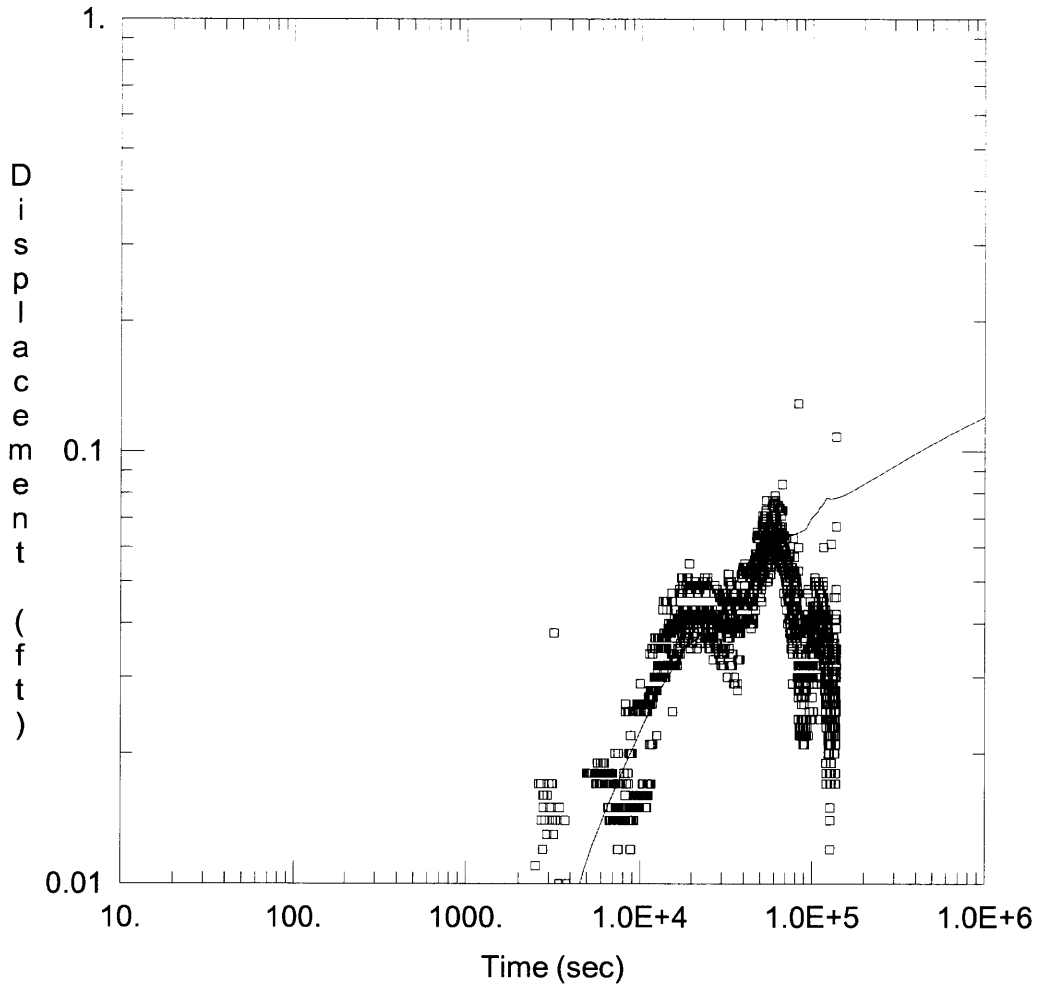


CORRECTED DRAWDOWN

Data Set: C:\...\MW69 PT MW-40 obs corr.aqt
Date: 11/23/09 Time: 10:59:17

PROJECT INFORMATION

Company: ERM
Client: Whirlpool
Project: 97933
Location: For smith
Test Well: RW-69
Test Date: 5/6/09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-69	0	0

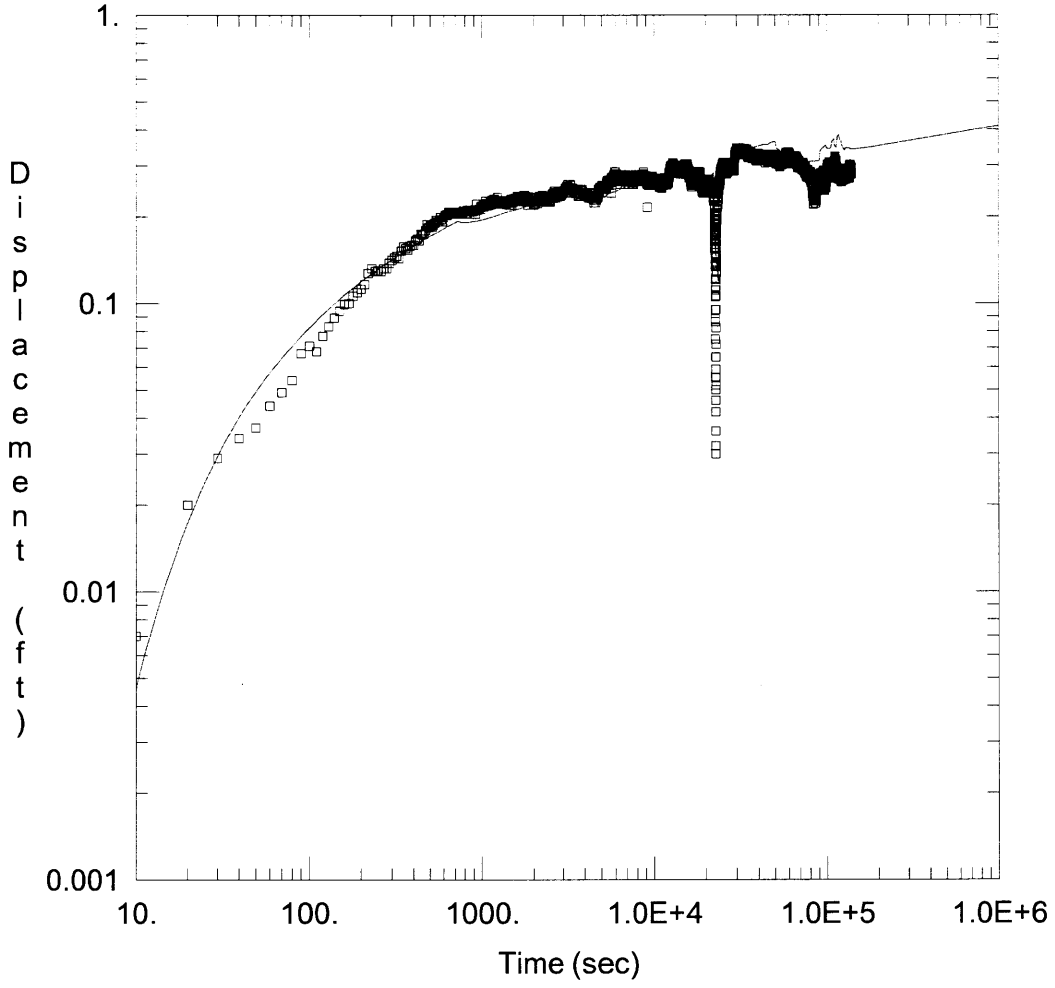
Observation Wells

Well Name	X (ft)	Y (ft)
MW-40	0	185

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 0.003444 ft^2/sec
S = 0.001446
Kz/Kr = 1.
b = 12. ft



CORRECTED DRAWDOWN

Data Set: C:\...\MW69 PT MW-70 obs corr.aqt
Date: 11/23/09 Time: 11:00:41

PROJECT INFORMATION

Company: ERM
Client: Whirlpool
Project: 97933
Location: Fort Smith
Test Well: RW-69
Test Date: 5/6/09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-69	0	0

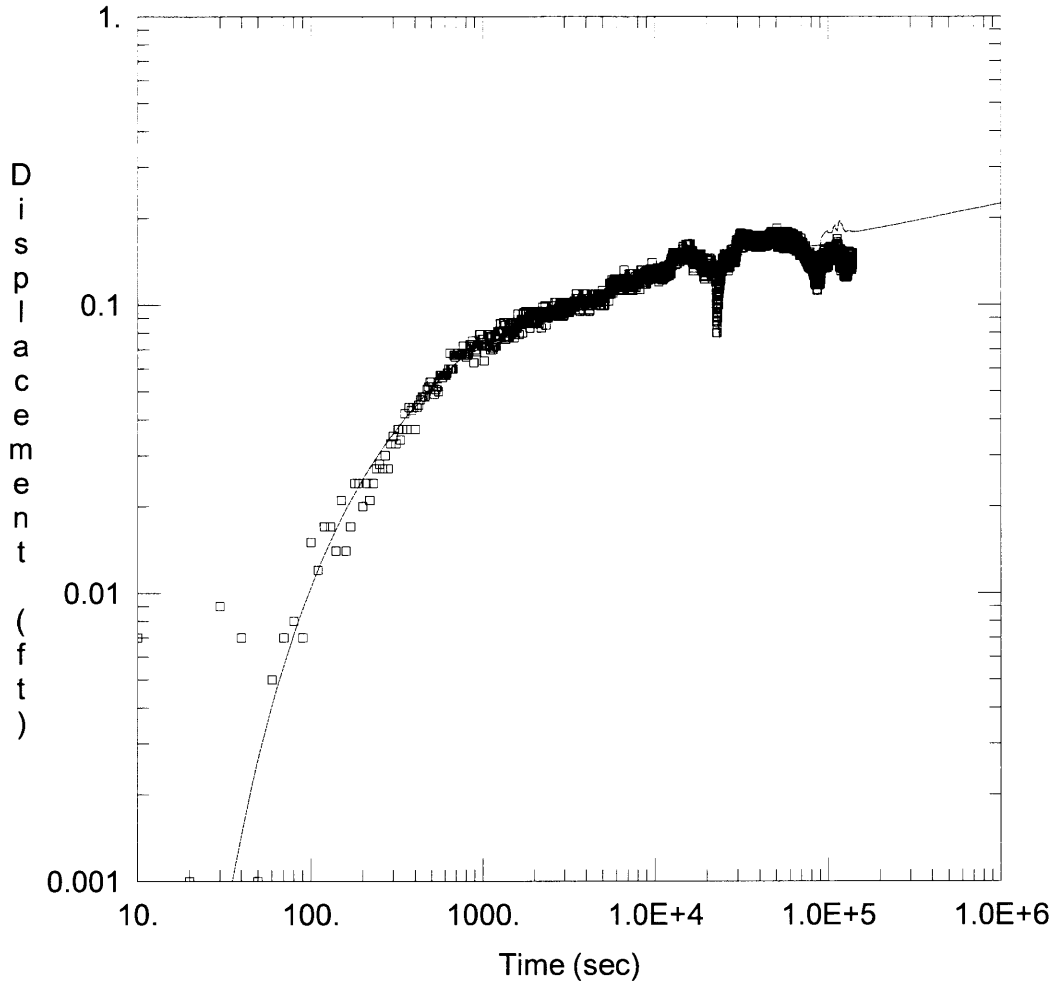
Observation Wells

Well Name	X (ft)	Y (ft)
□ MW-70	0.14	6.36

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 0.002067 ft^2/sec
S = 0.003431
Kz/Kr = 1.
b = 12. ft



CORRECTED DRAWDOWN

Data Set: C:\...\MW69 PT MW-71 obs corr.aqt
Date: 11/23/09 Time: 11:04:42

PROJECT INFORMATION

Company: ERM
Client: Whirlpool
Project: 97933
Location: Fort Smith
Test Well: RW-69
Test Date: 5/6/09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-69	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-71	1.13	16.71

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 0.003194 ft^2/sec
S = 0.004013
Kz/Kr = 1.
b = 12. ft