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## Semi-Annual Monitoring Report

Hercules Incorporated Hattiesburg, Mississippi

# FILE COPY

## Prepared for: Hercules Incorporated

## November 2008

Eco. Systems, Inc. Consultants, Engineers, and Scientists



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#### **1.0 INTRODUCTION**

Hercules Incorporated (Hercules) commissioned Eco-Systems, Inc. (Eco-Systems) to conduct groundwater and surface water monitoring at the Hattiesburg, Mississippi facility. The site location is shown in Figure 1. The work is being conducted in accordance with the <u>Corrective Action Plan Revision 01</u> (CAP) prepared by Groundwater & Environmental Services, Inc. (GES) dated January 20, 2005, which was approved by the Mississippi Department of Environmental Quality (MDEQ) in a letter dated January 25, 2005 and modified in a letter from MDEQ to Hercules dated August 18, 2006. The eight quarterly monitoring events specified in the CAP were completed in May 2007 and discussed in the second Annual Monitoring Report (Eco-Systems, August 2007). In accordance with the recommendation of the 2007 Annual Monitoring report, surface water and groundwater monitoring is being continued on a semi-annual basis.

This report describes sampling activities and analytical results for the 3rd semi-annual monitoring event. During this event, water levels were measured at 18 wells and 15 piezometers, surface water samples were collected from six locations in Green's Creek, and groundwater samples were collected from 18 monitoring wells. As required by the CAP, as approved and modified, surface water and groundwater samples collected during monitoring events are being analyzed for Appendix IX volatile organic compounds (VOCs).



#### 2.0 FIELD ACTIVITIES

Field activities conducted during this semi-annual sampling event include sample collection from 18 monitoring wells and 6 surface water monitoring locations. Groundwater and surface water samples were analyzed for Appendix IX VOC's.

#### 2.1 GROUNDWATER SAMPLE COLLECTION

On November 18, 2008 Eco-Systems personnel collected groundwater levels from the 18 monitoring wells to be sampled during the monitoring event and from the 15 piezometers at the site. A summary of the water level measurements obtained on November 18, 2008 is included as Table 1. A potentiometric surface map has been prepared from the November 18, 2008 groundwater elevations and is included as Figure 3.

Groundwater sample collection was conducted November 18 through 20, 2008. Prior to collecting groundwater samples, the monitoring wells were purged using traditional volume based methods. Purging was conducted until temperature, pH, specific conductance, and turbidity had stabilized. The water quality field parameters were measured with calibrated instruments and recorded in the field book along with the cumulative amount of water evacuated and time of batch parameter testing. Groundwater collection logs are attached as Appendix A.

Once field parameters stabilized, groundwater collected for analysis was sampled by collecting water directly into new sample containers supplied by the analytical laboratories. During the collection of field replicates that were collected for quality assurance and quality control (QA/QC), alternating aliquots were placed in each replicate bottle until each bottle was filled.

In general, the order of sampling was from least impacted to most impacted, based on historical data. Tubing used during purging and sampling was either dedicated to each well or disposed of after use. Subsequent to sampling, sample containers were labeled, placed and sealed on ice and shipped to the designated offsite laboratory for analysis. Chain-of-custody documentation accompanied the sample cooler. Personnel involved in sampling used clean, disposable gloves, which were changed between each sample collection. All non-disposable sampling equipment was decontaminated as outlined in Section 2.4.

During this event, groundwater samples were collected from permanent monitoring wells MW-2 through MW-19. Groundwater samples were collected in new sample containers supplied by the analytical laboratories. Filled sample containers were placed on ice in coolers. Groundwater samples for VOC analyses were shipped via overnight courier to Test America Laboratories in Savannah, Georgia for analysis.



#### 2.2 SURFACE WATER SAMPLE COLLECTION

On November 18, 2008, six surface water samples were collected from the previously established sampling points along Green's Creek, CM-0 through CM-5. Samples were collected beginning with the most downstream location, CM-5, and proceeding upstream to each successive sampling location. Surface water samples were collected directly into new sample containers that were supplied by the analytical laboratories. The filled sample containers were labeled, packed and shipped/delivered in the same manner as groundwater samples discussed in Section 2.1.

#### 2.3 QUALITY ASSURANCE/QUALITY CONTROL

For quality assurance/quality control (QA/QC) purposes, two duplicate groundwater samples, three rinsate samples, two trip blank samples, and three matrix spike and matrix spike duplicate (MS/MSD) were collected during field sampling activities. The duplicate groundwater samples were collected in alternating aliquots that were placed in each replicate bottle until each bottle was filled. The rinsate samples were prepared by pouring deionized water over groundwater sampling tubing and collecting the rinsate into new disposable sample containers supplied by the analytical laboratory. QA/QC samples were labeled, stored and shipped in the same manner as groundwater and surface water samples. QA/QC samples were analyzed for the same constituents as groundwater and surface water samples.

#### 2.4 DECONTAMINATION

In general, groundwater sampling equipment that would contact the groundwater sample was single-use, disposable equipment. For any re-usable groundwater sampling equipment decontamination was accomplished by the following procedure:

- 1) Phosphate-free detergent wash.
- 2) Potable water rinse.
- 3) Deionized water rinse.
- 4) Isopropanol rinse.
- 5) Organic-free water rinse or air dry.

If it was necessary to store or transport decontaminated equipment, the decontaminated equipment was placed in either a new, disposable plastic bag or wrapped in aluminum foil.



#### **2.5 OTHER PROCEDURES**

Procedures for sample collection, sample containerization and packing, sample shipment, cross-contamination control, drummed material disposal, field documentation, chain-of-custody, data review, and other work items not specifically covered in this document were conducted in accordance with the <u>Environmental Investigations Standard Operating</u> <u>Procedures and Quality Assurance Manual</u> (EPA Region IV, May, 2001), (EISOPQAM)



#### 3.0 RESULTS

Groundwater and surface water samples collected from the Hercules site were analyzed for Appendix IX VOC's according to U.S. EPA Method 8260B. Laboratory analytical reports for the samples collected during this monitoring event are included in Appendix B and summarized in Table 2 and Table 3.

#### **3.1 GROUNDWATER ANALYTICAL RESULTS**

Discussion presented in this section summarizes the analytical results for groundwater samples collected from monitoring wells MW-2 through MW-19 on November  $18^{th}$ ,  $19^{th}$ , and  $20^{th}$ , 2008.

#### 3.1.1 Volatile Organic Compounds

VOC's were not detected in groundwater samples collected from wells MW-02, MW-03, MW-04, MW-07, MW-10, MW-11, and MW-16.

Analysis of the groundwater sample collected from monitoring well MW-05 detected acetone at a concentration below the TRG.

Analysis of the groundwater sample collected from monitoring well MW-06 detected acetone at a concentration below the TRG.

Analysis of the groundwater sample collected from monitoring well MW-08 detected benzene, chlorobenzene, carbon tetrachloride, chloroform, and methylene chloride at concentrations above their respective TRG's.

Analysis of the groundwater sample collected from monitoring well MW-09 detected acetone and benzene at concentrations below their respective TRG's.

Analysis of the groundwater sample collected from monitoring well MW-12 detected acetone at a concentration below the TRG.

Analysis of the groundwater sample collected from monitoring well MW-13 detected benzene, dichlorobromomethane, carbon tetrachloride, chloroform, and 1,2-dichloroethane at concentrations above their respective TRG's. Dichlorobromomethane and 1,2-dichloroethane have not been previously detected in samples collected from MW-13.

Analysis of the groundwater sample collected from monitoring well MW-14 detected acetone at a concentration below the TRG.



Analysis of the groundwater sample collected from monitoring well MW-15 detected acetone at a concentration above the TRG.

Analysis of the groundwater sample collected from monitoring well MW-17 detected benzene, carbon tetrachloride, chloroform, and chlorobenzene at concentrations above their respective TRG's.

Analysis of the groundwater sample collected from monitoring well MW-18 detected chlorobenzene and 1,1-dichloroethene at concentrations below their respective TRG's.

Analysis of the groundwater sample collected from monitoring well MW-19 detected benzene and chloroform at concentrations above their respective TRG's.

#### **3.2 SURFACE WATER ANALYTICAL RESULTS**

Discussion presented in this section summarizes the analytical results for surface water samples collected from sampling locations CM-00 through CM-05 on November 18, 2008.

#### 3.2.1 Volatile Organic Compounds

VOC's were not detected in surface water samples collected from locations CM-00, CM-01, CM-02, CM-03, CM-04, and CM-05.

#### 3.3 QA/QC SAMPLE ANALYTICAL RESULTS

Analytical reports for the QA/QC samples are included in Appendix B and summarized in Table 3.

Duplicate groundwater samples were collected from MW-04, and MW-18. Analysis of the duplicate groundwater sample collected from MW-04 and the original MW-04 indicated all constituents were below MDL.

Analysis of the duplicate groundwater sample collected from monitoring well MW-18 detected the similar concentrations of 1,1-dichloroethene and chlorobenzene. Benzene and 1,2-dichloropropane were detected in the duplicate groundwater samples collected from MW-18 only.

VOC's were not detected in the rinsate samples (RS-1, RS-2, and RS-3)

VOC's were not detected in either of the trip blanks.



Review of the analytical reports for VOC's that were submitted by Test America indicates that spike sample recoveries for the spiked volatile organic constituents in the MS and MSD samples were within the acceptable recovery ranges reported by the laboratory for each of the spiked constituents.

Test America reported that the sample vials containing the groundwater samples collected from MW-14 and MW-5 arrived with air in the headspace of the sample containers. However, since analytical data for both samples were consistent with historical results, the presence of air in the headspace does not appear to have had a material effect on the analytical data.

As reported by Test America, all method blanks were non-detect for VOC's. The laboratory QC spike sample recoveries for VOC's detected in site samples were within the limits reported by the laboratory. Analyses were conducted within the 14 day holding time. Based on the information received and reviewed, the VOC analyses were conducted under controlled conditions and the data package is acceptable for use as reported, without qualification.



#### **4.0 FINDINGS AND CONCLUSIONS**

The findings and conclusions in this section are based on data obtained during the November 2008 monitoring event.

#### 4.1 SLUDGE PITS

Groundwater monitoring in the sludge pit area is conducted using five monitoring wells. Monitoring wells MW-2 and MW-3 are located north of the sludge pits in historically up gradient positions. Monitoring wells MW-4, MW-10, and MW-11 are located south of the sludge pits in historically down gradient positions.

VOCs were not detected in samples collected from monitoring wells MW-2, MW-3, MW-4, MW-10, and MW-11. Based on current and historical analytical results, VOCs are not migrating from the sludge pits at concentrations above TRGs.

#### 4.2 GREEN'S CREEK

VOCs were not detected in samples collected from surface water monitoring locations CM-00, CM-01, CM-02, CM-03, CM-04, and CM-05 during this monitoring event. Based on the current and historical analytical results, VOCs are not migrating from the site via Green's Creek.

#### 4.3 FORMER LANDFILL

Groundwater monitoring of the former landfill area is conducted using five monitoring wells. Monitoring wells MW-8 and MW-13 are located south and east of the former landfill in historically up gradient positions. Monitoring wells MW-5, MW-6, and MW-12 are located north of the former landfill in historically down gradient positions.

In samples collected from the up gradient wells MW-8 and MW-13, concentrations of benzene, chlorobenzene (MW-8 only), carbon tetrachloride, and chloroform persist at concentrations above TRGs. Methylene chloride was detected in the November 2008 sample collected from MW-8 at concentrations above the TRG's but has not detected in the samples collected from MW-8 since August 2006. Dichlorobromomethane and 1,2-dichloroethane were detected in the November 2008 sample collected from monitoring well MW-13 at concentrations above TRGs.

Acetone was detected in the samples collected from MW-5, MW-6, and MW-12 during the November 2008 sampling event at a concentration less than the TRG. The lack of VOCs in groundwater samples at concentrations above the TRG in down gradient wells indicates that VOCs are not migrating from the landfill at concentrations above TRGs.

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#### **4.4 GROUNDWATER**

Concentrations of benzene, chlorobenzene, carbon tetrachloride, chloroform and toluene above the TRG persist in samples collected from monitoring well MW-17, which is located in a suspected source area. Concentrations of these constituents have fluctuated, but have not shown overall increase or decrease.

Discussion of monitoring wells MW-8 and MW-13, which are near the suspected source area, is included in Section 4.3.

Concentrations of benzene above the TRG have been detected in samples collected from monitoring well MW-9 for all sampling events prior to May 2008. Benzene was detected at a concentration less than the TRG in the sample collected from monitoring well MW-9 during the November 2008 sampling event.

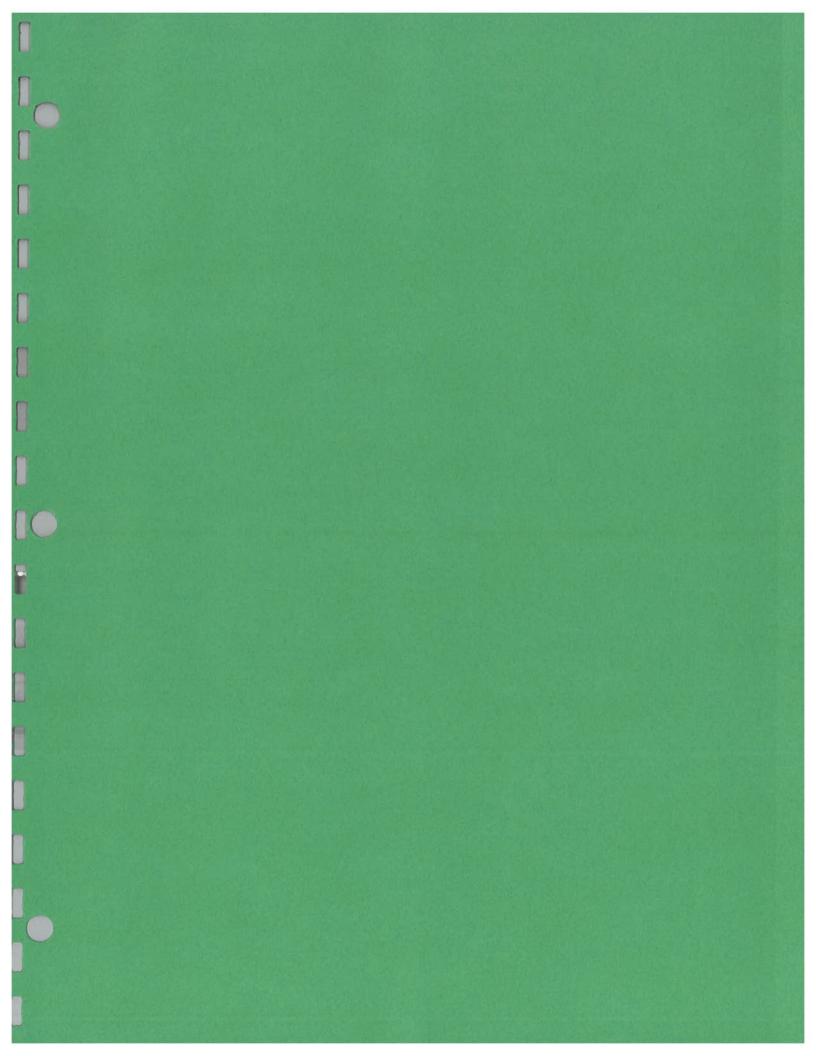
VOCs were not detected in the November 2008 groundwater sample collected from MW-16 and have not occurred in samples collected from MW-16 since November 2005. Concentrations of acetone were detected in the November 2008 groundwater samples collected from monitoring well MW-15 (above the TRG) and MW-14 (less than the TRG). Sporadic concentrations of acetone have been detected at concentrations both above and below the TRG in the groundwater samples collected from monitoring wells MW-14 and MW-15.

#### 4.5 EASTERN PLANT AREA

Monitoring wells MW-18 and MW-19, which are located east of plant buildings, were installed as part of the CAP, but potentiometric information has not indicated that these wells are part of the previously defined area of groundwater containing volatile organic constituents. Therefore, monitoring wells MW-18 and MW-19 are discussed separately.

Concentrations of benzene above the TRG persist in samples collected from monitoring well MW-19. Chloroform, which has not been previously detected in groundwater samples collected from MW-19, was detected in the November 2008 sample collected from MW-19 at a concentration above the TRG. Chlorobenzene, ethylbenzene, and toluene were detected in samples collected from monitoring well MW-19 at concentrations below the TRG during the November 2008 monitoring event.

Chlorobenzene and 1,1-dichloroethene were detected at concentrations below the TRGs in sample collected from monitoring well MW-18 during the November 2008 sampling event.





## TABLES

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## TABLE 1 SUMMARY OF GROUNDWATER ELEVATION DATA

November, 2008 Hercules, Incorporated Hattiesburg, Mississippi

	TOC ELEVATION	WATER DEPTH	GROUNDWATER
WELL NO.	(ft.) <sup>1</sup>	(ft) <sup>2</sup>	ELEVATION (ft.)
		MONITOR WELLS	
MW-1	174.12	NA <sup>3</sup>	NA
MW-2	160.07	7.79	152.28
MW-3	160.03	8.33	151.70
MW-4	159.75	11.52	148.23
MW-5	160.99	8.81	152.18
MW-6	174.05	9.89	164.16
MW-7	183.96	15.46	168.50
MW-8	179.99	15.49	164.50
MW-9	181.97	14.42	167.55
MW-10	159.88	11.79	148.09
MW-11	157.18	8.64	148.54
MW-12	162.17	9.03	153.14
MW-13	175.23	9.81	165.42
MW-14	169.23	15.18	154.05
MW-15	172.21	19.11	153.10
MW-16	175.62	16.24	159.38
MW-17	186.13	18.78	167.35
MW-18	165.31	6.90	158.41
MW-19	172.25	11.92	160.33
		F GAUGES	
SG-1	NA	NA	NA
SG-2	NA	NA	NA
SG-3	NA	NA	NA
<u>SG-4</u>	NA	NA	NA
		OMETERS	
TP-1	172.18	NA	NA
<u>TP-2</u>	171.72	12.22	159.50
TP-3	169.74	10.27	159.47
TP-4	163.64	10.22	153.42
TP-5	160.54	10.46	150.08
TP-6	158.63	9.49	149.14
TP-7	167.17	10.35	156.82
TP-8	183.79	15.54	168.25
TP-9	163.44	6.97	156.47
TP-10	179.69	15.34	164.35
TP-11	162.26	11.04	151.22
TP-12	159.95	12.02	147.93
<u>TP-13</u>	156.99	8.47	148.52
TP-14	162.59	6.38	156.21
TP-16	179.72	14.11	165.61
TP-17	182.71	17.37	165.34

NOTES:

1- Elevations are in feet relative to mean sea level.

2 - Depth to water is in feet below top of casing. Staff gauge readings are in feet above the base of the staff.

3 - Data not available.

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TABLE 2 SUMMARV OF VOC ANALYTICAL RESULTS November 2008 Hercules Incorporated, Hantesburg, Mississippi

Table 2

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11M	MIN.	WIX	WIN	MIX

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TABLE 2 SUMMARY OF VOC ANALYTICAL RESULTS Voreaber 2008 Hercules Incorporated, Hanischurg, Mississippi

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Tahle 2

TADIE 3 SUMMARY OF QA/QC SAMPLE ANALYTICAL RESULTS Hercules Incorporated Hattiesburg, Mississippi November 2008 

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							Concentra	Concentrations in µg/L	J/				
Location	ənotəsA	əuəzuəg	Bromomothane	Carbon Tetrachloride	Chlorobenzene	Chioroform	anationoldoid-1,1	Ethyldenzene	Methylene Chloride	Toluene	Теттеліогогіляті	Сһіоготейляпе	эляqотqотоldэiQ-2,1-siэ
MW-04	< <sup>1</sup> 25	< 1.0	< 1.0	< 1.0	< 1.0	< 1:0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-04 DUP	< 25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
% variation	%0	%0	%0	%0	%0	%0	%0	%0	%0	%0	%0	%0	%0
MW-18	< 25	< 1.0	< 1.0	< 1.0	23	< 1.0	1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-18 DUP	< 25	1.1	< 1.0	< 1.0	28	< 1.0	1.2	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	1.1
% variation	%0	10%	%0	%0	22%	%0	20%	%0	%0	%0	%0	%0	10%
RS-01	< 25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
RS-02	< 25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
RS-03	< 25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
TB-01	< 25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
TB-02	< 25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
1 - "<" indicates that the concentration of the analyte is less than the concentrations shown	that the conc	centration of t	the analyte i	s less than the	: concentratic	ns shown.							

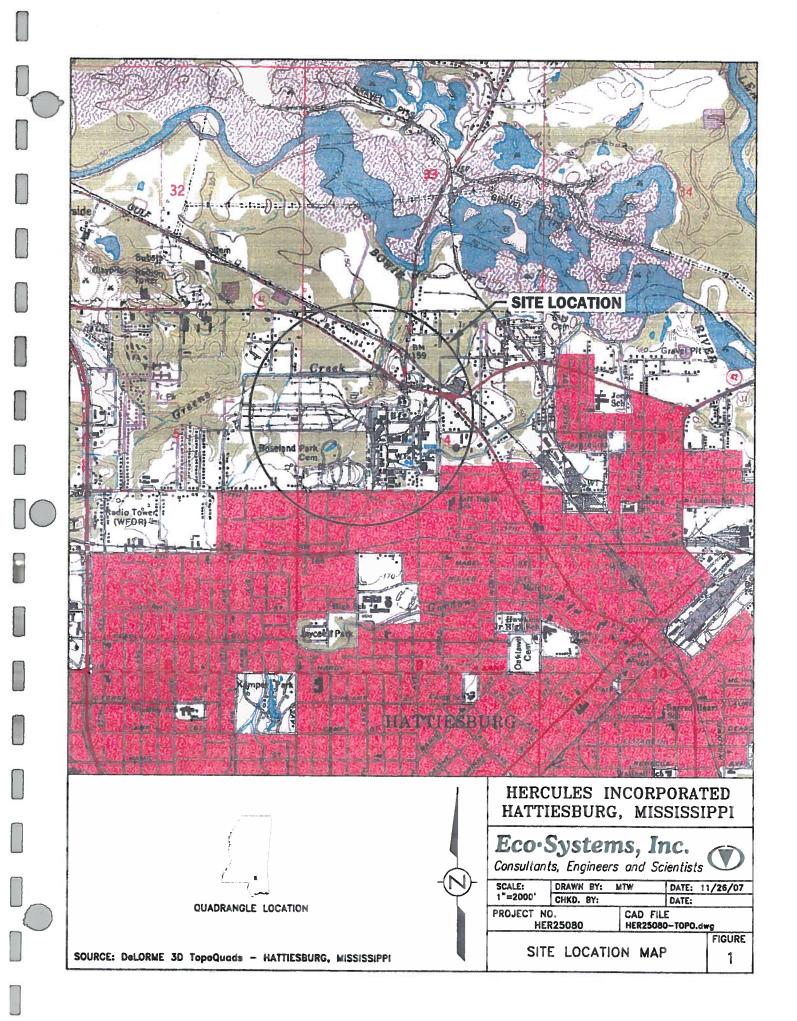
2 - ND indicates that the data was not detected





## **FIGURES**

 $[]\bigcirc$ 







### APPENDIX A GROUNDWATER COLLECTION LOGS

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## **Depth-To-Water Measurements**

Project Name Hercoles ocation Huttiesburg

roject Number

Collector(s) C. Terrell & M. Wochle

Date	Time	Well ID	DTW (ft-btoc)	TD - Previously (ft-btoc)	TD - Now (ft-btoc)	Comments
11-18.05	0907	MW-3	8,33			
11-18-08	5190	MW-2	7.79			
1-18-08	0918	TP - 6	9.49			Piłz.
1-18-08	7500	MW- 10	11.79			
1.18-08	0928	TP - 12	12.02			
1-18-08	0937	$M\omega - 4$	11.52			
1-18-08	0942	mw-11	8.64			
1-18.66	0944	TP-13	8.47			
11-18.08	0956	TP-11	11-04			
11-18-08	1002	TP-7	10.35			
11-18.08	1009	TP-3	10.27			
11-18-08		TP-4	10.22			
11-18.08		TP-5	10.46			
11-16-00	1042	MW-5	8.81			
1-18-05		mw.12	9.03			
11-18.05	1050	mw-6	9.89			
11-18-08	1054	TP-9	6.97			
11-18-08	11 00	TP-14	6,38			
1-18-08	1100	MW-18	6.90			
11-18.00	1105	mw-19	11.92			
11-18.08	1110	TP-2	12.22			
11-18-05	-	TP-8	15.54			
11-18-08	1120	MW-7	15.46	1 (100000 - 1000 - 100000		
11-15.08	1126	MW-16	16.24			

#### Notes:

DTW = Depth to Water ft-btoc=feet below top of casing

TD=Total depth

## **Depth-To-Water Measurements**

**Project Name** Hercules

Hattjesburg - Acation

	bject Number											
	Collector(s)	C- Te	rrell 3 M	. Woehp		······································						
			r		F							
	Date	Time	Well ID	DTW (ft-btoc)	TD - Previously (ft-btoc)	TD - Now (ft-btoc)	Comments					
	11-18-08	1132	MW-15	19.11			InterForenco?					
	11-18-08	1140	MW-14	15.18								
	11-18-08	1146	mw-13	9,8/								
	11-18-08		TP-16	14,11								
	11-18.08	1158	MW-8	15.49								
	11-18.08	1159	TP-10	15.34			X					
	11-18-08	12-04	TP-17	17.37								
	11-18-08	1208	MW-17	18.78								
	11-12-08	1213	mw-9	14.42								
					аны ў							
UY							d)					
		-										
U												
			- 2				_					

Notes:

DTW = Depth to Water ft-btoc=feet below top of casing TD=Total depth

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Eco-Syster	ns, I	Inc.	$\bigcirc$	Ground	water	Sample			Page <u>1_</u> of <u>18</u> .
Environmental En	gineer	s and Scientists	2	Coll	ection	Log			
ct Name:	<u>H</u>	lercules HER-250	080 -00			Boring ID: Site Location:	MW Huttiesbo	3 Jrg Ms	
Start Date:	)_(	-18-08		Finish Date:	11-19-08	- 0	Depth	n-to-Water (DTW)	
Sample Technicia Purge/Sample Met	n: thod: <b>L</b>	Er Terrel	1 \$ M.L tultie Pr	Nochle			Date 11-18-08	Time 0907	DTW (ft-bto 8.33
Purge/Sample Met Well Diameter (d) Fotal Depth (TD):	-	>"					11-19-08	•	8,59 8.56
Approximate Dept h= TD - DTW [ft	th of W	-	h)						
Calculated Well V V = vol in gal; d =	olume	(V=6hd²)						· · · · · · · · · · · · · · · · · · ·	
				WELL DEVEL	OPMENT/PL	JRGING DATA			
Date/Time		Cumulative Volume (gal)	рН	Specific Conductivity (b)S/cm)	Temperature (℃)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)	Comments
11.19.58 084	14	0,0	5.17	79,9	20.0	11,0		1	
 	£9	0.5	5,14	75,0	20.3	0.45	-	_	
090	I	0.1	5.11	75.1	20.2	0,40	-		
09		2.0	5.11 4.99	73,6	20.1	0,00	-	<b>~</b>	
						· · · · · · · · · · · · · · · · · · ·			
		· · ·							
				· · · · · · · · · · · · · · · · · · ·					
			L				I		
ample Identificat	ion: 🚱	+ HER-	MWO3	-111908			1	R SAMPLE CONT	
Veather Condition	ns Duri	ng Sampling:	Clear	Calm, 40	?°	Date 11-19-08	Time	Sample Container 3- VOAs	Preservative HC1
Comments:									
Sample Technicia	n: <u>C</u>	.Terrell	Date:	11-19-08	-				
Note		t-btoc = feet be al = gallons.	low top of	casing.					
	n %	nS/cm = milliS C = degrees Ce ITU = Nephelo ng/L = milligra	elsius. ometric Tur	bidity Units.		<b>k</b>	<b>1</b> <u></u>		<b></b>
	n	V = millivolts	•						

	Eco-Systems, Environmental Enginee				_	Sample			Page <u>2</u> of <u>18</u> .		
	ect Name:	Hercules HER-25	0F0-C(		ection	LOG Boring ID: Site Location:	MW-2 HaHiest	oury, MS			
		Water Column (f ]): e (V=6hd <sup>2</sup> )	11 z p Perist	1. Woehle	<u>11-19- σε</u> μ	<u></u>	Dept1 Date 11-18.08 11-19-58 11-19-68	n-to-Water (DTW) I Time 0912 0949 1009	Measurements DTW (ft-btoc) 7, 7 9 7, 97 \$, 01		
U	WELL DEVELOPMENT/PURGING DATA										
	Date/Time	Cumulative Volume (gal)	рН	Specific Conductivity ( <b>bl</b> S/cm)	Temperature (°C)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)	Comments		
	11-19-68 0936		6.05	82.0	20.0	22	~				
	0947	0.5	5,91	52,9	20,3	4.3					
	1000	1.0	5,80		20.9	3,1		~			
	1010	1.5	5,77	-	20,9	1.6					
	1031	2.0	5.79 5.75	90,1 91,4	21,0	0,20		-			
								8			
•		4 									
			- <b>11</b>								
	Sample Identification:	HER-MW	$\frac{02 - 11}{100}$	DUD HEN	-MW02-114	08-115 GR( Date	DUNDWATE Time	R SAMPLE CONT Sample Container	AINERS Preservative		
		MER-MW	102-1119	100 1150		Date	Time	Sample Container	FIESEIValive		

	HER-MWOZ-ILIQOEMSD
Weather Conditions	During Sampling: <u>Cley</u> , <u>WNE5</u> , 40°
Comments:	Sample, matrix spike, matrix spike Dig
Sample Technician:	C, Terrell Date: 11-19-08
Notes	gal = gallons.
	mS/cm = milliSiemens per centimeter. °C = degrees Celsius.
$\bigcirc$	NTU = Nephelometric Turbidity Units. mg/L = milligrams per liter. mV = millivolts.

11-19-08 1034 VOAs Ht/

### Eco-Systems, Inc.

U

Environmental Engineers and Scientists

## **Groundwater Sample Collection Log**

Page 3 of 18

			001			_			
iect Name:	Hercule	<u>~</u>			Boring ID:	<u>MW-10</u>	<u>MW-12</u>		
ject Number:	HER-25	080-	ec - M5		Site Locatio	n: <u>Hatties</u>	bury, MS		
Start Date:									
Start Date.	11-18-08 C. Terrell		Finish Date	: 11-19-0	8	Dept	h-to-Water (DTW)	Measurements	
Sample Techniciar	1: C. Terrell	3 M.	Woehlp			Date	Time	DTW (ft-btoc)	
Purge/Sample Met	hod: <u>LF/LS</u>	Perista	Itio Pump	> well	volumes	11.18.66	0927	11.79	
Well Diameter (d):	۵		<b>.</b>			11.19.08	1107	11.99	
'Total Depth (TD):	17.1	7				11.19.00	1129	12.06	
Approximate Dept	h of Water Column (	(h)	~						
Approximate Dept (h= TD - DTW [ft	-btoc]):	17.17 .	-11.79 = 5	,30					
Calculated Well V									
(V = vol in gal; d =	well diam. in ft):	6(5.	38)0,028 =	0,90 gal	/well vol.				
$\left\{ \begin{array}{c} (V = vol in gal; d = 0 \\ \hline \end{array} \right\}$			WELL DEVEL	.OPMENT/PU	JRGING DATA		·		
<u>x</u>	Cumulative		Specific	-	Turbidity	Dissolved	Oxidation/Reduction		
Date/Time	Volume (gal)	pН	Conductivity	Temperature (°C)	(NTU)	Oxygen	Potential	Comments	
			(mS/cm)		(110)	(mg/l)	(mV)		
11-19-08/10	53 0.0	5.76	33.3	21.9	25				
	00 0,5	5.64	33.2	22.3	21	-	~		
	14 1.0	5.64	33,4	22.1	18		~		
· · · · · ·	24 1.5	5,63	33,3	22,3	10				
	29-2-0-	2107	2212	6615	12,06				
		- 10						· · · · · · · · · · · · · · · · · · ·	
	\$ 2.0	5,67	33.3	22,1	19			<u>u</u>	
	52 2,5	5.62	33,7	22.1	-19	-	<b>نکه</b>	3 W.V.	
() 12	02 3,0	5.64	33.5	22.7	20	-	-		
12 12	16 4.0	5.54	33.5	23,0	21				
12:	20 4.5							5 WY	
				1					
}		<del> </del>							
]									
			11000		· · · · · · · · · · · · · · · · · · ·				
Sample Identification	on: <u>HEN- Mi</u>	N10-1	11900				R SAMPLE CONT		
	<u> </u>				Date	Time	Sample Container	Preservative	
Weather Condition	s During Sampling:	Clear, c	alm, 50°		11-19-09	5 1221	VOAs	Hel	
					-				
Comments:			wellvolume	<u>s</u>				· · · · · · · · · · · · · · · · · · ·	
<u>۲</u>	ampled at '5	WVS,							
Sample Technician	C, Terrell	Date:	11.19.08						
Notes	: ft-btoc = feet be	low top of	casing.						
	gal = gallons.								
	mS/cm = milliS	iemens per	centimeter.		<b></b>			·····	
	°C = degrees Ce	-							
	NTU = Nephelo	metric Tur	bidity Units.						
	mg/L = milligra		-						
	mV = millivolts								

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	Eco-Systems,	Inc.		Ground	water	Sample				Page_ <b>4</b> of <u>18</u> .
	Environmental Engine	ers and Scientists	5	Coll	ection	Log				
	Cect Name:	Hercules HER-250	; 080-CC-			Boring II Site Loca		MW-1 Hattie	l sbury	
	Start Date: Sample Technician: Purge/Sample Method: Well Diameter (d):	11-18-08 <u>C. Terrell</u> <u>LF/LS Pe</u>	t m.	WOELI	1- 19 - 0	£		Date 11.18.00	n-to-Water (DTW) N Time 0942 1357	Measurements DTW (fi-btoc) 8-64 8-73
	Well Diameter (d): Total Depth (TD): Approximate Depth of (h= TD - DTW [ft-bto Calculated Well Volur	Water Column (l c]):						11-19.08	4 4	8,78
	(V = vol in gal; d = we	ll diam. in ft):								
U		1- ···		WELL DEVEL	OPMENT/PU	RGING DATA				
	Date/Time	Cumulative Volume (gal)	рН	Specific Conductivity (MS/cm)	Temperature (°C)	Turbidity (NTU)		Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)	Comments
_	11-19-00 1347	0.0	5.98	180.0	22.2	20				
	(355)	0.5	5.97	192	22,3	14		~	~	
U	1/30_3		5,95	180	22.0	9.4		<u> </u>		
	1412	+	5.93	180	22,1	6,6				
	1427	2,0	5,90	184	22.1					
$\cup$										
		1							<u> </u>	
				ā				-		
						······································				
								1		
	Sample Identification:	HER-M	W11- 1	11908					R SAMPLE CONT	
						Dat		Time	Sample Container	Preservative
	Weather Conditions D	uring Sampling:	<u>Clear, U</u>	Vind Calm,	600	11-19	06	1428	VOAL 3	Hc/
U	Comments:		···							
		C En al								
	Sample Technician:	C. Terrell	Date:	11-19-04	-					
	Notes:	ft-btoc = feet be gal = gallons.	-	_						
		°C = degrees Co NTU = Nephelo mg/L = milligra mV = millivolts	liemens per elsius. ometric Tur uns per liter	bidity Units.						

Eco-Systems, Inc.	$\odot$	Groundwater	Sample
Environmental Engineers and Scier	itists	Collection	Log

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	U			Coll	ection 1	⊿og			
Pect N	ame:	Hercule. HER-250	5			Boring ID:	MW-L		
r roject N	umber:	HER- 250	<u>580-C</u>	C - MS		Site Location:			
Stort Date	<b></b>	115.5		Finish Date: Joeh Il 2(+1'e punj	11.19.08		Dent	n-to-Water (DTW) N	
Sian Date Sample T	echnician:	A 50000	<u> </u>	) and 18	11-11-00		Date	Time	DTW (ft-btoc)
Durge/Sor	mple Method	<u>C. lefsen</u>	- WI.C	NOCh IX			11.18.06	0937	11.52
Well Diar	meter (d):	21	Perisi	une run	0	<u>.                                </u>	11-19-01	1448	11,60
Fotal Der	oth (TD):		<u>.</u>			<u> </u>		······	
-		Water Column (I	 າ)						· · · · ·
••	DTW [ft-btoo	,	-,						
	d Well Volum			2					
		ll diam. in ft):							
		-							
		r			OPMENT/PURC	JING DATA	<b>D</b> 1.4		
Dei	te/Time	Cumulative	pН	Specific Conductivity	Temperature	Turbidity	Dissolved Oxygen	Oxidation/Reduction Potential	Comments
Da	te/ Time	Volume (gal)	pri	(mS/cm)	(°C)	(NTU)	(mg/l)	(mV)	0011110110
11 50 0	1156	0.0	1 10	235	23.0	34,			<u> </u>
11-19-09	1492	0,0	6.19			1.5		_	
	1942	0,5	6.18	199.9	23.4	0,15			
	1452	1.0	618	231	23.5 23,6				
<u> </u>	1504	1.5	6,16	234		0,00	••••	-	
	1513	2.0	6.14	231	23,5	0,00			
				· · · · · ·					
<u> </u>									
)									
						·			
		1	1	L		·····	<u> </u>		
Sample Id	dentification	HER - MW	04-1119	108		GRO	DUNDWATE	R SAMPLE CONT	AINERS
Junpie I		HEL- FOO				Date	Time	Sample Container	Preservative
Weather	Conditions D	uring Sampling:	Clear,	calm, 65	6	11.19.08	1515	VOAS	HEI
		5 . 5							
Comment	ts:	Sample	+ Fie	11 duplica	11				
		- 1	-						
Sample T	echnician:	C. Terrell	Date:	11.19.08	_				
							ļ		
	Notes:	ft-btoc = feet be	low top of	casing.			ļ		
		gal = gallons.					<u> </u>	l	
		mS/cm = milliS	•	centimeter.					
		°C = degrees Ce							
		NTU = Nephelo		=					
		mg/L = milligra	-	r.					
		mV = millivolts							

Eco-Systems, Environmental Engined				lwater lection	Sample Log			Page_6of_1&
ect Name:	Hercule HER-2		) - CC - MS	 	Boring 1D: Site Location:	MW-5		
Sample Technician: Purge/Sample Method:	Water Column (1 2]): he (V=6hd <sup>2</sup> )		Finish Date: Wochlf Itic Pumpo	<u>}</u> ]-14-0	<u>15</u>	Dept Date 11-19-08	h-to-Water (DTW) / Time 1042	Measurements DTW (ft-btoc) T.T
<b></b>			WELL DEVEL	OPMENT/PI	JRGING DATA			<u> </u>
Date/Time	Cumulative Volume (gal)	рН	Specific Conductivity ( <del>m</del> S/cm)	Temperature (°C)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)	Comments
11-19-08 1358		6.66	889	22.3	20		~	
1608		6,63	818	22.2	13			
1628	1,3	6,54	897	22,1	8,9	-	~	
630	2,0	6.59	909	21,9	3,4	-	~	
$\sim$								

Sample Identification:	HER-	MW05-	111908

Weather Conditions During Sampling: Clear, Caln, 65°

Comments:

Sample Technician: C. Terrell Date: 11-19-06

Notes: ft-btoc = feet below top of casing. gal = gallons. mS/cm = milliSiemens per centimeter. °C = degrees Celsius. NTU = Nephelometric Turbidity Units. mg/L = milligrams per liter.

mV = millivolts.

GROUNDWATER SAMPLE CONTAINERS										
Date	Time	Sample Container	Preservative							
11.19.08	1639	VOAs	HC1							
			· · · · · · · · · · · · · · · · · · ·							

### Groundwater Sample Collection Log

Eco-Systems, Inc.

Environmental Engineers and Scientists

				Con	ection	LUg				
	riect Name:						Desire ID:	MW-	12	
-	ect Number:	HER-25 HER-25	5000 0	( - 446	<b></b>		Boring ID: Site Location:	Hattie		
	Creet Nulliber.	1108 - 40	- 0- 0	C - M5			Sile Location:	"la Hle	sburg	
	Start Date:	11 15 18			11 2 3 5					
Ų	Sample Technician:	11-18-08 C- Torrell	4 14	Finish Date:	11-20-08	•		Date	n-to-Water (DTW) N Time	DTW (ft-btoc)
m	Purge/Sample Method:	L- MATELL		Woenip	·.			11-18-08		9.03
	Well Diameter (d):	<u>2"</u>	er 15+a 1+	10 punp				11-20-08	1046 0823	9.32
Ψ	Total Depth (TD):	a		· · · · ·				11-20	0834	9,66
	Approximate Depth of	Water Column (	b)	· · · · · · · · · · · · · · · · · · ·				11-20	0845	9.85
	(h= TD - DTW [ft-btoo	,	,					11.20	0857	10,11
U	Calculated Well Volum							11 20	0037	
_	(V = vol in gal; d = well	• •								
	······································									
U				WELL DEVEL	OPMENT/PU	RGING D	ATA			
_		Cumulative		Specific	Temperature	Т	urbidity	Dissolved	Oxidation/Reduction	-
	Date/Time	Volume (gal)	рН	Conductivity (mS/cm)	(°C)		(NTU)	Oxygen	Potential (mV)	Comments
U								(mg/l)	(	
	11-20-08 0820	0.0	6,03	98,0	20.7		50		-	
	083/	0.5	5.83	84.9	21.5		45	1	~	
	0845	1.0	5,82	85.4	21.0		5	-	~	
	0902	1.5	5.79	82.2	21.2		6.6	~	-	
U										
	······································			-						
	$\frown$									
		· · · · · ·	<u> </u>				· ·			
			<b> </b>							<u> </u>
			<u> </u>							
			+							
									<u></u>	
	L	L								
		11-0 11				1				
	Sample Identification:	MER-MO	NIG-	112008			GRC	Time	R SAMPLE CONT. Sample Container	Preservative
	Weather Conditions Du	uring Sempling:	Alast	tal ET	•		11-20.0%	0906	VOAS	He I
	weather Conditions Dr	ning Samping.	CIEUr	1 CALP 1 3 2			11-2000	0100		////
J	Comments:						·			· · · · · · · · · · · · · · · · ·
7										
	Sample Technician:	C. Terrell	Date:	11-20-08						
			-	<u>,</u>	-					
	Notes:	ft-btoc = feet be	low top of	casing.						
		gal = gallons.	u					2		
		mS/cm = milliS	iemens per	centimeter.						
		°C = degrees Ce								
	$\frown$	NTU = Nephelo		-						
(		mg/L = milligra	-	:						
	<u> </u>	mV = millivolts	•							

Page<u>7</u>of<u>18</u>.

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	Eco-Systems,	Inc.		Ground	water	Sam	ple			Page 8 of 18				
-	Environmental Engine		5	Coll	ection	Log	-							
	Cect Name:	Hercule HER-25				C	Boring ID: Site Location:	<u>MW-4</u>	0					
	Start Date: Sample Technician: Purge/Sample Method: Well Diameter (d):	11-18-08 <u>C</u> Terrel <u>LF/LS</u> 2"	1, M.L Pensty	Finish Date: Jochl Hic punp	11-20-0	1		Depth Date 11-15 65 11-20-65	n-to-Water (DTW) N Time 10 5 0 09 28	Neasurements DTW (ft-btoc) 9,89 10-29				
	Total Depth ('TD):													
				WELL DEVEL	OPMENT/PU	RGING D	ATA							
	Date/Time	Cumulative Volume (gal)	рН	Specific Conductivity (mS/cm)	Temperature (°C)	Tr (	urbidity NTU)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)	Comments				
0	11-20-09 0915		5.90	154.1	23.6	0	60		1					
	0938 0949	1.0	5,80	159,\$ 161,4	24.2	0	.00							
							······							
	ρ		 											
					10 									
U					. (ð 12			+						
	L	L	<u> </u>	· · · · · · · · · · · · · · · · · · ·			······							
	Sample Identification:	HER-M	W06~	112000			GR Date	OUNDWATE Time	R SAMPLE CONT	Preservative				
	Weather Conditions D	ouring Sampling:	C lear	calm, 65			11.20.08	0953	VOAS	HC/				
	Comments:	Sample	+ Ring	ate/EQUIPM	ENT BUN	k								
	Sample Technician:	C. Tersel	_ Date:	11-20.08	-									
	Notes:	ft-btoc = feet b gal = gallons.	-	-										
](		gal = gallons. DS/cm = millis °C = degrees C NTU = Nephel mg/L = milligra mV = millivolt	elsius. ometric Tu ams per lite	rbidity Units.										

Eco-Systems,	Inc.	$\bigcirc$
Environmental Enginee	rs and Sc	ientists

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## Groundwater Sample Collection Log

Page <u>9</u> of <u>18</u>
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					U	_				
ject Name:	Hercule	5			Boring ID:	MW-18 Hattle				
ect Number:	Hercule HER-2	5050-	CC-M5		Site Location:	Hattle	sbury	<u></u>		
<u> </u>				<u> </u>	· · · · · · · · · · · · · · · · · · ·					
Start Date:	11-18-08		Finish Date:	: 11-20-0	<del>4</del>		-to-Water (DTW) N			
Start Date: Sample Technician: Purge/Sample Method	C. Terre	1 3 1	1. Woehl	0	<u>_</u>	Date	Time	DTW (ft-btoc		
	: LF/Ls	Peristal	tie Pump			11-18-08	1100	6.90		
Well Diameter (d):	20					11-20-05	1014	6.92		
Total Depth (TD):						11-20-00	1026	6.95		
Approximate Depth o		h)								
(h=TD - DTW [ft-bto										
Calculated Well Volu										
(V = vol in gal; d = w	ell diam. in it):									
				OPMENT/PUR	GING DATA					
	Cumulative		Specific	Temperature	Turbidity	Dissolved	Oxidation/Reduction	Commonto		
Date/Time	Volume (gal)	pН	Conductivity (mS/cm)	(°C)	(NTU)	Oxygen (mg/l)	Potential (mV)	Comments		
						(mg/1)				
11-20-08 1005		6.34	699	25.4	4.1			· · · · · · · · · · · · · · · · · · ·		
10]3		6.37	700	25.7	0-000		<b></b>			
022		6.30	689	25,5	0,000		-			
103'	1.5	6.32	698	25,8	0,000					
	1	1								
		1		<u>                                      </u>						
	-			+						
				+ +						
				++						
		-		+						
	ILCA MAR		20001		GP		R SAMPLE CONT	AINERS		
Sample Identification	- 1/2 R - 1- 16	$\frac{1}{2}$	2 000		Date	Time	Sample Container	Preservative		
Weather Conditions I	Vuring Sampling	Clark	- 6) 6141	AL (A 70 G			VOAS	HC/		
Weather Conditions I	ouning Sampring.	Creq	$, \omega \omega \omega$	0 10, 10	11. 20 00	+ * 2.4	<u>v - : .</u>			
Comments:	600010	مز بک جا	18 duplie	att						
Commonio.	<u>Sum pr</u>	7								
••••••••••••••••••••••••••••••••••••••										
Sample Technician:	CETPETHI	Date:	11-20-0	8						
	<u></u>			-						
Notes:	ft-btoc = feet b	elow top of	casing.							
	gal = gallons. ₩S/cm = milli	Siemens per	centimeter.							
	°C = degrees C									
	NTU = Nephe	lometric Tu	rbidity Units.							
	mg/L = milligr	ams per lite	r.							
	mV = millivolt	is.								

	Eco-Systems, Environmental Engine			Ground			•			Page <u>/0</u> of <u>/8</u>			
	ct Number:	<u>Hercules</u> HER-25	080 -		ection		Boring ID: Site Location:	MW-1 Hattie	q es.burg				
	Start Date: Sample Technician: Purge/Sample Method: Well Diameter (d): Total Depth (TD):	11. 18.08 C. Tprrell L F/LS 9 2"	\$ M.V Peristal	Finish Date: Juchly Hiz Pump	11.20.00			Deptl Date 11.18.66 11.20.66	h-to-Water (DTW) ! Time 1 / 0 ら しして	Measurements DTW (ft-btoc) 11.92 11.65			
	Approximate Depth of Water Column (h)												
U				WELL DEVEL	OPMENT/PL	JRGING D	ATA						
	Date/Time	Cumulative Volume (gal)	рН	Specific Conductivity ( <b>M</b> S/cm)	Temperature (°C)	T	urbidity NTU)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)	Comments			
100	11-20.08 1056	0,0	6.40	400	25.9		,5	-	-				
	11/0	0.5	6,38	391	26.2	ð	<u>,00</u>		~				
U	1125	1.0	6,36	395	26,1	0	.00	<u>ب</u> ن	-				
	2. <sup>20</sup>												
U		-											
	A												
	6												
U													
						· <u>·</u> · · · · · · · · · · · ·							
	£.			\$1 		<u></u>							
				······.									
U													
					I			L	22				
	Sample Identification:	HER-MW	19-119	008		ſ	GRO	UNDWATE	R SAMPLE CONT	AINERS			
U	-						Date	Time	Sample Container	Preservative			
_	Weather Conditions Du	iring Sampling:	Clear,	W WAW 10	0_70°	[	11.20.05	1129	VOAS	401			
	<u></u>							/					
	Comments:			52 -		ļ							
							·						
	a 1 m t : :	C. Terrel		11 and of									
	Sample Technician:		Date:	11.20.08									
	Notes:	ft-btoc = feet bel	ow top of	asina				· · · · · · · · · · · · · · · · · · ·					
	110105.		-	casing.									
		gal = gallons. mS/cm = miltiSi	emens per	centimeter.		L		I	<u> </u>				
		°C = degrees Ce	-	- 10									
		NTU = Nephelo		bidity Units.									
		mg/L = milligram	ns per liter	22									
		mV = millivolts.											
U													

#### **Groundwater Sample** $\bigcirc$

Environmental Engineers and Scientists

Eco-Systems, Inc.

## **Collection Log**

				COL	ection	LO	J 2				
$\cup$	miect Name:	Hercule	ς				Boring ID:	MW-	7		
	ect Number:	HER - 25	5080 r	CC-MS			Site Location:	Hatti	7 esborg Ms		
		1.5 12 13									_
U	Start Date:	11-15-09	F	Finish Date	: 11.20	.06		Dept	h-to-Water (DTW) N	Aeasurements	
	Sample Technician:	C.Terre	11 \$ M	Worh lP	Date	Time	DTW (ft-btoc)	_			
	Purge/Sample Method	LF/LS	Perista	stic Fump			-	11. 15-50		15.46	_
$\cup$	Well Diameter (d):	<u>ጉ"</u>					_	11-20-00		15.54	
Start Date: $1l - 15 \cdot 05$ Finish Date: $l \cdot 20 \cdot 03$ Depth-to-Water (DTVSample Technician: $C \cdot Terrell $ M. Woehle$ DateTimePurge/Sample Method: $LF/LS$ Peristaltic Fumb $1/2 \circ 03$ Well Diameter (d): $2^{1/2}$ $1/2 \circ 03$ $1/2 \circ 03$ Total Depth (TD): $1/2 \circ 03$ $1/2 \circ 03$											
	Approximate Depth of	Water Column (	h)				_				
	(h= TD - DTW [ft-bto							e			
	Calculated Well Volum	• •									
	(V = vol in gal; d = we	ll diam. in ft):					()				_
U				WELL DEVEL	OPMENT/PI	IRGING	DATA		<u></u>		_
			Τ	Specific				Dissolved	Oxidation/Reduction		
	Date/Time	Cumulative Volume (gal)	pН	Conductivity	Temperature (°C)		Furbidity	Oxygen	Potential	Comments	
		Volume (gar)	<u>.</u>	(MS/cm)	( 0)		(NTU)	(mg/l)	(mV)		
	11-20-07 1248	0.0	4,74	91.9	26.0	ý	201	1	-		
	1303	0.5	4.76	91.3	26.0	- 14			-		
U	1318	1.0	4.70	93.0	26.1		,5				
						ť.	<b>4</b>		3		
$\cup$											-
			1								-
					<u> </u>			4			
											-
	· · · · · · · · · · · · · · · · · · ·				1					-	-
											-
							<u> </u>				-
	· · ·										
	<u> </u>	· · · · · · · · · · · · · · · · · · ·	- 93								_
						···					_
	L		l						i		_
		têr -	<u> </u>								_
U	Sample Identification:			1110 11 11 10 19	5 4460				R SAMPLE CONT		_
	HER-MW07-1 Weather Conditions Du	ving Sampling:		· ·			Date	Time	Sample Container	Preservative	-
	weather Conditions De	ning Samping.	C. lear	WIND NW IC	, /3		11.20.08	1323	VOAS	Her	_
	Comments:	Lamelt 1	Atril	Spike, mat	ril saikos	dup.				·····	-
		<u>Orthole</u> ,		Strefter	14 7/110	~ <i>/</i> /					-
											-
	Sample Technician:	C. Terrell	Date:	11.20.08							1
			-		•						٦
		ft-btoc = feet be		casing.							1
U		gal = gallons.	<b>&gt;</b>								
		mS/cm = milliSi	iemens per	centimeter.							
		°C = degrees Ce									
U,	$\frown$	NTU = Nephelo									
(		mg/L = milligram	-								
	The C	mV = millivolts									

Page<u>11</u>of<u>18</u>

U	Eco-Systems, Environmental Engine			24		Sample			Page/2of				
	Dect Name:	Hercul HER -	25080	- <u>cc</u> -ms	ection	Boring ID: Site Location:	MW- Hattie	16 sburp MS					
	Start Date: Sample Technician: Purge/Sample Method: Well Diameter (d):	11-18-08 C. Tersel LF/LSC	, M.L. Perist	Finish Date: Jochf altic Pont	11.20.08	τ		h-to-Water (DTW) Time 1/26	Measurements DTW (ft-btoc) 16.24				
	1402	16.20											
0	(h= TD - DTW [ft-btoc]):												
	Date/Time	Cumulative Volume (gal)	рН	Specific Conductivity (mS/cm)	Temperature (°C)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)	Comments				
	11.20.08 1347 1358 1412	0.0	6,40 6,29 6,22	806 788 789	25,4 25,5 25,6	<u>33</u> 0.00 0.80	۲ <sup>۱</sup>	~					
	0												
	Sample Identification:	HER . MI	<u> 316 - 11</u>	2008		GRO Date	UNDWATE Time	R SAMPLE CONT Sample Container	AINERS Preservative				
	Weather Conditions Du Comments:	ring Sampling: *	Ρζ, ω	WNW 10 ,	75°	11-20-08	1415	VOAs	HC1				
	Sample Technician:	C.Tesrell	Date:	11-20-08									
		ft-btoc = feet bel gal = gallons.cr	Ū.										
		S/cm = milliSi C = degrees Ce		centimeter.									

.

NTU = Nephelometric Turbidity Units.

mg/L = milligrams per liter.

mV = millivolts.

Eco-Systems, Inc.	
Environmental Engineers and Scient	ists

## Groundwater Sample Collection Log

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Page or

	ect Name:	Hercules HER-25	080 - C	С-М5			Boring ID: Site Location:	_ <u>MW.15</u> Ho	attiesburg M.	5	
					11-24-4	4		,			
	Start Date:	11-18-08	1 1 .	Finish Date	: 11-20-0				n-to-Water (DTW) M		
	Sample Technician: Purge/Sample Method	C. Terrell	<u>3</u> M	. Wochp				Date	Time	DTW (ft-btoc)	
	Purge/Sample Method	LE/LS	Peristi	ritic Pump	0			11-18-08	1/32	19.11	
JF.	Well Diameter (d):	2″						11-20-08	1440	20,42	
	Total Depth (TD):										
	Approximate Depth o		h)								
	(h= TD - DTW [ft-bto			<u> </u>							
	Calculated Well Volu	· · ·								<u> </u>	
7	(V = vol in gal; d = w	ell diam. in ft):									
J				WELL DEVEI	OPMENT/PU	RGING D	ATA			· · · · · · · · · · · · · · · · · · ·	
	······		1	Specific				Dissolved	Oxidation/Reduction		
	Date/Time	Cumulative Volume (gal)	pН	Conductivity (mS/cm)	Temperature (°C)		urbidity NTU)	Oxygen (mg/l)	Potential (mV)	Comments	
1	112 01/12-	00	120		250						
8	11-20-08 1427		636	802	25.8		5.8	<u> </u>			
	1438	0.5	6.37	809	25.7		1.1	<u> </u>	*		
J	1452	1.5	6.38	818	23.6	a	.6	-	-		
]					1			-			
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					┨─────┤─						
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410.) 											
			·		·*				<u>I</u>		
	Sample Identification:	HED - M	1115	112ADA		1 I	GRO	UNDWATE	R SAMPLE CONT	AINERS	
	oumpre reentimention.		w <u>v</u> 5 0	1 2000			Date	Time	Sample Container	Preservative	
	Weather Conditions D	uring Sampling	<u>A</u> 1		10 76°	ŀ	11-20.05	1455	VºAs	Hc/	
	Weather Conditions D	aring Samping.	Llear,	P WNN	10, 15		11-20.00	14.55	V - 73	1107	
	Commonto					ŀ					
	Comments:	<u> </u>				ŀ					
							<u> </u>				
	Sample Technician:	<u></u>	Date:	·····	_						
						ļ					
	Notes:	ft-btoc = feet be				l					
		gal = gallons. mS/cm = millis	Ð				· · · · · · · · · · · · · · · · · · ·				
		-mS/cm = milliSi	iemens per (	centimeter.		-					
		°C = degrees Ce									
	-	NTU = Nephelo		oidity Units.							
(		mg/L = milligra		-							
1		mV = millivolts	-								

_	Eco-Systems, Environmental Engine	, Inc. eers and Scientist			lwater lection	Sample			Page <u>14</u> of <u>15</u>		
	Project Name:	Hercule	4	001		0	Mul	- 14			
	ect Number:	HER-2	5080-	CC-MS		Boring ID: Site Location:	MW-14 Hattiesburg M3				
	<u> </u>										
	Start Date: Sample Technician: Purge/Sample Method:	11-18-0	8	Finish Date	<u>,                                     </u>	Dept	h-to-Water (DTW)	Measurements			
_	Sample Technician:	C. Terre	<u>u z p</u>	.Woehl	<u> </u>		Date	Time	DTW (ft-btoc)		
	Well Diameter (d):	LEILS	Perist	alte pum	P		11-18.00		15.18		
U	Total Depth (TD):	- <b>Ø</b>					11-20-08		13,97		
	Approximate Depth of		h)			·	11 20 00	//			
	(h= TD - DTW [ft-btoo			· · · · · · · · · · · · · · · · · · ·		·····					
	Calculated Well Volum (V = vol in gal; $d = well$										
	(v – voi in gai, u – we										
				WELL DEVEL	OPMENT/PUR	GING DATA					
	Date/Time	Cumulative	- U	Specific	Temperature	Turbidity	Dissolved	Oxidation/Reduction			
	Daterrine	Volume (gal)	рН	Conductivity (mS/cm)	(°C)	(NTU)	Oxygen (mg/l)	Potential (mV)	Comments		
	11-20-08 1505	0.0	6.44	691	24.8	21	(g.) 				
	1513 MU 8	0,5	6.42	695	24.7	12		~			
	1525	1.0	6,44	694	24.5	4.0	-	-			
	·										
		······································									
						·					
	Sample Identification:	HER-MWI	4-112	008		GRO	UNDWATE	R SAMPLE CONT	AINERS		
	Waathar Canditions Du	-i 01'	. (			Date		Sample Container	Preservative		
	Weather Conditions Du	ring Sampling:	<u>Clear</u> , I	Und WNW	10, 70-	11-20-08	1529	VOAs	Hel		
	Comments:										
-	-										
				<del></del>							
	Sample Technician:	····	Date: _								
	Notes:	ft-btoc = feet held	ow top of a	asino			·				
	Notes: ft-btoc = feet below top of casing. gal = gallons.										
ت	1	mS/cm = milliSie	emens per c	æntimeter.		••••••••••••••••••••••••••••••••••••••	Ļ	L			
٦		°C = degrees Cel									
J		NTU = Nephelor mg/L = milligram		idity Units.							
) [		mV = millivolts.	is per mer.								

Eco-Systems,	Inc.	$\bigcirc$	Grou
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#### Environmental Engineers and Scientists

## ndwater Sample **Collection Log**

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						8			
	Ject Name:	Hercules				Boring ID:	MW)-	13	
	ect Number:	HER. 2	5080-	CC. MS		Site Location:	+10 H.	13 esburg M:	5
	<u> </u>						<u> </u>	es NUT J	
	Start Date:	11-18-08		Finish Date	11-20-09	Ŧ	Denti	n-to-Water (DTW)	Megguremonto
	Sample Technician	: C. Terrei	Itm	1.) pelale	11 40 0		Date	Time	DTW (ft-btoc)
	Purge/Sample Met	hod: $LE/LS$	Prich	Woehle altic fun	d)		11-18-00	1146	9,81
	Well Diameter (d):	$\frac{1}{2''}$			·	2	11.20.08	1552	9,84
	Total Depth (TD):				· · · · · · · · · · · · · · · · · · ·		11.20-05	1604	9.82
	• • •	h of Water Column (	 ′h)				11-20-0	1607	7.02
	(h= TD - DTW [ft-		,				·		
	Calculated Well Vo								
	(V = vol in gal; d =								
	<b></b>								
				WELL DEVE	LOPMENT/PUP	RGING DATA			
	Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (b/S/cm)	Temperature (°C)	Turbidity (NTU)	Dissolved Oxygen	Oxidation/Reduction Potential	Comments
	11		- 15				(mg/l)		
_	11-20-06 150		5.68	216	25.6	0.00	-		
	15		5.96	294	25.6	7.5	~~	~~	
	16		6.10	345	25.5	3.5	-	-	
	16	16 1.5	6.08	362	25,4	1.5	-	-	
	16	16 2.0	6.12	383	25.4	0.85	-	-	
1						<b>v</b>			
			1		<u> </u>				
	5				1				
J		· · · · · · · · · · · · · · · · · · ·			<u> </u>	·			
					┇			- 10	
	ļ				<u> </u>				
	Sample Identification	m: HER-N	yw13	3-11200	18	GRO	UNDWATE	R SAMPLE CONT.	AINERS
_						Date		Sample Container	Preservative
	Weather Conditions	During Sampling:	<u>Clear</u>	c, wind WA	UW (0, 70°	11-20-08	1629	VOAS	HCL
-									
	Comments:								
									2
	Sample Technician:	<u> </u>	Date:						
						2			
	Notes		low top of a	casing.					
		gal = gallons.	r0						
		gal = gallons.	iemens per	centimeter.					
		°C = degrees Ce	lsius.						
3	$\frown$	NTU = Nephelo		•					
(		mg/L = milligram	-						
ר		mV = millivolts.							

Groundwater	Sample
Collection	Τωσ

Eco-Systems, Inc.

Environmental Engineers and Scientists

			Con	ection	LUg			
ect Name:	Hercules				Boring ID:	MW-9		
ect Number:	HER-250	580-C	C-M5		Site Location:		tjesburg	MS
Start Date:	11-18.08		Finish Date:	11-21-08		Deptl	n-to-Water (DTW) N	
Sample Technician:	C. Terrell	3 M.	Woehk			Date	Time	DTW (ft-btoc)
Purge/Sample Method:	LF/LS	Parista	Itic punp			11-18-08	1213	14.42
( )	2"					11-2108	0838	13.60
Total Depth (TD):						11-21-08	0849	13,59
Approximate Depth of		h)						
(h= TD - DTW [ft-btoo								<u> </u>
Calculated Well Volum (V = vol in gal; d = well	• •							·····
							L	·····
				OPMENT/PUR	GING DATA	····		
D . 171	Cumulative		Specific	Temperature	Turbidity	Dissolved	Oxidation/Reduction Potential	Comments
Date/Time	Volume (gal)	pН	Conductivity (mS/cm)	(°C)	(NTU)	Oxygen (mg/l)	(mV)	Comments
RI 21 S SUI	0,0	1. 2/2		214	90		<u> </u>	
11.21.08 0824		6.26	532 535	21,4	1.00			
0835	0.5	6.18	414	22.5	0.75	-	-	
9847	1.0	6.04			0.5			. <u></u> .
0857		5,99	380	22,7				
0907	2.0	5,94	383	227	<u> </u>			
				<u> </u>				
		0						
	-							
				+		<u> </u>		
	· · · · · · · · · · · · · · · · · · ·							·
	]							
Sample Identification:	HER-N	W09-	112108			T	R SAMPLE CONT Sample Container	AINERS Preservative
		- 1		0.2.2. 1/2°	Date	Time	VoA s	Hc1
Weather Conditions D	uring Sampling:	<u>Clean</u>	Wind N.I	0-20, 40	11-21-08	10400	00113	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Comments:				· · ·				
Commonis.								
	· · · · · · · · · · · · · · · · · · ·							
Sample Technician:		Date:		_			U.	
		-		_				
Notes:	ft-btoc = feet be	-	casing.					
	gal = gallons.					<u> </u>		
	⊶mS/cm = milliS	iemens per	centimeter.					
	$^{\circ}C = degrees Co$		1 · J·, · · ·					
$\frown$	NTU = Nephele							
	mg/L = milligram MV = millivolts	-	г.					
	m v – minivolts							

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	Eco-Systems, Environmental Enginee					Sample			Page <u>17</u> of <u>18</u>
	ect Name:	Hercoles HER-250	5 080 - C		ection	Boring ID: Site Location:	MW-8 Hutje	sburg MJ	
	Purge/Sample Method: Well Diameter (d): Total Depth (TD): Approximate Depth of V (h= TD - DTW [ft-btoc] Calculated Well Volume	C. Terrell 2'' 2'' Water Column (h ]): e (V=6hd <sup>2</sup> )	3 M. S Per	Woehe		Б	Deptil Date 11-16-06 11-21-06 11-21-08	n-to-Water (DTW) N Time 1158 0931 09449	Measurements DTW (ft-btoc) 15.44 15.78 15.78
	· · · · · · · · · · · · · · · · · · ·						L	·····	
	Date/Fime	Cumulative Volume (gal)	рН	Specific Conductivity (mS/cm)	Temperature (°C)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)	Comments
	11-21-03 0920	0,0	6.37	707	225	55	-		
	0930	0.5		701	21.7	45	-	-	
						11	-	-	
	0955	1.5	6.2	685	23.1	7.5	×	-	
						······································			
	$\square$								
	F								
-					<u> </u>				
7									
				· · · · · · · · · · · · · · · · · · ·					
								L	····
	Sample Identification:	HER-MW	112	2108		GR		ER SAMPLE CONT	AINERS
ر	Sample Idontification. <u>HCK 14000 110100</u>					Date	Time	Sample Container	Preservative
	Weather Conditions Du	ring Sampling:	Clear.	Wind N 15	<u>, 40°</u>	11-21-0E	0957	VOAS	Hel
			<del>۱</del>				· · · ·		
	Comments:						<b> </b>		
							<u> </u>		
	Sample Technician		Data						·
	Liet Name:       Hercoles       Boring ID: $M \omega - 8$ Site Location: $H = R - 25080 - 2C - M3$ Boring ID: $M \omega - 8$ Star Date: $11 - 15 \cdot 64$ Finish Date: $1/ 2 / 65$ Sample Technician:       C. $\neg 4x_{CC}ell \rightarrow M$ , $Woch P$ Durp         Durge Sample Method: $24'$ Depth-to-Water (DTW) Method P         Approximate Depth of Water Column (h)       Period P Point       Durp         (m = D - DTW (heboc)):       Calculated Well Volume (V=6hd <sup>2</sup> )       Well DevelopMent/PURGING DATA         Date/Time       Cumulative       PH       Specific       Turbidity       Dissolved       Oxygen         (m = D - DTW (Volume (gal))       PH       Conductivity       Temperature       Turbidity       Oxygen       Oxygen       Oxidation/Reductival         (m = D - DTW (Volume (gal))       PH       Conductivity       Temperature       Turbidity       Oxygen       Oxygen       Oxygen       Oxidation/Reductival         (m = D - DTW (Volume (gal))       PH       Conductivity       Temperature       Turbidity       Oxygen       Oxygen       Oxygen       Oxygen       Oxidation/Reductival         (h = L - D - 0/955 1.5 G + 21 - 0.8 (G +								
								<u> </u>	

ft-btoc = feet below top of casing. Notes: gal = gallons. wicro mS/cm = milliSiemens per centimeter.

°C = degrees Celsius.

NTU = Nephelometric Turbidity Units.

mg/L = milligrams per liter.

mV = millivolts.

#### **Groundwater Sample** $\bigcirc$ **Collection Log**

Eco-Systems, Inc.

Environmental Engineers and Scientists

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	Project Name:	Hercule	5	_CC - M5		Boring ID:	Mw-	17	
_	ect Number:	HGKZ	5000	-cc-M3	···	Site Location:	·		
		11 15 1			a	/			
U	Start Date:	11-18-0		Finish Date:	11-20-0	<u> </u>		1-to-Water (DTW)	
	Sample Technician:	C Terrell	- B M.1	Nochle			Date	Time	DTW (ft-btoc)
	Purge/Sample Method	: LF/LS Pe	istaltic	Pump			11-18-08	1208	18.78
	Well Diameter (d):	2"					11-21-00	1021	18,80
	Total Depth (TD):								
	Approximate Depth of	,	h)						
	(h=TD - DTW [ft-bto	oc]):							
	Calculated Well Volum	me (V=6hd²)							
	(V = vol in gal; d = we	ell diam. in ft):					-		
				WELL DEVEL	OPMENT/PU	JRGING DATA			
		Cumulative		Specific	_	Truck die	Dissolved	Oxidation/Reduction	
٦	Date/Time	Volume (gal)	pН	Conductivity	Temperature (°C)	Turbidity (NTU)	Oxygen	Potential	Comments
5		(gui)		(mS/cm)		(((10)	(mg/l)	(mV)	
_	11.20.08 1012	0,0	6,29	817	23.5	OVER FRAge	5	/	Very Turbil.
	1019	0,5	6.25	820	23,6	13	-		Clearing
8	1029		6.22	830	23.8	10			
)		1.0		835		8,25			
_	1039	1.2	6.21	255	23,8	0,0)			
1									
	5	20							
				· · · · · · · · · · · · · · · · · · ·			-		
m)						·	+		· · · · · · · · · · · · · · · · · · ·
	• · · · · · · · · · · · · · · · · · · ·								
						· · · · · · · · · · · · · · · · · · ·			
			L	L	<u></u>				······································
	Sample Identification:	HED - MIN	17-117	108				D SAMDLE CONT	ANIEDS
	sample identification.					Date	Time	R SAMPLE CONT Sample Container	Preservative
	Weather Conditions D	uring Samaline	<u> </u>	2. A	1150	11-21-08		VOA3	Fieservative
7	Weather Conditions D					11 21-08	1040	VVNS	//2 (
	Commonta	1 1-11 1		pesticide od					
	Comments:	well has :	STrony ;	pesticide ou	05				
T									
	Sample Technician:	<u></u>	Date:						
_		0.1.							
	Notes:	ft-btoc = feet be	low top of	casing.					
5		gal = gallons.							
		mS/cm = milliS	-	centimeter.					
)		°C = degrees Ce							
}	~	NTU = Nephelo	metric Tur	bidity Units.					
- (		mg/L = milligra	ms per liter	2					
		mV = millivolts	•						
-									